Green Economy and Capacity Building for Panel Products

Due to increasing material scarcity, a transition from the traditional linear ‘make-take-waste’ production scenario to a more circular and renewable green model is essential to be able to meet the needs of future generations. In a perfect Circular Economy, products are made using 100% renewable energy and are designed in such a way that their components either fit as nutrients in the biological cycle, i.e. biodegradable after use and recycled and regrown by nature itself, or in the technical cycle, i.e. non-renewable industrial materials whose finite stocks need to be secured by high-level recycling.

In aforesaid backdrop, a surging bio-based green economy, preferably fast-growing plants such as Melia dubia, poplar, eucalypts and bamboo as well as agro-residues have an important role to play - not to replace wood as biomaterial, but to complement it as a solution for various applications, such as building industry, interior design, furniture, textile, paper, energy sector etc.

Among all the contemporary bio-materials, the most promising Bamboo albeit having a lot of potentials is one of the most underutilized. The main reason is lack of awareness and technical capacity. A Global Knowledge Management and Capacity Building System for bamboo may be evolved to systematically
and formally share and transfer the learning concepts viz. best practices, innovations and other implicit knowledge among all the member organizations. It may provide an open and transparent way of sharing knowledge and information amongst the bamboo professionals and all others persons and organizations interested in the subject of bamboo development. Global knowledge repository and capacity building resources may be accessed by all members; it may provide training and facilitates field trips to bamboo development areas; produces value-added products, working papers and other publications.

In sync with the above, the Skill India Mission, under Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India utilising the vast network and expertise of ENVIS Hubs/RPs, has taken up an initiative for skill development in the Environment and Forest sector including bamboo to enable India’s youth to get gainful employment and/or self-employment, called the Green Skill Development Programme (GSDP). The programme endeavours to develop green skilled workers having technical knowledge and commitment to sustainable development, which will also help in the attainment of the Nationally Determined Contributions (NDCs), Sustainable Development Goals (SDGs), National Biodiversity Targets (NBTs), as well as Waste Management Rules. With great pleasure to share that along with other institutes, IPIRTI is has been chosen as an advance centre to conduct GSDP in Bamboo Crafts to train a pool of Master Trainers who can further train youths across the country.

Dr. B. N. Mohanty, IFS
Director, IPIRTI
The consumption of composites has increased manifold in the last two decades especially in industrial consumer application. The Western Europe, USA and Japan enjoy a major share of the world market of composites.

Armed with a wide gamut of advantages, composites have a key role to play in the growing market in India. The developmental efforts for finding newer composites for existing and novel applications are an area of top priority. Considerable expertise exists in INDIA in the technological institutions and a few manufacturing industries. The usage of composites in all these years has been limited to multiple commercial applications and potential for export have also not been tapped even in a limited way. In view of the crucial need for developing indigenous capability in composite technology, IPIRTI has taken a challenge towards developing bamboo composite based houses for dwellings and commercial purposes.

Bamboo composites bestowed with unique advantages like lightweight, high strength to weight ratio etc., drew attention from the developed world towards novel application and is replacing the conventional materials like metals, woods etc. Bamboo composite materials offer some significant advantages to metals in many structural applications due to the flexibility of selecting various combinations of bamboo slivers reinforcement and resin matrix. The reinforcing slivers are the primary load bearers of composite materials with the matrix component transferring the load from sliver to sliver. Selection of optimal thickness of the material is dependent on the property requirements of the finished part. It has been observed that a weight saving of over 20% is attainable in most of the structures. This is due to lower density of composites and in addition their inherent properties provide performance benefits over metals. The use of composites structures has become an increasingly important factor in engineering design. Composites of high performance fibers and a range of polymeric matrices has enabled many engineering achievements. Composite products meet stringent requirements such as satisfactory performance even at high temperature, pressure, corrosive environment or high stress.

Some advantages of composites material over conventional one are mentioned below:

(a) Tensile strength of composites is four to six times greater than that of steel or aluminium.
(b) Improved torsional stiffness and impact strength properties.
(c) Composites exhibit excellent corrosion resistant and fire retardancy.
(d) Composites have higher fatigue endurance limit.
(e) Composite materials are 30-40% lighter than aluminium structures designed for the same functional requirements.

(f) Composites are less noisy while in operation and provide lower vibration transmission than metals.

(g) Composites are more versatile than metals and can be tailored to meet performance needs and complex design requirements.

(h) Composites enjoy reduced recycle cost compared to metals.

(i) Improved appearance with smooth surface and readily incorporable integral decorative melamine are other characteristics of composites.

(j) Composite parts can eliminate joints/fasteners, providing part simplification and integrated design compared to conventional metallic parts.

With a view to disseminate the technology developed by IPIRTI a full scaled bamboo composite house of plinth area 1512 sft. was constructed in premises of Botanical Garden, Kothaguda Reserve Forest, Kondapur, Gachibowli by Shri. Amitava Sil, Scientist, IPIRTI Field Station, Kolkata and his team. The walling is double panelled structure with insulated material in between them using 6mm thick Bamboo Mat Boards (BMB). Bamboo Mat Corrugated Sheet (BMCS) was used as roofing and bamboo flooring tiles was used for floors. This type of Bamboo composite panel based houses will be a major thrust to disaster prone areas. With the involvement of stake holders it would go a long way in developing innovative bamboo composites applications meeting quality and wider acceptance by the users thus contributing to the growth of knowledge based business in India.
Industry/Organisation visits

06-09.04.2018: Shri. Anand Nandanwar, Scientist visited IPIRTI Centre, Mohali to observe the functioning of the Centre as an Officer-In-Charge.

07-10.04.2018 & 13-14.04.2018: Shri. Amitava Sil, Officer-In-Charge, IPIRTI Field Station, Kolkata visited M/s. Telangana State Forest Development Corporation Limited, Hyderabad for final inspection of finishing work of Bamboo Composite house


02.05.2018: Shri. S. C. Sahoo, Scientist visited to M/s. Century Ply, Kolkata to improve the quality of cold press resin.

20-24.05.2018: Dr. Pradeep Kumar Kushwaha, Scientist visited CFC Bijapur, Chhatisgarh for installation & inspecting the replaced Hot air oven and maintenance of other old bamboo processing machines.


27.05.2018: Dr. B.N. Mohanty, IFS, Director, IPIRTI visited the Bamboo Agarbatti Clusters at Unakoti Industrial Estate and had discussion with Shri. Shyamal Debnath and Shri. Anup Chaudhury, office bearers of Agarbathi Manufacturing Clusters at Kumarghat, North Tripura.

29.05.2018: Dr. B.N. Mohanty, IFS, Director, IPIRTI visited the Bamboo & Cane Development Institute (BCDI) at Agartala.

to attend the floor level problems faced by the industry during resin manufacturing and production of plywood.

Meetings/Seminars/Workshops/Conferences

03-04.04.2018: Dr. B.N. Mohanty, IFS, Director, IPIRTI Chaired the Internal Research Committee (IRC) Meeting of IPIRTI and reviewed the progress of various Research Projects being carried out in the Institute. Dr. Manoj Kumar Dubey, Joint Director convened the meeting.

04.04.2018: Dr. B.N. Mohanty, IFS, Director, IPIRTI and Shri. Anand Nandanwar, Scientist attended a Meeting with Shri. M. Srinivasa Rao, CCF/IWST & Shri. Sayeed Ahmed, M/s. BIESSE regarding setting up of Gujarat Centre for Skill Development.

12th April, 2018: “Bamboo Stakeholders Interaction Meet - 2018” held at IPIRTI, Bangalore. Dr. Alka Bhargava, Joint Secretary (Agriculture Marketing), Department of Agriculture Cooperation & Farmers Welfare, New Delhi attended the workshop along with other important stakeholders in Bamboo development. Dr. B.N. Mohanty, Director of IPIRTI delivered welcome address and expressed his pleasure to have this interactive meet. Dr. Manoj Kumar Dubey, Joint Director, IPIRTI made a presentation on “High End Products from Green Gold”. The interaction and discussion among Bamboo stakeholders brought developmental outcome in the meet. All the HoDs of IPIRTI also took part in the Meet.

13.04.2018: 62nd meeting of the Research Advisory Committee (RAC) of IPIRTI was held in the Conference Hall at IPIRTI, Bengaluru under the Chairmanship of Shri. Sajjan Bhajanka, President, FIPPI, New Delhi. Dr. B.N. Mohanty, Director Co-chaired the meeting; Dr. Manoj K. Dubey, Joint Director was the Convenor of the meeting and both took part in approval of new research projects and reviewed the progress of various on-going research projects. In addition to the RAC members, the meeting was attended by Scientists of IPIRTI from Bengaluru, Field Station Kolkata and Mohali.

16.04.2018: Dr. B.N. Mohanty, IFS, Director, IPIRTI participated in a seminar on “Recent Developments in the Bamboo Sector and Road Ahead” and Chaired a session on “Existing barriers and addressing the
revival issues for the Stake Holders from Medium & Large Sector like Plywood & Energy sectors” at New Maharastra Sadan, New Delhi.

**16.04.2018:** Dr. Manoj Kumar Dubey, Joint Director attended meeting as an External Expert for selection of Research Associate, JRF/JPF in ICFRE/External projects and to review Group-C employees at IWST, Bengaluru.

**18.04.2018:** Dr. Manoj Kumar Dubey, Joint Director attended a meeting to organize a conference and trade fair on Sustainable Forest Management under the Chairmanship of ADG FC at MoEF & CC, New Delhi.

**25.04.2018:** Dr. B.N. Mohanty, IFS, Director, IPIRTI Chaired the 22nd meeting of the Wood & other Lignocellulosic products Sectional Committee CED 20 in Joint Session with Sub-Committees CED 201 & CED 206.

**03.05.2018:** Dr. B.N. Mohanty, IFS, Director, IPIRTI attended a meeting with Shri. Saibal Dasgupta, ADG(FC) at MoEFF&CC, New Delhi about various issues of IPIRTI. 03.05.2018: Ms. Sujatha. D, Scientist attended the Industry Awareness Programme on Wood products and presented a paper on “Technical advancements in wood industry with specific focus on wood substitutes” at Chennai.

**04.05.2018:** Dr. B.N. Mohanty, IFS, Director, IPIRTI attended a meeting regarding the amendment to Recruitment Rules (RRs) for selection of the post of Director, WII under the Chairmanship of DGF & SS in Krishna Conference Hall, IP Bhawan, New Delhi.

**07-08.05.2018:** Dr. Vipin Kumar Chawla, Scientist, IPIRTI attended and presented a technical talk on Bamboo Composite Technology in India for commercialization and also Post-Harvest Management and preservation of bamboo conducted by State Agroforestry & Bamboo Mission, Chhattisgarh, Raipur.

**11.05.2018:** Dr. B.N. Mohanty, IFS, Director, IPIRTI took part in the first meeting of the committee to analyse the “Import of Bamboo and Bamboo products to India and recommend strategies to ensure availability of quality raw material from domestic sources” which was held at Krishi Bhawan under the Chairpersonship of Joint Secretary (NRM/NBM).

**15.05.2018:** Dr. Manoj Kumar Dubey, Joint Director attended meeting on pending issues with various institutes under RT Division at the MoEF&CC, New Delhi.

**18.05.2018:** Dr. B.N. Mohanty, IFS, Director, IPIRTI had meeting with Dr. N. Bharathi, Managing Director, M/s. Growmore Biotech along with other officials who visited IPIRTI regarding Technology transfer for Bamboo Match Sticks.
19.05.2018: Dr. B.N. Mohanty, IFS, Director, Dr. Manoj Kumar Dubey, Joint Director, Ms. Sujatha D., Shri. Uday D.N., Dr. Vipin Kumar Chawla, Scientists, IPIRTI attended meeting with Hon’ble Minister of State for Micro, Small & Medium Enterprises (MSME) Shri. Giriraj Singh (I/C) at Central Coir Research Institute, Peenya, Bengaluru.

28.05.2018: Dr. B.N. Mohanty, IFS, Director, IPIRTI attended a meeting with National Bamboo Mission at Agartala to analyse the “Import of Bamboo and Bamboo products to India and recommend strategies to ensure availability of quality raw material from domestic sources”. He also attended a meeting with Shri. A.K. Gupta, (PCCF & HoFF) Tripura along with Shri. Sandip Rathore, Mission Director, Tripura Bamboo Mission to discuss various issues faced by Bamboo Industries in the State.

28.05.2018: Dr. V.K. Upadhyay, Scientist attended workshop on Management Development Programme on Lean Six Sigma at ABBS, Bengaluru.

29.05.2018: Ms. Sujatha. D, Scientist attended as a panellist for the stake holder consultation meeting on transforming Agriculture/crop Residue into composite panel products at India International Centre, New Delhi.

30.05.2018: Dr. B.N. Mohanty, IFS, Director and Ms. Sujatha. D, Scientist, IPIRTI attended Expert Committee meeting under the Chairmanship of Dr. S.R. Wate for “Exemption of In-House Resin making from Environmental Clearance” at Sutlej Conference Hall, IP Bhawan, New Delhi. Ms. Sujatha. D made a presentation on exemption of Environmental Clearance for making in house resin by Plywood and Panel Industries.

04.06.2018: Dr. B.N. Mohanty, IFS, Director, IPIRTI and Dr. Vipin Kumar Chawla, Scientist, IPIRTI attended State Environment Minister’s Conference at Van Vignan Bhavan, New Delhi.

05.06.2018: Dr. B.N. Mohanty, IFS, Director, IPIRTI had meeting with Shri. Saibal Dasgupta, ADG (FC) and other Stake Holders from International Network for Bamboo and Rattan (INBAR), Development of North Eastern Region (DONER) about participation in forthcoming BARC, 2018 at Beijing, China.

08.06.2018: Dr. Manoj Kumar Dubey, Joint Director and Dr. Pradeep Kumar Kushwaha, Scientist, IPIRTI attended meeting to discuss certain issues on Inspection of the Third Committee of Parliament on Official Language of the Central Government Offices at Bengaluru convened by Addl. Commissioner Customs at the Office of Commissioner of Customs, Bengaluru.

09.06.2018: Shri. Uday D. N, Scientist attended Bamboo conclave and presented paper on “IPIRTI technologies for Bamboo composites” at Patna, Bihar.

21.06.2018: Dr. B.N. Mohanty, IFS, Director along with Dr. Manoj Kumar Dubey, Joint Director, Dr. Pradeep Kumar Kushwaha, Scientist and Hindi Officer, IPIRTI and other officials had a meeting with Members of Third Sub-Committee of Parliament who visited Bengaluru for “Inspection of IPIRTI on Official Language”.

25-27.06.2018: Dr. B.N. Mohanty, IFS, Director and Dr. Vipin Kumar Chawla, Scientist, IPIRTI participated in Bamboo and Rattan Congress (BARC 2018) held at Beijing, China. The conference theme of BARC 2018 was “Enhancing South-South Cooperation for Green Development through Bamboo and Rattan’s Contributions to the Sustainable Development Goals.

In this conference Dr. Vipin Kumar Chawla presented the Bamboo housing technology developed in India. IPIRTI exhibited various Bamboo based products, miniature bamboo pre-fab house and a full size Bamboo Skin Door in the Asia-Pacific pavilion. IPIRTI had showcased several bamboo composites as substitute of wood Viz. Bamboo Mat Board (BMB), Bamboo Mat Veneer Composite (BMVC), Bamboo Mat Corrugated Sheet (BMCS), Bamboo Mat Compreg, Bamboo Wood (BW), Bamboo Flooring Tiles, High Density Shuttering grade panels, Bamboo Mat Ridge Cap (BMRC), Bamboo Mat Moulded Skin Door, Bamboo Particle Boards, Bamboo Lumber etc., In addition to this IPIRTI promoted two types of Bamboo housing technologies: IPIRTI-TRADA housing and Pre-fab housing technology. More than 300 visitors visited exhibits and appreciated IPIRTI technologies which may be harnessed for future collaboration and technology dissemination. In addition to that Vipin K Chawla presented a poster on “Development of vertical laminates board from bamboo for interior house applications” was presented during the Poster Presentation of BARC 2018.

29-30.06.2018: Dr. B.N. Mohanty, IFS, Director, IPIRTI and Shri. Amitava Sil, Scientist, IPIRTI, Field Station, Kolkata participated in two days Agri Entrepreneurship conclave-2018 organized by National Institute of Agriculture Marketing (NIAM) & KPMG at Shiksha ‘O’ Anusandhan Bhubaneswar, Odisha. Dr. B.N. Mohanty, IFS, Director, IPIRTI presented a paper in the plenary session on “Agro-Forestry and Tribal”. IPIRTI showcased value addition from Agro & Forest Lignocellulosics for the benefit
of large number of farmers who gathered from different parts of Odisha in the august presence of three Hon’ble Union Ministers Shri. Dharmendra Pradhan, Shri. Giriraj Singh & Shri. Gajendra Singh Shekhawat.

**Exhibition**

**02.05.2018:** Dr. B.N. Mohanty, IFS, Director, Dr. Vipin Kumar Chawla, Scientist & Shri. Ramesh Karri, JTA, IPIRTI attended the exhibition on World Environment Day celebration 2018 in Delhi and exhibited our products where Hon’ble Prime Minister graced the occasion as the Chief Guest.

**03.06.2018:** Dr. Vipin Kumar Chawla, Scientist participated in the thematic session on “Corporate Sustainability and the Sustainable Goals” (SDGs) at New Delhi organized by MoEF&CC and also exhibited the bamboo and other wood based composite products at Rajpath-India Gate, Hexagon along with Shri. R. Srinvasa murthy (Lab Assitant) and Shri. Ramesh Karri, JTA, IPIRTI Centre, Mohali.

**11.06.2018:** Shri. K. Thanigai, Scientist, IPIRTI attended one day “MSME” Technology searching seminar and exhibition organized by MSME at CSIR-Thiruvananthapuram.

**Other activities**

**27.04.2018:** Dr. B.N. Mohanty, IFS, Director, IPIRTI took part in Swachatta Day which was organized for Campus Cleanliness Drive at IPIRTI.

**10.05.2018:** Dr. B.N. Mohanty, IFS, Director, IPIRTI Chaired the General Body Meeting of IPIRTI Officers, Scientists and staff for celebration of World Environment Day on 05.06.2018 & International Yoga Day on 21.06.2018.

**05.06.2018:** Dr. Manoj Kumar Dubey, Joint Director successfully organized World Environment Day celebration at IPIRTI by planting saplings, poster display, plastic removal, Green LED lighting, painting competition and display of movies.
**20-21.06.2018:** Dr. B.N. Mohanty, IFS, Director, Dr. Manoj Kumar Dubey, Joint Director and other officials of IPIRTI actively took part in the celebration of 4th International Day of Yoga, 2018 at IPIRTI, Bengaluru.

**Visit of Dignitaries**

**02.05.2018:** Shri. Dillip Arora, Director, M/s. Sarada wood and bobbin works (P) Ltd., Ashritsar visited IPIRTI Field Station, Kolkata and discussed with Shri. S.C.Sahoo, Scientist regarding improvement in the plywood quality.

**04.05.2018:** Shri. Rajesh Mundhra, M.D & Shri. U.S. Panda from M/s. ARCL Ltd., Kolkata visited IPIRTI Field Station, Kolkata to discuss with Shri. S.C. Sahoo regarding the sponsored project of PF Powder resin testing.

**08.05.2018:** Shri. Ravichandra Tavag, Managing Director (Retd), M/s. Dieffenbacher India Private Limited visited and discussed about the possibilities of Collaborative projects with Director, IPIRTI, Bengaluru.

**22.05.2018:** Shri. Chandrakant Deo and Shri. Prosonjit Ganguly, Partners, M/s. Wood Cure Enterprises visited IPIRTI Field Station, Kolkata to discuss with Shri. S.C. Sahoo regarding the sponsored project report.

**06.06.2018:** Shri. Monoj Kumar Kanoi, Director, M/s. Masa India, Kolkata had visited IPIRTI Field Station, Kolkata to discuss with Shri. S.C. Sahoo regarding the sponsored project report.

**07.06.2018:** Shri. Amit Kr. Mukherjee, Dy. General Manager, Nicco Parks & Resorts Ltd, Salt Lake Kolkata visited IPIRTI Field Station, Kolkata and had discussion with Shri. Amitava Sil, Officer-In-Charge regarding construction of Bamboo composite house at the resort.

**18.06.2018:** Shri. P. Dutta, Director, M/s. Maa Manasha Plywood Industries (P) ltd., Malda visited IPIRTI Field Station, Kolkata to discuss with Shri. S.C. Sahoo regarding the warping problem arising during manufacture of plywood.

**25.06.2018:** Dr. Manoj Kumar Dubey, Joint Director organized a visit and interacted with Twenty-Five (25) officials/ instructors working for the Department of Artisanal Development of Eritrea from Eretria at IPIRTI, Bengaluru. The above visit was part of Ni-MSME Eight Weeks International Training Programme on “Promotion of Basket & Mat Weaving Artisan Enterprises”
MoU signed

A Memorandum of Undertaking (MoU) was signed and exchanged between Dr. B.N. Mohanty, IFS, Director, IPIRTI and M/s. Deepak Nitrite Limited, Gujarat for sponsored project under the title: “Evaluation of Protecto B Plus (Wet cake of Cresol based chemical) wood preservative chemical against Mold, Borer & Termites for Plywood and Solid wood”.

Patented: IPIRTI successfully obtained following two patents:-

1. Wood Preservatives and a method for Protecting Wood and Wood Based Panel Products – No. 297510

2. A Method of Manufacture of Bamboo Mat Ridge Cap, an Eco-friendly Industrial Product for Roofing purpose, Compatible with Bamboo Mat Corrugated Sheets – No. 297517

TRAINING

One Year Post-Graduate Diploma Course on Wood and Panel Products Technology (WPPT): 34 students of 29th Batch of one year Post Graduate Diploma Course in Wood and Panel Products Technology (WPPT) are undergoing training

Short Term Vocational Training Course

25-29.06.2018: Short term training course on “Testing of Plywood an Block Board” was conducted for 22 candidates at IPIRTI Field Station, Kolkata.

Special Training Course