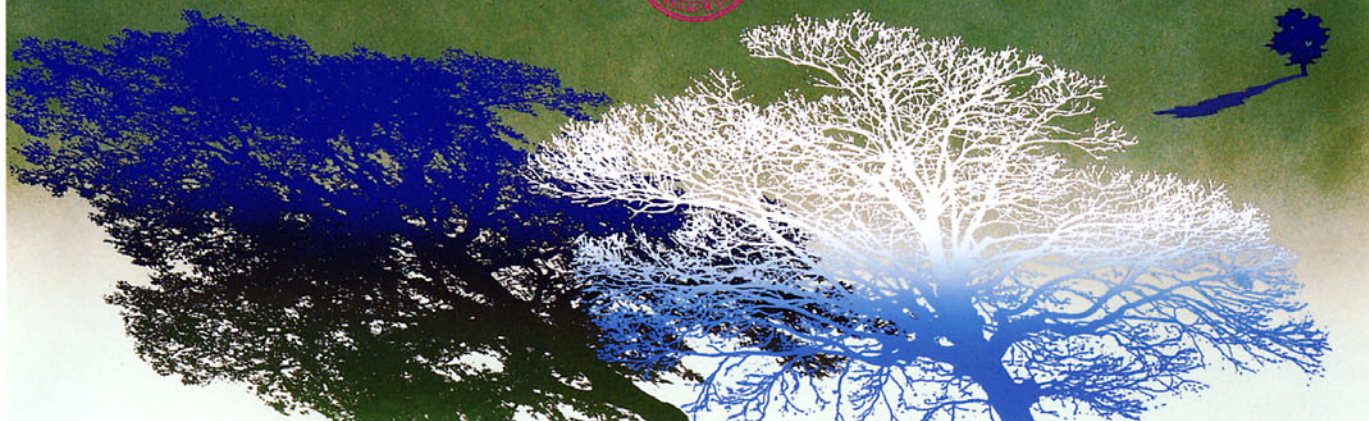


# International Newsletter

Wood Research Institute



Kyoto University, Japan



## Importance of International Cooperation in Wood Science and Technology Research

Masaaki Kuwahara, Program Coordinator, WRI, Kyoto University

Wood biomass is the most abundant bioresource on the earth. However, high levels of consumption of this resource, along with increasing combustion of fossil fuels, have serious negative impact and the global environment due to the release of large amounts of carbon dioxide. Development of technologies for effective utilization of wood as well as basic research are indispensable for the conservation of wood resources and the global environment. The following research areas are expected to achieve this purpose.

### 1. Material science and physics

The development of technologies to construct materials from various wood resources including forest residue, wood wastes and unutilized and lesser utilizable wood or plants is a matter of current concern. Novel composites are also expected to be produced from these resources. Enhancement of the function of wood by mechanical and chemical processes is also very important for effective utilization of wood. Understanding of the mechanism of wood deterioration will help in the development of technology for preservation of wood. These technologies are based on the results of fundamental research on the physical and mechanical properties of wood.

### 2. Chemistry and biochemistry

Wood is basically composed of three main polymers; cellulose, hemicellulose and lignin. These components are expected to provide various useful materials after the petrochemical era. Environmentally friendly pulping processes using biochemical reactions are prospective uses of cellulose. Wood also contains extractives which can be used as biologically active compounds. These research aims will be achieved by understanding the mechanisms of chemical and biochemical reactions concerning the conversion of these components.

### 3. Biology and genetics

To maintain wood resources at a sustainable level, production of trees themselves is important. For the enhancement of the important genetic factors which control the growth rate of plants, resistance to disease and environmental changes and others, elucidation of the precise mechanisms of expression of plant genes is indispensable. Research in these fields is also expected to contribute to maintenance of the global environment by promoting the fixation of carbon dioxide.

The final goal of the research mentioned above is to sustain wood



Prof. Masaaki Kuwahara

resources by developing technology for its effective utilization. International cooperation is indispensable for the promotion of such research.

The cooperative research program between Wood Research Institute, Kyoto University, and R & D Centre for Applied Physics, Indonesian Institute of Sciences (LIPI), began in 1996 under the "Core University Program" of the Japan Society for the Promotion of Science (JSPS). Many scientists from 19 Japanese and 16 Indonesian universities and institutes are currently participating in this program. This research program is expected to cover all the fields of wood science and technology mentioned above. The Second International Wood Science Seminar is scheduled to be held on November 6th to 7th, 1998, in Serpong, Indonesia to present the research results obtained in this project.

This letter is published to provide information regarding our current activities in this cooperative program. Suggestions concerning our activities, which will promote cooperative research, are welcome.



## Core University Program between WRI and R & D Centre for Applied Physics on Wood Science and Technology

*Anung Kusnowo, Program Coordinator, R & D Centre for Applied Physics*

Wood product is the main export from Indonesia after oil, and it is the second biggest country income resource. Main wood industries in Indonesia are plywood and sawmill. Recently, some plywood and sawmills collapsed due to the lack of raw material supply from the forests. However, new wood industries such as particleboard and MDF were being built. All of those technologies in wood industries were generated from abroad with turnkey technology. The high development of wood industries is not followed by high development and research on wood science and technology.

On the other hand, the government institutions that conduct research in the field of wood science and technology are limited. The strengthening of science and technology capability to deal with ligno-cellulosic materials, especially from low quality wood and forest residue, will be one of the important programs in Indonesia. To anticipate this trend, the multi disciplinary research group of the wood material in Research and Development Centre for Applied Physics, Indonesian Institute of Sciences (LIPI) was initiated in 1970 within the program of materials science and technology which has been developed since 1969 in LIPI. At the early stage (1984), human resource development was started by the International Cooperative Research with Wood Research Institute (WRI) of Kyoto University, Japan with Japan Society for the Promotion of Science (JSPS) as sponsor. In the early period of cooperation, the group at Indonesian side was still in the infancy stage. On the other hand, WRI has already rich experiences on wood science and technology. In other words, WRI is already in highly mature stage during the initiation of the cooperative program. However, cooperation between those two different levels of groups has been successfully linked since both sides agreed to follow the approach on exploiting more on the similarity of interest rather than to expose the differences of capacities.

The agreement of cooperative pro-

gram adopted the research theme: "The Characterization and Efficient Utilization of Woods and Forest Residue". The scope of activities covered the problems of fundamental investigation, processing and product development. During the cooperative research program, fast growing tree is one of the strategic issues in National Development Program of Indonesia, the joint research activities have been also directed toward this problem. The impact of cooperative program, a number of new scientific findings and important technological development have been made on this research project through an international collaboration. This international cooperation has successfully developed the research group at RDCAP-LIPI in particular, and Indonesia in general. During twelve years of JSPS cooperation program the group at RDCAP-LIPI has been growing to be a strong group with sufficient facilities to conduct and develop research in wood materials in the future.

Following the success of the above cooperation program, both institutions, i.e., RDCAP-LIPI and WRI-Kyoto University agreed to expand this program into "Core University Program" sponsored by JSPS, with the main research projects: 1. Wood Material Science for Sustainable Utilization of Tropical Forest Resources, 2. Development of Wood Biomass Technology for Tropical Species, and 3. Wood Bioscience & Technology for Tropical Species. The role of JSPS in promoting international scientific cooperation has been successfully achieved in the case of wood science and technology between Japan and Indonesia. With this Core University Program sponsored by JSPS we hope this cooperation will assist to develop scientific and technical capacity of the Indonesian side through upgrading human resources and knowledge, to promote the wood research activities in Indonesia, and to strengthen the relation between the institutions involved in the joint activities. Moreover, to develop good understanding and friendship between



*Dr. Anung Kusnowo*

scientific communities of wood science and technology in Japan and Indonesia with mutual benefit for both sides, and hopefully for world scientific community as well. Good personal relationship and understanding among scientific exchanges are very important ingredients for building a better world to live in.

### "Sampai jumpa lagi" Indonesia

*Ryuichiro Kondo  
Kyushu University*

On July 6, 1997 I went from Fukuoka to Jakarta, Indonesia by Garuda Air after spending one hour in transit at Denpasar Airport. That was my first visit to Indonesia as a part of the JSPS-LIPI Core University Program in the Field of Wood Science. My research subject is "Production of pulp and paper by using biological methods from tropical wood resources" cooperating with Dr. Honda, Wood Research Institute, Kyoto University.

Bali is an exotic and touristic area, whereas Jakarta is an economic center and an energetic city with large buildings, having the vitality of a developing country. Our busy schedule prevented us from seeing Jakarta more attentively, thus we traveled to Serpong with Dr. Bambang Prasetya, our counterpart from LIPI. LIPI in Serpong is located in a research park, similar to the one in Tsukuba. We visited the Research and Development Centre for Applied Physics and Applied Chemistry.

The next day we moved to Bogor by car and visited Indonesian Biotechnology Research Institute for Estate Crops and Bogor Agricultural University. After seeing these institutes we stayed at a residence at the Bogor Botanical Garden, which was built by the Dutch during their



colonial rule, and this building impressed me with its European tradition and beauty. This botanical garden is famous throughout the world for its size and amazing collection of plants. It felt like an extension of nature that surrounded us, which was gathered together into an exhibit, where a successful blend of man made management of plants and rivers was put into a wholesome area for viewing enjoyment. Early in the morning I awoke by the sound of men praying at the local mosque. I felt that I was in truly in a foreign land and I could sense the holy soul of the Muslim religion.

Our next and final destination was Bandung. From Bogor to Bandung, we drove through some tea fields, across mountains and valleys passing along the way some rice paddies and other crops. Some beautiful tall trees lined each side of the road and we could see the LIPI buildings. In Bandung we visited also the Institute of Technology Bandung and a pulping company. It felt like the countryside in Japan and the hospitality of the area was familiar to me. People are very kind and women are beautiful.

As a souvenir, I bought a puppet called "Wayang Golek", which is used for shadow theater. This brought our trip to a conclusion, so we flew back to Jakarta. After I returned to Japan, I was very surprised because we used Sempati Air, and the same flight that we took crashed a week later and thirty three people were killed in the plane.

Finally I would like to express my gratitude to all the people who took care of us on our journey and also to those who showed us much kindness and courtesy while we were visiting this most beautiful country of Indonesia. "Sampai jumpa lagi", see you again in Indonesia.



From the editorial board

## On-going Seven Research Projects

The JSPS Core University Program between Wood Research Institute (WRI), Kyoto University and the Research and Development Centre for Applied Physics, LIPI in the field of Wood Science has been launched in fiscal year (FY) 1996, i.e., April 1, 1996. Under the Program, several cooperative projects are planned, and these projects can be classified into three groups: 1) Wood Material Science for Sustainable Utilization of Tropical Forest Resources, 2) Development of Wood Biomass Technology for Tropical Species, and 3) Wood Bioscience & Technology for Tropical Species. In the first FY of the program, i.e., FY 1996, five cooperative projects regarding Wood Material Science were started, and in FY 1997 two projects on Wood Biomass Technology have been started. As a whole, seven cooperative projects are under way. Their titles and principal investigators in Japan and Indonesia are as follows:

### 1) Wood Material Science for Sustainable Utilization of Tropical Forest Resources

#### 1.1 Cement Bonded Particleboard from Fast-growing Trees, Bamboo and Agro-wastes, and its Application to Housing Exterior Siding

Principal Investigators: Shuichi Kawai, WRI, Kyoto University; Bambang Subiyanto, R & D Centre for Applied Physics

#### 1.2 Weathering Properties of Chemically Modified Wood-based Materials from Fast-growing Trees and Agro-wastes

Principal Investigators: Munezoh Takahashi, WRI, Kyoto University; Sulaeman Yusuf, R & D Centre for Applied Physics.

#### 1.3 Dimensionally Stable Compressed Wood and Composite Wood Products from Fast-growing Trees by High-pressure Steam Treatment

Principal Investigators: Misato Norimoto, WRI, Kyoto University; Myrtha Karina, R & D Centre for Applied Physics.

#### 1.4 Fire Resistive Wood Composites from Agro-wastes and Fast-growing Trees

Principal Investigators: Shigehisa Ishihara, WRI, Kyoto University; Subyakto, R & D Centre for Applied

Physics.

#### 1.5 Growth Mechanism of Fast-growing Species in Tropical Forest

Principal Investigators: Takashi Okuyama, School of Agriculture, Nagoya University; Yusuf Sudo Hadi, Faculty of Forestry, Bogor Agricultural University.

#### 2) Development of Wood Biomass Technology for Tropical Species

##### 2.1 Biopulping and Biobleaching Technologies in the Production of Pulp and Paper from Tropical Wood and Lignocellulosic Biomass

Principal Investigators: Masaaki Kuwahara, WRI, Kyoto University; Bambang Prasetya, R & D Centre for Applied Physics.

##### 2.2 Survey and Identification of Biologically Active Extractives from Tropical Hardwoods

Principal Investigators: Toshiaki Umezawa, WRI, Kyoto University; Wasrin Syafii, Faculty of Forestry, Bogor Agricultural University.

Due to budget constrain, the total number of cooperative projects are limited. New projects including those in the field of Wood Bioscience & Technology for Tropical Species may be initiated following the expiration or reshuffle of the on-going projects within 1 - 2 years.

From the editorial board

## Exchange of Scientists FY1997

The JSPS Core University Program between Wood Research Institute (WRI), Kyoto University and the Research and Development Centre for Applied Physics, LIPI in the field of Wood Science allocates travel expenses for exchange of scientists. The allocation is divided into three categories: 1) Scientist Exchange, 2) Cooperative Research, and 3) Seminar. "Cooperative Research" is for the exchange of scientists who are involved in the seven cooperative research projects described in the foregoing item. "Scientist Exchange" is for a short stay, and scientists who are not involved in the cooperative projects can apply for this category. "Seminar" is the support of overseas travel expenses to attend the International Wood Science Seminar of the Core University Research Program. This fiscal year (FY) we do not have the International Seminar, so nobody is allocated for this category. The



following is the list of exchange of scientists in FY 1997:

**1) Scientist Exchange**

From Japan to Indonesia

- Dr. S. Kitayama (Tokyo University of Agriculture and Technology)
- Dr. R. Funada (Hokkaido University)
- Dr. G. Meshitsuka (University of Tokyo)
- Dr. N. Yoshizawa (Utsunomiya University)
- Dr. T. Furuno (Shimane University)
- Dr. I. Furukawa (Tottori University)
- Dr. K. Sameshima (Kochi University)
- Dr. H. Kuroda (Kyoto University)
- Dr. T. Nobuchi (Kyoto University)
- Mr. S. Okuno (Kyoto University)

From Indonesia to Japan

- Mr. Kasmujo (Gadjah Mada University)
- Ms. Niniek Setyowati (R & D Centre for Biology)
- Mr. Dede Rohadi (Forest Products Research Institute)
- Mr. Mimpin Sitepu (North Sumatera University)
- Dr. Sipon Muladi (Mulawarman University)
- Dr. Neni Sintawardani (R & D Centre for Applied Physics)
- Ms. Nursyamsu Bahar (Institute for R & D for Cellulose)

**2) Cooperative Research**

From Japan to Indonesia

- Dr. H. Sasaki (Akita Prefectural College of Agriculture)
- Dr. M. Takahashi (Kyoto University)
- Dr. T. Morooka (Kyoto University)
- Dr. T. Hata (Kyoto University)
- Dr. T. Okuyama (Nagoya University)
- Dr. H. Yamamoto (Nagoya University)
- Dr. R. Kondo (Kyushu University)
- Dr. Y. Honda (Kyoto University)
- Dr. T. Umezawa (Kyoto University)
- Dr. M. Shimada (Kyoto University)

From Indonesia to Japan

- Dr. Bambang Subiyanto (R & D Centre for Applied Physics)
- Dr. Sulaeman Yusuf (R & D Centre for Applied Physics)
- Mr. Mohamad Gopar (R & D Centre for Applied Physics)
- Ms. Anita Firmanti Lovian (Research Institute for Human Settlement)
- Dr. Sri Nugroho Marsoem (Gadjah Mada University)
- Dr. Triadi Basuki (R & D Centre for Applied Chemistry)
- Dr. Didiek H. Goenadi (Biotechnology Research Unit for Estate Crops)
- Dr. Liswidowati (R & D Centre for Biology)
- Dr. Wasrin Syafii (Bogor Agricultural University)

Mr. Paimin Sukartana (Forest Products Research Institute)



**MoU  
for Scientific Cooperation  
between WRI and Other  
Research Organizations**

*Kunio Tsunoda, WRI*

International cooperation in academic activities has been a matter of increasing concern in recent years. This phenomenon is of no exception to wood research activities. In view of this, the Committee of International Academic Exchange in Wood Research Institute (WRI) has been discussing the possibility of exchanging formal agreements with universities and/or research institutes of established reputation to promote international scientific cooperation. This resulted in the signing of Memorandums of Understanding (MoU) for Scientific Cooperation with Nanjing Forestry University (NFU), China and New Zealand Forest Research Institute (NZFRI).

Joint study was initiated when three scientists from NFU came to WRI for a long duration in 1980. Since then, the president and 14 other scientists from NFU have come to visit WRI to discuss collaborative subjects and WRI scientists have been regularly invited to deliver some lectures at NFU. In 1994, WRI and NFU coorganized an international symposium on the "Utilization of Fast-Growing Trees". These collaborative activities led to the consideration of a long term collaborative work between WRI and NFU, and MoU was signed in October 1996. The primary focus of the collaboration with NFU has been on the research of the development and utilization of high-performance wood panels. The collaborative research areas will be extended when additional

research personnel exchange will be planned to enable more mutual and productive involvement.

In April 1997, another MoU was signed between WRI and NZFRI which has 50-year experience in forestry and forest product technology research. Generally, good linkage with foreign research groups begins with personal exchange between the groups. NZFRI is one of such cases. In the late 1970's, wood preservation group of WRI and NZFRI initiated their contact. A financial support from Japan Society for the Promotion of Science in 1980 and 1981 significantly contributed to the promotion of the later joint studies. However, the collaborative work has not been extended to other areas other than wood preservation. On the other hand, commercial and scientific interests have been increasing in high quality use of New Zealand radiata pine as it is possible to obtain sustainable supply from the plantation forests. These circumstances

encouraged both WRI and NZFRI to exchange MoU and to commence collaborative research projects. Japan-New Zealand Wood Science and Technology Seminar was held at WRI in October 1996 with the support of New Zealand Embassy in Tokyo, to provide the public with more information on the processing and utilization of radiata pine. New Zealand Forest Industries kindly donated the radiata pine materials of an extensional bridge at WRI in early 1997 for evaluating its long term performance.

Under such scientific collaboration agreements with foreign university and research institute, WRI is expected to play a more important role in making progress in the research on sustainable use of forest resources in various aspects.

**The Committee of International Academic Exchange**

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