Dear Readers,

Bamboo the Game-changer: Some success stories from North-East India

Birsa, a bamboo species, has been used by the indigenous tribes of North-East India for centuries due to its versatility and sustainability. However, it is only recently that the Indian government has started recognizing the potential of bamboo in various fields, leading to increased production and usage.

In 2018, the government launched the Bamboo Mission, which aimed to boost the bamboo industry by providing financial support, training, and technology transfer. This mission has led to a significant increase in bamboo cultivation and production, as well as the development of new products and applications.

Some of the success stories include:

1. **Bamboo furniture**: Bamboo furniture is becoming increasingly popular in India due to its durability and natural aesthetics. Several companies have started producing high-quality bamboo furniture, which is both eco-friendly and stylish.

2. **Bamboo construction**: Bamboo is being used as an alternative building material, especially in rural areas where traditional construction techniques are being replaced by modern methods. This has led to the development of low-cost and sustainable housing solutions.

3. **Bamboo biocomposites**: Researchers are exploring the potential of bamboo in the production of biocomposites, which are used in various sectors such as automotive, aerospace, and construction. This has opened up new avenues for the bamboo industry.

4. **Bamboo tourism**: With the rise in eco-tourism, bamboo has become a popular attraction in several places in India. This has led to the development of bamboo-based tourism initiatives, which are both sustainable and economically viable.

The bamboo industry in India is expected to grow significantly in the coming years, driven by the government's initiatives and the increasing demand for sustainable and eco-friendly products.

"We are committed to harnessing the power of bamboo to drive innovation and growth, and we look forward to seeing more success stories emerge in the future," said Dr. Ramachandra, Director of the Bamboo Research Institute.

For more information on the Bamboo Mission and other initiatives, please visit [BambooMission.gov.in](http://BambooMission.gov.in).
Bamboo, a perennial woody grass is one of the fastest growing plants on Planet Earth. Maturing in about 4 years, Bamboo can produce annual yields of 3 to 6 tonnes of culms which in most counts are as good as timber. However, in order to pit Bamboo as a viable wood substitute, research efforts in India dated back to mid-fifties which were inhibited by the high production cost at that time. With renewed R&D innovations by Scientists of IPIRTI in subsequent period, a factory for producing Bamboo Mat Board (BMB) was established at Angamaly, Kerala in 1985. In the recent time more industries have come up in North Eastern States of Tripura, Meghalaya, Assam, Mizoram and Nagaland producing BMB, Bamboo Laminates, Bamboo Scrimbers etc.

The high-end products out of Bamboo detailed above are not only eco-friendly but also cost-effective, easy to adopt, durable, high-in-finish and are sustainable in the long run. Before embarking large scale industrial productions, the primary processing of bamboo at the harvest site is a must which meets the immediate monetary requirements of rural community from initial value additions. Primary processing not only includes cross cutting, knot removal, strip making, sliver making, mat-weaving, round stick making but also involves seasoning and preservative treatments. Once bamboo mats, strips, round sticks etc. are produced, further industrial processing with the use of resins/glues, temperature-pressure treatments, drying, finishing etc. transforms Bamboo into high value timber substitutes such as BMB, BMVC, BMCS, BMRC, Bamboo Laminates (Flooring Tiles & Furnitures), Bamboo Blinds, Bamboo Particle Boards, Bamboo Medium Density Fibre (MDF) Boards etc. On a commercial scale, these products can cater to the growing markets of India and rest of the globe and have the potential to play a stellar role of game-changer for the challenged and backward economy of Bamboo-rich areas - especially the North East Region (NER) of India.

Inspite of huge bamboo resources and largest bamboo area of 11.4 million hectares, domestic production in India is only USD 4.5 Billion, which is far behind that of China’s domestic market of 30 Billion USD with only 6 million hectares of bamboo area. Bamboo processing technologies developed by IPIRTI for high-end products have the potential to narrow down this gap and to contribute significantly towards economic growth, employment generation and rehabilitation of the enormous areas of degraded land. The success stories of Kerala and North Eastern Region, are mainly due to incessant efforts of scientists of IPIRTI which are worth emulating in other parts of the country.

Dr. B. N. Mohanty, IFS
Director, IPIRTI
Panel industry is growing at 20-25% largely due to shift in consumer’s preference for Medium Density Fibre board (MDF). The demand for MDF in country is 1600-1800 cbm per day. Since wood raw material is becoming scarce, there is a need to source raw material from other natural material. In India huge quantity of agricultural residue is generated every year. Use of agro waste would replace wood in MDF manufacture and thus save valuable trees in forest on outside. On the otherside in the absence of assured returns, farmers find burning is an economic way of managing the agro waste. Burning of straw emits gases like carbon dioxide, methane, carbon monoxide, nitrogen oxide, sulphur oxide which adversely affect human health as well as the environment. Hence an attempt to evaluate the suitability of Agricultural waste such as wheat straw for the manufacture of MDF was taken up by Mrs. Mamatha B.S, Scientist and her team at IPIRTI, Bengaluru.

Wheat straw contains 4-6 percentage of Silica. The percentage of silica varies depending on the source of wheat grown. The chemical and physical characteristics of alkali treated and untreated wheat straw fibers investigations reveals that the ash and lignin content decreased as the percentage of alkali treatment increased. Refining parameters with pressure of 0.6Mpa at refining time of less than 4 minutes have been studied. MDF was manufactured using different wood adhesives such as Phenol formaldehyde, urea formaldehyde and melamine urea formaldehyde resin. The targeted density of all the boards was in the range of 850-900 kg/m³. Physical and mechanical properties were tested according to IS 12406-2003 “Specification for MDF for General Purpose”. The results showed that MDF panels can be made from Fiber derived from Wheat straw. MDF made using Melamine Urea Formaldehyde resin without any treatment meets the requirement of physical and mechanical properties of the boards as per IS: 12406 for Grade 2 and alkali treated MDF boards made using PF adhesive for Grade 1.

For more details contact: The Director, IPIRTI, Bengaluru
Industry visits

20.02.2017-26.02.2017: Dr. V.K. Upadhyay, Scientist visited Directorate General Commercial Intelligence and Statistics, Kolkata and met Dr. Amitava Saha, Director (Dissemination) for collection of import data of wood and wood products. He also visited Federation of Indian Plywood and Panel Industry, New Delhi and met Shri. Anthony Fernandes to discuss on the numbers of panel industries existed in India, status and trends of panel industries.

He visited Century Plywood Industry, Kolkata and discussed about raw material availability, production, import of wood logs and Excise duty of wood and wood products etc. with Dr. C.N. Pandey (Ex. Director, IPIRTI) and discussed about panel Industries trends with Dr. S.K. Nath (Ex. Joint Director, IPIRTI). He also visited Green Ply, Kolkata and discussed with Shri Sabyasachi Malik, Production Manager on panel industries productions, trend and raw material import and possibilities for future import of raw materials. Along with Shri. Amitava Sil, Officer-In-charge, Field Station, Kolkata he visited M/s. B.S. Progressive Pvt. Ltd., Kolkata and had discussion with Shri. Dipak Ranan Gantait, Production Manager regarding collection of data for raw materials used in their factory and about production and trained manpower situation in that area.

22.02.2017: Shri. S.C. Sahoo, Scientist IPIRTI Field Station Kolkata visited M/s. Khandelwal Saw Mill, Assam to solve the floor level problem faced by them.

24.02.2017: Shri. S.C. Sahoo, Scientist, visited M/s. ARCL, Kolkata and had discussion with Shri. S.R. Mundhra Chairman regarding submission of sponsored project on powder PF resin and fire retardant adhesive.

09.03.2017: Dr. B.N. Mohanty, IFS, Director visited State Forest Department, Meghalaya and had meeting with Dy. CEO, Megalaya Basin Development Authority and Development Commissioner at Shillong, Meghalaya and signed MoU in front of Chief Secretary, Meghalaya for setting up Bamboo CFCs in the State.

Meetings/Seminars/Conferences

04.01.2017 to 06.01.2017: Dr. Manoj K. Dubey, Joint Director, Ms. Sujatha D. and Shri. Anand Nandanwar, Scientists visited Gandhinagar and Kutch (Gandhidham) for examining feasibility of opening field station at Gujarat. They met Shri. D.K. Sharma, APCCF Gujarat; representatives of M/s. Kandla Timber Association (KTA); Shri. A.O. Sharma, CCF and Shri. A.C Patel, DCF Kutch.

10.01.2017: Dr. Manoj K. Dubey, Joint Director delivered a lecture on “Bamboo as Green Gold” during one week IFS training course on “Advances in Wood Production & Utilization” conducted by Institute of Wood Science & Technology (IWST), Bengaluru.

17.01.2017: Dr. B.N. Mohanty, IFS, Director had meeting with Shri. Ashish, Representative of M/s. IKEA regarding possible collaborations in the field of wood and panel products at IPIRTI, Bangalore.

31.01.2017: Dr. B.N. Mohanty, IFS, Director visited Odisha and had meeting with PCCF, Odisha & other officials about setting up of Bamboo Development Centres for primary processing in different villages of the State.

02.02.2017-03.02.2017: Dr. Manoj K. Dubey, Joint Director participated and delivered presentation on “Major Characteristics of wood affecting plywood production” in the National Conference on Tree Improvement Research in India: Current Trends and Future Prospects at Institute of Wood Science & Technology (IWST), Bengaluru.

03.02.2017: Shri. Amitava Sil, Officer-In-Charge, IPIRTI, Field Station Kolkata and Shri. S.C. Sahoo, Scientist, attended National Seminar on “Recent Advances on Multifunctional Materials - RA2M-2017” at Haldia Institute of Technology, Haldia, West Bengal and delivered lectures on “Building houses with Bamboo” and “Non-formaldehyde bio-adhesive for wood composites” respectively

17.02.2017: Dr. B.N. Mohanty, IFS, Director visited Odisha Forest Development Corporation (OFDC) and had meeting with Managing Director & other officials and discussed about possible collaboration for Panel Development out of Plantation timbers including Bamboo.

23.02.2017-24.02.2017: Dr. Manoj K. Dubey, Joint Director participated in the conference on Bamboo for Sustainable Development and presented a paper on “Technologies for Bamboo processing for value added products” at Dr. BNCA Auditorium, Karvenagar, Pune.
28.02.2017: The 21st Meeting of the Wood and other lignocellulosic products Sectional Committee, CED 20 in joint session with its subcommittees, CED 20:1 and CED 20:6 of BIS held at IPIRTI Bengaluru under the chairmanship of Dr. B.N. Mohanty, IFS, Director. Dr. Manoj K. Dubey, Joint Director, Ms. Sujatha D., Shri. Anand Nandanwar, and Shri. Narasimha Murthy, Scientists attended the meeting as CED Committee Members.

02.03.2017: Dr. Ranjana Yadav, Scientist, Officer-In-Charge, IPIRTI Centre Mohali attended the State Level Committee meeting of wood based industry in Haryana Forest Department, Panchkula.

07.03.2017: Dr. B.N. Mohanty, IFS, Director attended the “Innovation Scholars in-residence programme” held at Rashtrapati Bhavan, New Delhi and interacted with Bamboo innovators from Nagaland and Gujarat.

08.03.2017: Dr. B.N. Mohanty, IFS, Director attended the Meeting of Hindi Salahkar/ Advisory Committee under the Chairmanship of Hon’ble Minister, MoEF&CC in Teesta Conference Hall of Indira Paryavaran Bhawan, New Delhi.

11.03.2017: Shri. S.C. Sahoo, Scientist, IPIRTI Field Station, Kolkata attended National Seminar on “Recent Advances on Multifunctional Materials - RA2M-2017” at Haldia Institute of Technology, Haldia, West Bengal and presented a paper entitled “A study on aluminium oxide as nano additive to enhance the rheological properties of aminoplastics resin used for manufacturing wood composites”.

11.03.2017-14.03.2017: Shri. Narasimha Murthy, Scientist participated in the National Seminar on “Bamboo Log” at Uravu Indigenous Science and Technology Centre, Wayanad, Kerala and made a presentation on “Preservative Treatment Methods and Grading of Bamboo”.

**Visit of Dignitaries**

19.01.2017: Shri. S.S. Srivastava, IFS Principal Chief Conservator of Forests (HoFF), Bhubaneswar, Odisha visited IPIRTI, Bengaluru and had discussion with Dr. B.N. Mohanty, IFS, Director for study on forest residues for preparation of ply & panel products and different training modules for capacity building of artisans & field staff.

23.01.2017: 35 Nos. of RFO Trainees from Kundal Academy of Development, Administration & Management, Maharashtra visited IPIRTI, Bengaluru. Dr. B.N. Mohanty, IFS, Director addressed the train-
ees and briefed about panel products from plantation timbers including Bamboo.

27.01.2017: Shri. S.R. Mundhra, CMD, M/s. ARCL Organics Ltd., Kolkata along with Shri. U.S. Panda, Marketing Head visited IPIRTI Field Station, Kolkata to finalize the sponsored project of PF powder resin.

23.02.2017: Shri. Prasanta Kumar Majumdar, Proprietor, M/s. Prasanti Herbal, Kolkata visited IPIRTI Field Station, Kolkata regarding setting up of Bamboo cottages at their land by using the technologies developed at IPIRTI.

25.02.2017: Shri. Chandrakant Deo and Shri. Prosenjit Ganguly, M/s. Wood Cure Enterprises visited IPIRTI Field Station, Kolkata to discuss the final report of the sponsored project titled “Modification and efficacy study of wood protector, the eco-friendly wood preservative for glue line treatment during manufacture of plywood”.

30.03.2017: Shri. Rajesh Mittal, Managing Director, M/s. Green Ply Ltd., Kolkata visited IPIRTI, Bengaluru and had meeting with Dr. B.N. Mohanty, IFS, Director & discussed about issues of Plywood Manufacturers in different parts of the country.

Exhibitions:

01.03.2017-04.03.2017: Dr. B.N. Mohanty, IFS, Director and Shri. K. Thanigai, Scientist participated in the Delhi Wood 2017 at India Expo Centre and Mart, Greater Noida, Uttar Pradesh.

06.03.2017-08.03.2017: Shri. K. Thanigai, Scientist, IPIRTI Bengaluru, Dr. Ranjana Yadav, Scientist, Officer-In-Charge, IPIRTI Centre Mohali and Shri. Ramesh Karri, STA participated in Destination North East 2017 at Chandigarh.
HIGHPOINTS

23rd All India Forest Sports Meet:

Dr. B.N. Mohanty, IFS, Director and some of the Scientists & Staff members from IPIRTI, Bangalore and IPIRTI Field Station Kolkata participated in the 23rd All India Forest Sports meet held during 07-11 January 2017 at Hyderabad, Telengana. Dr. K. Ch. Varadarajulu, Scientist was the Nodal Officer of the sports meet.

Shri. Anirban Dey, Library Assistant won the Silver Medal in Table Tennis, Men’s Singles. A felicitation function was organized to Shri. Anirban Dey for winning the Silver Medal in Table Tennis on 16.01.2017 at the Institute.

Observance of National Productivity Week

National Productivity Week from 12 – 17 February 2017 was observed at IPIRTI, Bengaluru during which a “Poster Competition 2017” on the theme “Reduce, Recycle, Reuse from waste to Profit” was also conducted on 20.02.2017 under the guidance of Dr. B.N. Mohanty, IFS, Director.

BIS Audit

BIS Renewal Audit of Mechanical and Chemical testing laboratories was held during 30-31 March 2017 at IPIRTI, Bengaluru.

Swachhata Drive

30.01.2017, 27.02.2017 and 31.03.2017: Dr. B.N. Mohanty, IFS, Director along with Scientists, Staff and Trainees of IPIRTI observed Swachhata Day by organizing Campus Cleanliness Drive inside the campus and facilities.
One Year Post-Graduate Diploma Course on Wood and Panel Products Technology:

33 trainees are undergoing the 28th Batch of one year Post Graduate Diploma Course in Wood and Panel Products Technology (WPPT).

The Kannada Learning Classes for trainees was inaugurated by Dr. B.N. Mohanty, IFS, Director on 03.01.2017 at IP-IRTI, Bangalore.

Short term vocational training courses:

09.01.17-13.01.17: A training course on “Testing of Plywood, Block Board and Flush Door” was conducted at IP-IRTI Field Station, Kolkata.

06.02.17-10.03.17: One month training course on “Plywood manufacturing technology” was conducted at IP-IRTI Field Station, Kolkata. As a part of the training course, Shri. Amitava Sil, Officer-In-Charge, IP-IRTI Field Station, Kolkata visited M/s. Century Plyboards (P) Ltd, Kolkata by accompanying trainees for demonstration on 10.03.2017.

29.03.17-31.03.17: A training course on “Resin Manufacturing” was conducted at IP-IRTI Field Station, Kolkata.

Research Reports Published

<table>
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<tr>
<th>RR.190</th>
<th>Study on the effect of Density Variation through thickness on Properties of Three Layer Particle Board</th>
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<tr>
<td>RR.191</td>
<td>Study on suitability of Melia dubia for Laminated Veneer Lumber (LVL) manufacturing</td>
</tr>
<tr>
<td>RR.192</td>
<td>Development of PUMF Resin for the Manufacture of Plywood</td>
</tr>
<tr>
<td>RR.193</td>
<td>Studies on Variation in Plantation Grown Melia dubia Including Selected Clones of Populus deltoids and its Suitability for Plywood Manufacturing</td>
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<tr>
<td>RR.194</td>
<td>Development of Bamboo Strand Lumber for Housing Application</td>
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<tr>
<td>RR.195</td>
<td>Development of Composite using Bamboo Saw Dust and Bamboo Fibers</td>
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### SHORTTERM TRAINING COURSES FOR JUN- DEC, 2017 AT BENGALURU

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Title of the Training Course</th>
<th>Duration</th>
<th>Date</th>
<th>Fees*</th>
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<tbody>
<tr>
<td>1.</td>
<td>Testing Of Flush Door And Block Board As Per IS:2202 And IS:1659</td>
<td>5 days</td>
<td>Jun 12-16</td>
<td>23000</td>
</tr>
<tr>
<td>2.</td>
<td>Plywood Manufacturing-I (Log Storage, Centering, Peeling, Clipping, Drying, Knife Grinding)</td>
<td>5 days</td>
<td>Jul 10-14</td>
<td>17250</td>
</tr>
<tr>
<td>3.</td>
<td>Plywood Manufacturing- II (Adhesives For Plywood And Plywood Manufacturing-Resin Preparation, Gluing, Hot Pressing)</td>
<td>5 days</td>
<td>Jul 17-21</td>
<td>17250</td>
</tr>
<tr>
<td>4.</td>
<td>Testing Of Plywood And Block Board As Per IS:303, IS:710, IS:1328, IS:4990 And IS:1659</td>
<td>5 days</td>
<td>Aug 07-11</td>
<td>23000</td>
</tr>
<tr>
<td>5.</td>
<td>Preliminary Bamboo Processing and Bamboo preservation</td>
<td>2 days</td>
<td>Aug 28-29</td>
<td>6900</td>
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<tr>
<td>6.</td>
<td>Bamboo Composites Technology (Mat &amp; Strip based products)</td>
<td>3 days</td>
<td>Aug 30-01</td>
<td>11500</td>
</tr>
<tr>
<td>7.</td>
<td>Low Cost Phenolic Resins Using Renewable Bio Materials As Replacement For Phenol</td>
<td>5 days</td>
<td>Sep 11-15</td>
<td>17250</td>
</tr>
<tr>
<td>8.</td>
<td>Low Formaldehyde Emission Adhesives For Plywood And Particle Board</td>
<td>5 days</td>
<td>Oct 09-13</td>
<td>17250</td>
</tr>
<tr>
<td>9.</td>
<td>Defects And Remedial Measures In Plywood Manufacture</td>
<td>5 days</td>
<td>Nov 13-17</td>
<td>17250</td>
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<tr>
<td>10.</td>
<td>Testing Of Plywood And Block Board As Per IS:303, IS:710, IS:1328, IS:4990 And IS:1659</td>
<td>5 days</td>
<td>Dec 11-15</td>
<td>23000</td>
</tr>
</tbody>
</table>

* 15% Service Tax Extra

** Programme Coordinator: Dr. V K Upadhyay, Head, IT & SORIT (upadhyay@ipirti.gov.in). You can apply online by filling and submitting the Registration Form (PDF)/Registration Form (doc). Registration has to be done 10 days before the date of commencement of the course by remitting prescribed course fee. Fees payable to the organization may be sent by crossed Demand Draft in favour of Director, IPIRTI, Bengaluru and sent by post to Post Bag No. 2273, Tumkur Road, Yeshwanthpur PO, Bengaluru - 560 022.

### SHORTTERM TRAINING COURSES FOR JUN - DEC, 2017 AT KOLKATA

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Title of the Training Course</th>
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<th>Date</th>
<th>Fees*</th>
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<tbody>
<tr>
<td>1.</td>
<td>One Month Training Course on “Plywood Manufacturing Technology”</td>
<td>1 Month</td>
<td>Jun 01-30</td>
<td>23000</td>
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<tr>
<td>2.</td>
<td>Block Board &amp; Flush Door Manufacturing</td>
<td>5 days</td>
<td>Jul 17-21</td>
<td>17250</td>
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<td>3.</td>
<td>Low Formaldehyde emission adhesives for plywood and particle board</td>
<td>3 days</td>
<td>Aug 16-18</td>
<td>11500</td>
</tr>
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<td>4.</td>
<td>Retention of Preservative Chemical</td>
<td>5 days</td>
<td>Sep 11-15</td>
<td>17250</td>
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<tr>
<td>1.</td>
<td>Testing Of Block board And Flush Door As Per IS:1659 &amp; IS: 2202 (Part - I)</td>
<td>5 days</td>
<td>Jun 12-16</td>
<td>11500</td>
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<td>2.</td>
<td>Testing Of Fire Retardant Plywood As Per IS: 5509</td>
<td>2 days</td>
<td>Jul 17-18</td>
<td>5750</td>
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<td>3.</td>
<td>Testing Of Plywood As Per I:S 303, 1328, 710 &amp; 4990</td>
<td>5 days</td>
<td>Aug 21-25</td>
<td>13800</td>
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<tr>
<td>4.</td>
<td>Analysis of Raw Material (Phenol &amp; Formalin)</td>
<td>3 days</td>
<td>Sep 11-13</td>
<td>11550</td>
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<tr>
<td>5.</td>
<td>Testing Of Plywood As Per I:S 303, 1328, 710 &amp; 4990</td>
<td>5 days</td>
<td>Oct 09-13</td>
<td>13800</td>
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<tr>
<td>6.</td>
<td>Analysis of Raw Material and Resin Manufacturing ( PF &amp; UF)</td>
<td>5 days</td>
<td>Nov 20 -24</td>
<td>17250</td>
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<td>7.</td>
<td>Retention of Preservative Chemical</td>
<td>5 days</td>
<td>Dec 04-08</td>
<td>13800</td>
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</table>

* 15% Service Tax Extra
** Lodging and Boarding are not included and have to be arranged by the trainees.

Programme Coordinator: Dr. Ranjana Yadav (ranjana@ipirti.gov.in) IPIRTI Centre (MoEF&CC, Govt of India) B-65, Phase -7, Industrial Area, Mohali-160055, Punjab. Tel: 0172-5095875. Registration has to be done 10 days before the date of commencement of the course by remitting prescribed course fee. Fees payable to the organization may be sent by crossed Demand Draft in favour of Director, IPIRTI, Bengaluru. You can apply online by filing and submitting the Registration Form.
Ph.D Programme

IPIRTI is a nodal centre for pursuing research leading to award of Ph.D by Forest Research Institute (FRI) Deemed University, Dehradun (Link: http://www.ipirti.gov.in/phdprogram.html)

The following candidates were awarded Ph.D through Nodal Centre IPIRTI, Bengaluru

**Shri. Purosottam Sharma, M.Sc.,**

Shri. Purosottam Sharma has been awarded Ph.D. by FRI Deemed University, Dehradun through the Ph.D. Nodal Centre IPIRTI, Bengaluru of FRI, Dehradun on 23rd September 2016, for the work done on the topic entitled “To assess the suitability of bamboo fibre for manufacturing Medium Density Fibreboard” under the guidance of Dr. S.K. Nath, Ex-Joint Director, IPIRTI Bengaluru.

**Shri. Ganesh Gopal T.M., M.Sc.**

Shri. Ganesh Gopal T.M. has also been awarded Ph.D by FRI Deemed University, Dehradun through the Ph.D. Nodal Centre IPIRTI, Bengaluru of FRI, Dehradun on 26/02/2017. for the work done on the topic entitled on “MDI Resins in wood panel products” under the guidance of Dr. S.K. Nath, Ex-Joint Director, IPIRTI, Bengaluru.