A one-day Seminar on “Affordable housing using Bamboo and Bamboo Composites” was jointly organized by IPIRTI, Bangalore & TRADA Technology, U.K., at IPIRTI, Bangalore on 20th March 2001. The collaborative work of IPIRTI and TRADA Technology Ltd., U.K. under DFID funded KaR Project “Bamboo Shelter-demonstration of best construction practices” was highlighted. A demonstration house using bamboo, Bamboo Mat Board (BMB) and Bamboo Mat Corrugated Sheets (BMCS) in combination with other building materials constructed in IPIRTI premises was on display. Brief presentations on various technical aspects of IPIRTI - TRADA bamboo building system including testing of building components were made by Paul Follet, Senior Engineer, TRADA Technology U.K., Dr. H.N. Jagadeesh, Consultant IPIRTI Bangalore, and Mr. H. Guruva Reddy, Scientist IPIRTI Bangalore.

Welcoming the delegates, Sri Arun K. Bansal, IFS, Director IPIRTI, Bangalore, emphasised that IPIRTI-TRADA bamboo based housing system can address the three major national concerns: **ECOLOGICAL SECURITY**: through conservation of forests through timber substitution, efficient sequestration, alternate materials to non-biodegradable & high energy consuming materials like metals, and plastics; **SUSTAINABLE FOOD SECURITY**: through bamboo based agro-forestry system, maintenance of soil fertility of adjoining agricultural lands, and bamboo shoots; and **LIVELIHOOD SECURITY**: through generation of employment in planting and primary processing for manufacturing mat based composites and other market driven bamboo products. He also emphasized upon the need for formulating a national bamboo building code, and Indian Standards for bamboo and bamboo based building components. Mr. Lionel Jayanetti, Head, TRADA International Ltd., U.K., gave a brief description of the organizational set up of TRADA, its R & D activities. He stressed the efforts of TRADA in promoting the use of Bamboo in construction and shelter in developing countries. The Seminar was successful in bringing together the major stakeholders in housing and construction namely architects, designers, builders, entrepreneurs and researchers. More than 90 delegates participated in the seminar. In the concluding session, after detailed deliberations following Action Plan for promoting use of Bamboo and bamboo composites in housing and constructions was agreed to:

- To produce a manual and Code of Practice and incorporate bamboo based building components in the Schedule of Rates. In the interim, their use is to be promoted through CPWD, BMTPC, HUDCO etc.
- To amend relevant Indian Standards to include use of bamboo mat board for panel inserts in door and window shutters.
- To promote the IPIRTI-TRADA bamboo housing system through organizations such as the Rajiv Gandhi Rural Housing Corporation and NGOs active in

Pantry near Glass House at Raj Bhawan, Bangalore, renovated using IPIRTI-TRADA bamboo housing technology in collaboration with Rajiv Gandhi Rural Housing Corporation, Karnataka. (Architect: Manasaram Architects Bangalore)

**Demonstration Bamboo House Built at IPIRTI**
Delegates were taken round to show the manufacturing process of BMB and BMCS, mechanised processing of Bamboo, preservative treatment of Bamboo and various products made from BMB. Many participants joined the conducted visit to the pantry and toilet complexes renovated using bamboo grid walling, Bamboo Mat Board for fascia and serving counter, BMB flush doors, and BMCS for roofing, near the Glass House at Raj Bhawan, Bangalore. Architect Mrs. Neelam Manjunath who has designed and supervised the renovation work, explained the various details to the delegates.

OPEN HOUSE ! .. !
You have any questions ?.. ?
About
Processing, Durability of Wood and Wood Products,
Innovative Environment friendly Wood Alternates from
Bamboo and other Natural Fibers and their Applications,
in
Housing and other Sectors.
Visit
IPRTI
On
National Technology Day
9 a.m to 5 p.m.

Demonstration House,
Architect: Mr. Sandeep, Architecture Paradigm, Bangalore – 95

Editorial

Man is using bamboo since time immemorial in one form or the other. Bamboo is known to have more than 1500 uses. Over last few decades many technological innovations have taken place to increase the production of bamboo and processing bamboo to produce high value products. Growing awareness about the environment is resulting in preferential demand for products which are biodegradable and environmental friendly. Bamboo which is a versatile material can be used either in round/split form or as processed products including panel materials in housing/transport/packaging etc., or as a food product to meet several basic needs. Many National/State level Institutions/Govt. Departments/NGOs and International Organizations are currently working for the development of Bamboo Sector in the country, but without any structured/formal network of such organizations. Experience has shown that a Mission approach has contributed tremendously to the growth of the specific sector, in the country. Hence, what is needed today is a “BAMBOO TECHNOLOGY MISSION” to develop the sector, including cultivation & management, development of processes/products, public awareness about products made out of bamboo etc. This view has emerged from the deliberations, in some forums including recent ones, which are covered in this issue.

K. Shyamasundar
With a view to sensitize various stake holders in development of bamboo sector and as a prelude to the VII International Bamboo Congress to be held in India during February/March 2002, the Planning Commission of India facilitated and supported organization of three regional workshops at Tripura, Banagalore and Bhopal. The workshop for the southern region was held at the Institute of Wood Science and Technology, Bangalore (IWST) on 21st March 2001 and was jointly organized by Karnataka Forest Department, Bamboo Society of India (BSI), IWST and IPIRTI. Inaugurating the workshop, Hon’ble Minister for Forest, Ecology & Environment, Government of Karnataka, Sri. K.H. Ranganath, said that Karnataka has about 6.8 lakh hectares of natural bamboo forests of which about 30% is in protected areas, national parks or sanctuaries. Proper management of the remaining 4.5 lakh hectare can sustainably produce 2.25 crore bamboos annually. He emphasized that bamboo not only has the potential to address the conservation needs of the forests, but also, for a country like India where about 70% of the population is depending on agriculture, growing of bamboo and its use can bring about substantial change in the rural economy.

Others who spoke on the occasion were Dr. D.N. Tewari, Member, Planning Commission, Sri. C.P. Oberoi, Director General of Forests & Spl. Secretary, MoEF, GOI, Sri. Sadasiviah, Chairman, BSI, and Dr. S.N. Rai, Principal Chief Conservator of Forests, Karnataka.

The inaugural session was followed by three technical sessions. In technical session I, chaired by Dr. P.M. Ganapathy, IFS, (Retd.) and former Director, IPIRTI, Bangalore, representatives from state forest departments of Andhra Pradesh, Karnataka, Kerala and Tamilnadu presented status papers of their respective States. Director, IPIRTI, gave a brief presentation on bamboo development activities at the Institute. In technical session II, group discussions were held in three parallel sessions, on (i) Resource, environment & production, Chaired by Sr. N.S. Adukoli, Vice Chairman, BSI, (ii) Processing, Products and Technology assessment & Technology Transfer Chaired by Dr. P.M. Ganapathy, and (iii) Research & Socio-economics Chaired by Dr. Keshav Reddy IFS, IWST.

In technical session III, Chaired by Dr. D.N. Tewari, Member Planning Commission, Mr. Lionel Jaynetti, Head, TRADA International, TRADA Tech. U.K. made a brief presentation on international initiatives on Bamboo. At the plenary session, Chaired by Dr. Tewari with Mr. Parameswarappa as the Co-Chairman, recommendations of three groups of technical session II were presented and deliberated upon. The workshop made following recommendation:-

(a) Resource, Environment and Production

♦ To Optimize working of the bamboo forests as per silvicultural principles coupled with artificial regeneration wherever required and sustainable management of the bamboo resources.
♦ To popularize bamboo cultivation in private lands wherever feasible by identifying various homegrown species suitable to different localities and standardizing the package of practices.
♦ Joint forest planning and management for effective management of bamboo forests.

♦ To introduce uniform pricing policy of bamboo, to enable paper mills to take more bamboo as raw material and promotion of bamboo plantation in private lands
♦ Kerala Forest Research Institute (KFRI) should come up with an updated publication on the aspects of bamboo in collaboration with the Botanical survey of India.
♦ ICFRE and SFDs to prepare genetic pool of all species of bamboo appropriate to various agro-climatic zones and to work for their propagation keeping in mind the end uses.

(b) Processing, Products & Technology Transfer

♦ Development of appropriate tools/techniques for improved harvesting, processing and finishing.
♦ Up grading of traditional skills available with rural artisans.
Sri. C. P. Oberoi, Director General of Forests & Spl. Secretary, MoEF, GOI, addressing the gathering

- Establishment of Training Centers for training artisans in using improved tools/techniques.
- Formation a nodal agency for around development of bamboo uses and products.

(c) Research and Socio-economics
- To identify superior clones of bamboo based on end-product development and adaptability to local climate.
- Bamboo - based agroforestry models development and assessment of their economic viability.
- Preparation of a national -level calendar to provide species-wise information on bamboo flowering. The states should be forewarned about the onset of flowering. Development of improved storage methods for bamboo seeds.

**ADHESIVE FOR PLYWOOD** (Continued from Vol.2. No.4)

Careful monitoring of process parameters in plywood manufacture such as adhesive spread, closed assembly time, hot press temperature, pressure and time is very essential for quality products. Uniform spread of around 0.3 kg per square meter (DGL) is generally required for good bonding. Lay up of assembly should be done as fast as possible. Closed assembly time during lay up should not extend 45 minutes to avoid drying out of glue line and also precuring which result in poor bonding. Loading the assembly to the hot press, closing of the hot press and building up of pressure should be completed in around 90 seconds.

Hot press conditions generally employed for UF bonding plywood are: temperature -105°-110°, pressure - 10 kg/cm² and time - depending on plywood thickness. Warm veneers and hot aluminium cauls should be avoided to prevent precuring problem. On removal from hot press, panels have to be stacked for post curing and stabilisation for about 8 hrs. before trimming.

**PRE PRESSING OF PLYWOOD**

Cold pressing of veneer assemblies into temporary bonded sheet before hot pressing is a very common practice in plywood industry all over the world. Sufficient number of veneer assemblies up to a height equal to the opening of the cold press are assembled together and taken for prepressing. The process is regarded as an inseparable part in plywood manufacture. However, in India from the very beginning, prepressing has been left out in plywood processing except in two South Indian and two North Indian Plywood Industries. These four factories with technical assistance from IPIRTI implemented the process and they continue to use it.

**Benefits of prepressing:**
1. Overall improvement of quality of plywood with respect to blister and delamination. Face defects can be reduced to almost zero level through repairing after prepressing.
2. Increase in productivity by about 20 percent through (a) faster loading into hot press (b) shorter curing time (c) increased number of daylight in the same hot press as the prepress assemblies require lesser opening for loading hot press.
3. Manufacture of higher thickness plywood up to 40 mm, which, so far, could not be done as the total assembly thickness of veneer is higher than the opening of daylights in hot press.
4. Manufacture of overlaid or decorative plywood in a single hot pressing cycle. At present double hot press cycle is

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**Announcement**

**VII World Bamboo Congress**

**February/March 2002, Dehra Dun, India**

Sponsored and organized by a cooperation of bamboo peoples, the name of this conference incorporates both the International Bamboo Association (IBA) and the International Network of Bamboo and Rattan (INBAR) events. Altogether, the Congress events will be comprised of technical sessions, training workshops, satellite workshops, the trade fair, a music and dance festival, excursions and much more. The Congress will consist of four sections:

1) **The Congress**
- This will consist of paper and poster presentations over 6 days, with one day for an in-Congress field visit. Each thematic session will have an illustrated synoptic overview presentation. It is estimated that approximately 100 papers will be delivered and 100 posters presented, covering wide-ranging subject groups
2) **Music and Dance Festival**
3) **Craft Mela (Exhibition and Trade Fair)**
4) **Industrial and Infrastructure Fair**

Has a topic been overlooked? Are you interested in participating? Please inform IBA.

More details and information will be available soon. Check for updates on the IBA web site: www.bamboo.org.au/iba or through the link on the INBAR web site: www.inbar.int.

- Establishment of Training Centers for training artisans in using improved tools/techniques.
- Formation a nodal agency for around development of bamboo uses and products.
- Creation of bamboo development board to cater to the technical, financial and marketing related requirements of communities dependant on bamboo.
- Creation of a national bamboo network.

**TECHNICAL NOTES**

- Careful monitoring of process parameters in plywood manufacture such as adhesive spread, closed assembly time, hot press temperature, pressure and time is very essential for quality products.
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4. Manufacture of overlaid or decorative plywood in a single hot pressing cycle. At present double hot press cycle is
used for such product.

5. Economy in plywood production: There is economy in resin consumption, overhead for production comes down with increase in production (about 20%), and there is a decrease in defective products.

6. Adhesive cost based on PF resin is less.

7. Use of aluminium cauls can be partially or totally avoided. Technology package for adopting of pre pressing technique in the existing plywood mill is available at IPIRTI.

POLLUTION ASPECTS RELEVANT TO PLYWOOD INDUSTRIES

The plyboard and related industries are under the priority list of the State (West Bengal) Pollution Control Board for its inherent water pollution and air pollution problems and particularly so, for the repeated complaints received from the public.

The sources of pollution in the process are listed below with its nature & method of disposal/treatment:

## Air pollution

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Source</th>
<th>Processing area</th>
<th>Mode of disposal/treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A₁</td>
<td>Thermic fluid heater (fuel combustion)</td>
<td>This is an utility unit feeding hot thermic fluid to the dryer, hot press and to the resin kettle (resin used in the manufacture of glue). This is the most apparent source of pollution generated; the dry waste veneers fed as fuel to the thermic fluid heater generates thick black smoke particularly at the time of charging – this is because of unburnt carbon particles or soot coming out with the flue gas emission.</td>
<td>Emission is treated through pollution control devices (multicyclone/baghouse) and disposed through stack. Baghouse is found most effective pollution control device. However it has been observed that veneers if doused in water and fed as fuel generates a cleaner emission.</td>
</tr>
<tr>
<td>A₂</td>
<td>Steam Boiler (fuel combustion)</td>
<td>This is in some units perform the same function as Thermic fluid heater, where steam replaces thermic fluid as the supplier of heat energy.</td>
<td>Same as above.</td>
</tr>
<tr>
<td>A₃</td>
<td>Sanding operation (fugitive emission)</td>
<td>This is one of the finishing operations.</td>
<td>Saw dust collected in bags after cyclone dust extractor is also sold off.</td>
</tr>
</tbody>
</table>

## Water pollution

<table>
<thead>
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<th>Mode of disposal/treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>W₁</td>
<td>Resin kettle wash-water</td>
<td>The resin plant acts as a feeder to the mainstream; Periodic washing of the kettle is necessary.</td>
<td>This is high in phenolics/COD/ammonialcal nitrogen depending on the nature of resin. Treatment plant in some units is based on physico-chemical principles. This type of treatment is found effective in some cases.</td>
</tr>
<tr>
<td>W₂</td>
<td>Glue spreader wash-water</td>
<td>The glue spreaders used for spreading glue to the veneer surfaces before assembled to make plywood are washed periodically.</td>
<td>Same as above.</td>
</tr>
</tbody>
</table>

It is observed that the untreated wastewater fails to comply with the prescribed standard in respect of Total Suspended Solids / Chemical Oxygen Demand/Phenolic compounds/ammonialcal nitrogen depending on the nature of the resin used.

## Solid waste

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>Wood waste (timber bark, waste veneer)</td>
<td>Log-cutting, debarking, peeling, clipping, finishing operation</td>
<td>Major portion of the waste is used for boiler firing and some portion is sold off.</td>
</tr>
<tr>
<td>S₂</td>
<td>Saw-dust</td>
<td>Log-cutting, Sanding</td>
<td>The waste generated is sold off</td>
</tr>
</tbody>
</table>
The prescribed standards as enforced by the State Pollution Control Boards do not consider the plyboard industry separately. The general standards are imposed on these units (Schedule VI, Part A, Environment Protection Rules, 1989). (Contributed by Dr. D. Chakraborty, Chief Scientist, West Bengal Pollution Control Board, based on the experience of field engineers in two representative plywood industries in Kolkata).

One Week Compulsory Training Course for IFS Officers

Institute conducted one week compulsory training course for IFS Officers on “Prospects of and challenges in processing and utilization of plantation timbers” sponsored by Ministry of Environment & Forests, Govt. of India was conducted at the Institute from 5-9 March, 2001. As a part of the course one day visit to M/s. Mysore Chipboards, Mysore, an integrated unit manufacturing plywood, block board, plain and pre-laminated particle board, was arranged which was very much appreciated by the participants. The participants also visited the forest nursery at Bangalore maintained by Karnataka Forest Department.

The course also included a group discussion on “Efficient utilization of wood & wood products-training needs for subordinate forest officers” facilitated by Director Shri. Arun K. Bansal. Panel discussions on “Policy Changes Needed for Sustainable Supply of Wood” and “Improvement in the Working of State Forest Departments through Effective HRD Programme” were also held. Panellists were Dr. P.J. Dilip Kumar, IFS., CCF, Karnataka, Shri I. B. Srivastava, IFS., Executive Director, KSFD, Bangalore, Shri Ashok Garg, IFS., U.P., Representative of Trainee Officers and Shri Arun K. Bansal, Director, IPIRTI, Bangalore. Shri S.K. Chakraborty, IFS., Principal Chief Conservator of Forests (Wild Life), Karnataka gave the valedictory address and distributed certificates.

Training of Forest Officers/ACFs and ROs on efficient utilization of wood and wood products

The need for imparting training to Forest Range Officers and Assistant Conservators of Forests, who are the backbone of the State Forest Departments for implementing various programmes has been identified as one of the HRD initiatives aimed at enhancing their knowledge and understanding related to total effective utilization of wood and wood products, bamboo and other renewable fiber based wood alternates. This matter was deliberated upon in a group discussion at the recent training course for IFS Officers. The unanimous opinion of the group was that enrichment of the knowledge of young Forest Officers in respect of value of wood/wood products, wood substitutes from natural fibers and technological innovations for better utilization of plantation wood is the need of the hour for development of forestry sector. Therefore, it is proposed to conduct one week training course for ROs and ACFs covering topics on Demand and supply of wood raw material for various sectors, Plantation management to produce industrial raw material, Processing technology for wood, wood based panel products and alternates from natural fibers, Production management – general concepts w.r.t. wood and wood based panel industry, Efficient utilization of wood and panel products for various end uses and Wood products marketing needs.

Readers comments/suggestions are welcome

Short term Training Courses

A special short term training course on “Economic Adhesives for Manufacturing MR and BWR Plywood” was conducted from 12 - 16 February 2001 for and at the request of M/S. Terai Chemicals, Yamunanagar.

Fifth batch of Introductory Training course on Manufacturing and testing of plywood conducted at IPIRTI, Field Station, Calcutta from 12.3.2001 to 23.3.2001

EXTENSION

January 2001 IPIRTI in collaboration with Rajiv Gandhi Rural Housing Corporation and M/s Manasaram Architects carried out the renovation of Pantry, near the Glass House at Bangalore Raj Bhawan, using Bamboo Mat Corrugated Sheets for roofing, plastered bamboo grid partition walls and BMB Flush Doors in combination with other materials. The renovation was designed and supervised by Mrs. Neelam Manjunath of Manasaram Architects.


18 February 2001 Shri S. S. Zoolagud visited M/s. Venus Bamboo Products (P) Ltd., Plot No.7 & 12, Sector-1, Falta Export Processing zone, Falta - 743504, 24 paraganas (S), West Bengal, held detailed discussions with Shri Krishna Shah, Director.
96th meeting of the Board of Governors and the 37th Annual General Body Meeting of IPIRTI Society

96th meeting of the Board of Governors of the Institute was held at Paryavaran Bhawan, New Delhi on 3rd January, 2001 and was Chaired by Sri. P. V. Jayakrishnan, IAS, Secretary, Environment & Forests, Govt. of India. Among other things, the Annual Report for 1999-2000 was approved for placing at the AGM. Revised Budget for 2000-2001 and Budget Estimates for 2001-2002 were also approved.

The 37th Annual General Body meeting of IPIRTI society was held at Paryavaran Bhawan, New Delhi on 7th March, 2001. The meeting was chaired by the Hon’ble Minister of Environment & Forests, Govt. of India, Thiru. T. R. Baalu. Annual Report for the year 1999-2000 was approved for placing at the AGM. Revised Budget for 2000-2001 and Budget Estimates for 2001-2002 were also approved.

**EXHIBITIONS**

1. IPIRTI participated in the exhibition organised at CODISSIA, Coimbatore from 29-30 January 2001 by Tamil Nadu Pollution Control Board to coincide with the “National Seminar of State Ministers for Environment and Forests”. Hon’ble Union Minister for Environment & Forests Thiru. T. R. Baalu inaugurated the exhibition. He was happy to see the products developed at IPIRTI for construction & housing and advised the Secretary, MoEF to take suitable action for promotion of such products.

2. IPIRTI participated in exhibition organized during the workshop on Development of Bamboo Sector in Tripura and other North Eastern States held at Agartala on 20-21 February 2001. Participants showed keen interest on bamboo based composites, bamboo based affordable housing systems developed at the Institute.

20-21 February 2001 Shri S. S. Zoolagud visited Tripura Handicrafts Development Samiti to see mechanized processing of Bamboo to produce round bamboo sticks used in manufacture of curtains, mats, etc., He also visited Bamboo and Cane Development Institute, Agartala.

22nd February 2001 Shri Arun K. Bansal, IFS., Director accompanied by Mr. P. Naha, OIC Kolkata, visited the factory of M/s. Worthy Plywoods Ltd., Several good features seen there included successful implementation of pre-pressing techniques that has been in use for last four year and has been very beneficial particularly in quality production – about 98% of production is graded as premier quality.


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two days workshop on “Development of Bamboo Sector in Tripura and other North Eastern States” organised by the Government of Tripura with the support of Planning Commission, Government of India. Shri Arun K. Bansal, IFS., Director made a presentation on bamboo based panels and also chaired the Working Group on “Bamboo Processing and Treatment”.

30 March 2001 Shri Arun K. Bansal, IFS., delivered a talk on bamboo based building materials for the participants of the International Training Course on “Material Design and Production Processes for Low Cost Housing” organised by ICS/UNIDO from 26-31 March, 2001 at Regional Research Laboratory, Thiruananthapuram.

Superannuation
Dr. H.N. Jagadeesh, Scientist F, Joint Director I/C retired from service on 28.2.2001, the Institute Acknowledges his contribution especially in the field of Timber Engineering/Technology, applications and product development in plywood, Bamboo Composites and Standardisation, and wishes him a happy and peaceful retired life.

Consultant
Dr. H. N. Jagadeesh, has been appointed as consultant to IPIRTI for a period of one year.

### Working Groups for Preparation of Tenth Five Year Plan-Forestry Sector
The Planning Commission of India have constituted working groups to evolve effective and efficient plans and programmes for the development of the Forestry Sector. Two such working groups on “Forestry” & “Research and Education for the Environment & Forests” are headed by the Secretary to the Government of India, Ministry of Environment & Forests. Director, IPIRTI, who is a member of these Working Groups, participated in the first meeting of the WG on Forestry held on 14th March 2001 at Paryavaran Bhawan, New Delhi. First meeting of the working group on Research and Education for the Environment & Forests was held on 24th March, 2001 at New Delhi. Director, IPIRTI, who is also a member of Working Group on “Application of Science & Technology for the Society” constituted by the Steering Committee on Science & Technology, for the formulation of the Tenth Five Year Plan set up by the planning Commission of India, participated at the first meeting of the WG held under the Chairmanship of Director General ICFRE on 13th March, 2001 at New Delhi.

Director IPIRTI, also participated in consultations held with the Environment & Forestry related Institutions on 7th March 2001, and Forest Based Industries on 13th March, 2001 under the chairmanship of Dr. D.N.Tewari, Member, Planning Commission at Yojana Bhawan, New Delhi.

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### Short term Training course

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Title of the course</th>
<th>Course for</th>
<th>Duration</th>
<th>Date</th>
</tr>
</thead>
<tbody>
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OP: Operators
M&S: Managers & Supervisors

**Working Groups for preparation of Tenth Five Year Plan-Forestry Sector**

The Planning Commission of India have constituted working groups to evolve effective and efficient plans and programmes for the development of the Forestry Sector. Two such working groups on “Forestry” & “Research and Education for the Environment & Forests” are headed by the Secretary to the Government of India, Ministry of Environment & Forests. Director, IPIRTI, who is a member of these Working Groups, participated in the first meeting of the WG on Forestry held on 14th March 2001 at Paryavaran Bhawan, New Delhi. First meeting of the working group on Research and Education for the Environment & Forests was held on 24th March, 2001 at New Delhi. Director, IPIRTI, who is also a member of Working Group on “Application of Science & Technology for the Society” constituted by the Steering Committee on Science & Technology, for the formulation of the Tenth Five Year Plan set up by the planning Commission of India, participated at the first meeting of the WG held under the Chairmanship of Director General ICFRE on 13th March, 2001 at New Delhi.

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### Short term Training course

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30 March 2001 Shri Arun K. Bansal, IFS., delivered a talk on bamboo based building materials for the participants of the International Training Course on “Material Design and Production Processes for Low Cost Housing” organised by ICS/UNIDO from 26-31 March, 2001 at Regional Research Laboratory, Thiruananthapuram.

### Superannuation
Dr. H.N. Jagadeesh, Scientist F, Joint Director I/C retired from service on 28.2.2001, the Institute Acknowledges his contribution especially in the field of Timber Engineering/Technology, applications and product development in plywood, Bamboo Composites and Standardisation, and wishes him a happy and peaceful retired life.

### Consultant
Dr. H. N. Jagadeesh, has been appointed as consultant to IPIRTI for a period of one year.