



XXIII IUFRO WORLD CONGRESS HIGHLIGHTS: MONDAY, 23 AUGUST 2010

The XXIII International Union of Forest Research Organizations (IUFRO) World Congress, "Forests for the Future, Sustaining Society and the Environment," co-organized by IUFRO and the Korea Forest Research Institute, opened on Monday 23 August in Seoul, Republic of Korea. Over 2700 participants from international organizations, governments, academia, the private sector and civil society, heard an opening speech by the President of the Republic of Korea Lee Myung-Bak and discussed forest research issues in an opening ceremony, plenary, three sub-plenaries, 12 IUFRO business sessions, 19 technical sessions, and poster sessions.



Lee Myung-Bak, President of the Republic of Korea, giving his opening address.

OPENING CEREMONY

The XXIII International Union of Forest Research Organizations (IUFRO) World Congress opened on Monday 23 August 2010 with a drum performance and film presentation on the Republic of Korea's work promoting green growth.

Don Koo Lee, IUFRO President, highlighted IUFRO's history of advancing global cooperation on forest science through activities of its member organizations and stressed the importance of the IUFRO World Congress given the magnitude of ecological and social challenges facing the world. He said that only through cooperation and sustainable development can we tackle challenges such as climate change, desertification and poverty, and the need for new strategies for green growth. He then declared the Congress officially open.

Eduardo Rojas-Briales, FAO, stressed difficulties faced by simultaneous increases in financial constraints on the forest sector and demand for forest environmental services (FES). He emphasized that the world cannot mitigate or adapt to climate change without paying central attention to forests, and called for: not reducing forests to just carbon; Reducing Emissions from Deforestation and Forest Degradation in developing countries (REDD) mechanisms that cooperate with national forest programmes; a comprehensive global forest carbon model; and more forest-related education.

Jan McAlpine, UN Forum on Forests (UNFF), for Ban Ki-moon, UN Secretary General, said IUFRO plays an essential role in promoting sustainable forest management (SFM) through collaborations on forest research activities and in generating knowledge and assistance for improving forest governance.



Performance of a traditional Korean dance called the "Lotus Flower".



Don Koo Lee, IUFRO President, and Su-Se Lee, IUFRO, presented the Scientific Achievement Awards.

Don Koo Lee and Su-Se Lee, IUFRO, presented the host scientific award to Sung Gak Hong, the National Academy of Sciences, Republic of Korea, recognizing his work in elevating the profile of forest science and research, and scientific achievement awards to eleven other recipients in recognition of their work advancing forest research.

Lee Myung-Bak, President of the Republic of Korea, discussed his country's efforts to restore its once barren lands, noting that forests are the foundation of our lives and the source of our basic needs. Calling climate change humanity's biggest challenge, he urged UN climate delegates to think to the future in their continuing negotiations. He said the Republic of Korea now ranks fourth in the OECD for its ratio of forests to total land area and said this can be an example of how to advance green growth, noting tree planting programmes and green space initiatives in Seoul.

The opening ceremony concluded with a presentation by children introducing the Congress theme of Forests for the Future: Sustaining Society and the Environment.

OPENING PLENARY

The opening plenary was chaired by Jung-Hwan Park, Republic of Korea. Nobel Prize winning poet, Ko Un called for the development of a Human Charter for the Forest to prevent future atrocities committed against forests, referring to the "cumulative crime of forest destruction perpetrated over previous centuries by human avarice." He stressed that voluntary institutions are urgently needed to ensure that such a declaration does not become a mere slogan. He said that the future of the human race can only be guaranteed by making the forest spirit the very spirit of humanity. He made suggestions on: educating schoolchildren on the importance of forests; allocating some work hours as "forest time" in workplaces; planting a tree on occasions of birthdays and celebrations; and raising the rank of the Korean Forest Service and other relevant government administrations to that of top government agencies. He concluded by stating that the nations of tomorrow will succeed as nations only if they are nations of the forest.

SUB-PLENARY SESSIONS

In the afternoon, three concurrent sub-plenaries took place on forest health in a changing environment, keeping Asia green, and perspectives of the Collaborative Partnership on Forests (CPF) on biodiversity, climate change and forestry.

FOREST HEALTH IN A CHANGING

ENVIRONMENT: Elena Paoletti, National Research Council Plant Protection Institute, Italy, presented the compounding effects of air pollution on forest ecosystems given climate

change. She discussed how climate change exacerbates impacts of ozone and nitrogen on forest health, and reduces forest-carbon sequestration.

Nicola La Porta, Fondazione Edmund Mach Istituto Agrario di S. Michele All'Adige, said factors related to climate change, including temperature changes and altered precipitation patterns, may increase the effects of fungal diseases on forests. He said trees may be more susceptible due to higher stress levels or new threats may appear because of changing species composition and the arrival of new pathogens.

Andrew Liebhold, U.S. Forest Service, emphasized globalization as a key cause of invasive species and noted the US has about 400 non-native forest species, only some of which have negative economic consequences. He described varied impacts of invasions on natural, plantation, and urban forests, and said work to prevent arrivals can reduce control and eradication costs.

Martin Lorenz, Institute for World Forestry, presented on the International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests, describing its work monitoring forest ecosystem conditions and spatial and temporal variation of forest health. He said they are enhancing the system to capture interactions, coordinate with national forest inventory plots to measure forest growth, and increase measurement intensity to assess ecosystem functions.

William Otrosina, U.S. Forest Service, described how land-use changes, including for fire suppression and agriculture, create sub-optimal conditions for certain species due to interactive effects with root pathogens which, need to be considered in restoration before silvicultural interventions are prescribed.

Andrea Battisti, Padova University, Italy, presented on the importance of climate change for the frequency and distribution of insect outbreaks, noting that direct and indirect effects of climate change will have a positive but varied effect on herbivorous insect activity. He said these positive effects, combined with expanded insect ranges will likely increase insect outbreaks.

KEEP ASIA GREEN: REHABILITATING AND RESTORING FOREST ECOSYSTEMS IN ASIA: The session was chaired by Michael Kleine, IUFRO. Don Koo Lee, IUFRO President, highlighted that the session would summarize the results of IUFRO's "Keep Asia Green" initiative.

Zhiqiang Zhang, Beijing Forestry University, presented on afforestation and ecological restoration in the East Asia region. He noted that despite dramatic forest land use changes resulting in deforestation and forest land degradation, extensive forest related land rehabilitation activities undertaken in the region have resulted in significant restoration of forest cover in some countries.



Ko Un, a famous Korean poet



L-R: Ahmed Djoghlaif, CBD; Bill Jackson, IUCN; Jan McAlpine, UNFF; Peter Mayer, IUFRO; Eduardo Rojas-Briales, FAO; Tony Simons, World Agroforestry Centre; and Emmanuel Ze Meka, ITTO.

Victor Teplyakov, Seoul National University, discussed the Russian Federation's Far East forest use and rehabilitation, noting efforts on reforestation which have been made.

Lucrecio Rebugio, University of the Philippines, presented successful cases and lessons learned on rehabilitating degraded forest lands in Southeast Asia, noting that in spite of efforts, forest cover decline continues in most of the regions' countries.

Promode Kant, Institute of Green Economy, India, reported on rehabilitating forests and extending tree cover in South Asia, highlighting the importance of: forest law and policy; community-based forest management; and establishment of rehabilitation projects.

Khosro Sagheb-Talebi, Research Institute of Forests and Rangelands, presented on the forest landscape restoration and rehabilitation activities in West Asia, highlighting: survey and site-specific planning; application of participatory approaches; watershed rehabilitation in mountainous regions; combating desertification; flood-water spreading; and rain-water harvesting.

BIODIVERSITY, CLIMATE CHANGE AND FORESTRY – PERSPECTIVES OF THE COLLABORATIVE PARTNERSHIP ON FORESTS:

The sub-pleinary was facilitated by Peter Mayer, IUFRO, and highlighted key global forest activities, needs and ideas.

Eduardo Rojas-Briales, FAO, spoke on the goals and achievements of the CPF. He highlighted several CPF successes, including the Forest Days at the UNFCCC COPs, which formally put REDD on the climate agenda, and the CPF Strategic Framework on Climate Change. He also noted that 2011 will be the UN's International Year of Forests (IYF), to be organized by UNFF.

Bill Jackson, IUCN, discussed the landscape approach for linking climate change, forest biodiversity and the needs of people. He recommended "nature-based solutions," such as REDD, with an emphasis on all forest values. REDD, plus conservation (REDD+), he said, is the only cost-effective, proven way to scale up emissions reductions while alleviating poverty and vulnerability, and for which large-scale opportunities exist. Emphasizing the importance of connecting communities to forest management, he described IUCN's Livelihoods and Landscapes Strategy, which uses the landscape approach to forest management and in which the landscape is determined by the local social, economic, and geographic context.

On climate change and the 2010 International Year of Biodiversity, Ahmed Djoghlaif, Convention on Biological Diversity (CBD), described the importance of the upcoming CBD COP 10 to adopt a new global strategy for biodiversity, especially related to access and benefit sharing and conservation of genetic resources. He underlined his hope

that an agreement would include a legally-binding monetary evaluation mechanism. Djoghlaif closed by highlighting the CBD's global tree-planting initiative, Green Wave, which has expanded from 50 to 6000 schools in two years.

Emmanuel Ze Meka, International Tropical Timber Organization (ITTO), described reducing deforestation and forest degradation and enhancing environmental services in tropical forests (REDDES). He identified several REDDES research priorities and encouraged greater investment in financial incentives for SFM and functional markets.

Tony Simons, World Agroforestry Centre, referencing that neither the word "tree" nor "forest" was used in the 1972 Stockholm Declaration and that forestry was only marginally referenced in the 2001 Millennium Development Goals' indicators, stated that in 2010 "forestry has never had it so good." He emphasized the importance of good communication with the example that although the word "forestry" is now contained in 40 million internet URLs, while some much less inspiring searches bring up many times this number.

Jan McAlpine, UNFF, stressed the need to integrate multiple values of forests and to recognize that large populations depend on forests. She presented two John D. Liu films emphasizing connections between damaged environments and human poverty, and how restoration of wild vegetation can revitalize agricultural systems and local economies. On the issue of cross-sectoral connections, McAlpine described the UNFF 360 degree perspective as an initiative valuing and creating institutional partnerships beyond the forestry sector, including with several UN conventions and the ITTO.

TECHNICAL SESSIONS

In the late afternoon, participants scattered throughout the massive COEX complex to attend 19 concurrent technical sessions spanning all nine conference themes. IISD Reporting Services was there to cover two of them, on income from smallholder forestry and economic valuation of forest ecosystem services.

INCOME FROM SMALLHOLDER FORESTRY – CAN IT BE A DRIVER OF POVERTY ALLEVIATION?: This session was chaired by Verina Ingram and Patrice Levang, Center for International Forest Research (CIFOR).

Divine Foundjem-Tita, Ghent University, discussed how creating institutional arrangements for informal non-timber forest product (NTFP) markets can improve livelihoods of farmers in Cameroon. Institutionalizing communication pathways and standards for measurement were found to increase: point of sale prices; market certainty; bargaining power; and competition amongst farmers.

Verina Ingram, CIFOR, elaborated on lessons learned from two case studies in Cameroon, finding only small financial benefits and even economic costs from moving to communal forest usage in some cases, but that estimated sustainability of projects increased 40%.

Dede Rohadi, CIFOR, discussed possibilities to improve incomes from teak harvesting, one being to introduce a standing tree valuation system to ensure smallholders receive fair market prices. He also found that although teak is financially feasible, it is often not the best source of income for smallholders.

Kazuhiro Harada, University of Hyogo, Japan, highlighted how small group timber certification can play a role in poverty alleviation in Indonesian smallholder communities by offering: financial support from the group to undertake extraction; income security of certification; halting of illegal logging due to improved income from certified products.

Aziza Rbibate, University of Johann Heinrich von Thünen-Institut, Germany, analyzed the Malagasy forest fringe as a basis for developing adaptive incentives in the context of REDD. She noted that the social and economic functions of deforestation and forest degradation are highly dependent on social and economic structures, and that these should form the basis of any REDD related incentives or alternatives.

Kazi Kamrul Islam, Kyushu University, talked about how participatory agroforestry in Bangladesh is hindered by bureaucracy, monopoly market structures, poor infrastructure, and exploitation by middlemen.



Verina Ingram and Patrice Levang, CIFOR

Shoana Humphries, University of Florida, expounded on the economic feasibility of community-based forest enterprises in Brazil. She found that although they can be successful, donors need to reconsider their definition of viability to incorporate options for continued support to alleviate poverty sustainably.

Sushila Kumari Thapa Magar, ForestAction, discussed community forest enterprises in Nepal, noting their success is a function of appropriate regulation, stakeholder participation in decision-making and project ownership.

Ousseynou Ndoye, FAO, discussed the need for regulatory policy reform for development of NTFP enterprises in Central Africa, highlighting that laws dealing with traditional use rights currently criminalize sale of NTFPs by smallholders. He also emphasized the effects of mid-level corruption, as its costs travel down the value chain to smallholders.

ECONOMIC VALUATION OF FOREST ECOSYSTEM SERVICES: Co-Chair Larry Mason, University of Washington, discussed the policy challenges of successfully valuing and compensating FES. Drawing on US examples, he lamented the numerous problems associated with approaches such as certification and carbon markets, and called for place-based approaches to forest management.

Co-chair Richard Yao, Scion and New Zealand Forest Research Institute, discussed research on non-market valuation of recreational use of New Zealand's Whakarewarewa forest. Describing user surveys and econometric techniques, he



View of the technical session on income from small holder forestry.

reviewed differences between how mountain bikers and walkers value forest attributes and their levels of satisfaction with the forest.

Peter Herbst, IUFRO, described a forest eco-compensation package seeking to offset forest habitat destruction in Georgia related to an international pipeline right-of-way. Rather than monetize forest services, he explained a scoring method used to assess habitat attributes and their change over time.

Robert Deal, US Forest Service, discussed work to value ecosystem services in the US, such as wetland banking under the Clean Water Act. On work to bundle ecosystem services, he described the challenge of coordinating across regulatory agencies, avoiding double counting and demonstrating additionality.

Shuirong Wu, Chinese Academy of Forestry, presented a meta-analysis of the valuation of FES in China. She highlighted that China's valuation standard differs from Costanza or the Millennium Ecosystem Assessment, and in the review of 50 studies concluded that there is great variation in FES values, and that uncertainty exists for predicting values based on previous studies.

Eduardo H. Ditt, Ecological Research Institute, Brazil, discussed valuation and policy in the context of the Atlantic Forest of Brazil, which supplies water for nine million people. He said the total value of its ecosystem services, differentiated by land use type and valuation method, provides a valuation range of \$49-60 million per year. He said this analysis offers a variety of practical policy options and prices.

In discussion, participants also considered the issue of high transaction costs for FES, the prospect of an ecosystem having infinite value, and the importance of economic analyses in giving weight to policy decisions.



Participant posing with IUFRO mascots.



XXIII IUFRO WORLD CONGRESS HIGHLIGHTS: TUESDAY, 24 AUGUST 2010

On Tuesday, participants continued discussing forestry issues of every hue, beginning with a plenary keynote speech by CIFOR Director General Frances Seymour on past and future challenges of forest research. The day continued with three sub-plenaries on urban forests, the next generation of forest research, and forests and climate mitigation. Additionally, 38 technical sessions met, covering all nine Congress themes, along with multiple side and business events, as well as the first of two official poster sessions.



IUFRO theme banners prominently displayed in the exhibition hall.

PLENARY SESSION

Niels Elers Koch, Forest and Landscape Denmark, chaired the plenary and introduced keynote speaker, Frances Seymour.

Frances Seymour, CIFOR, began with a retrospective talk on forest and communities research aimed at gleaning lessons for the multiple challenges of integrating climate change into future research. After commending progress made on understanding effects of rights and market constraints, and highlighting the importance of institutions, she warned against the “tyranny” of the case study, the proliferation of which has created an excess of objectivity, allowing scientists to build scientifically supported arguments to corroborate any normative position on the effects of community-based forestry. To move away from the “it depends” conclusion on this effectiveness, Seymour

highlighted that the inclusion of a more open, political economy approach is needed to account for the multiple, often competing, interests involved in, and served by, forest policy-making.

Seymour then highlighted key aspects that must be included in future climate change-related forestry research. First, noting that communication with the “climate world” is imperative, what may be conventional wisdom to some is novel information to others. Second, she urged that new research agendas must build on what is already known about creating effective, efficient and equitable outcomes. Third, she called for forest scientists to commit to “big science,” as too much “small think” can impede evidence-based rural policy-making. She stressed that much is to be gained by investing in global comparative



Frances Seymour, Center for International Forest Research (CIFOR),

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Frances Seymour, CIFOR Director General

studies, but because no single organization has the capacity to undertake such an operation on its own, collaborative research must be pursued now more than ever.

Responding to questions from Koch, Seymour noted that IUFRO will play a valuable role in the adaptation of big science through its promotion of interdisciplinarity and cooperation.

SUB-PLENARY SESSION

PROMOTING URBAN FOREST SERVICES IN PARTNERSHIP BETWEEN SCIENTISTS AND COMMUNITIES:

Chair Cecil Konijnendijk, University of Copenhagen, summarized changing urban trends affecting urban forestry: demography, lifestyle, information and entertainment, urbanization, and changes in the wider environment. He continued by presenting characteristics urban forestry should embody, namely: integrative, strategic, inter- and multi-disciplinary, participatory, and adequate in meeting urban demands, since foresters' "customers today are primarily urban."

David Nowak, US Forest Service, discussed partnering with urban communities to secure data and promote urban management of forest services in the United States using the iTree tool. He described how this free software provides the US Forest Service with free data on urban forests and helps cities better understand the functions and needs of their urban forests.

Kjell Nilsson, University of Copenhagen, introduced the Peri-urban Land Use Relationships - Strategies and Sustainability Assessment Tools for Urban-Rural Linkages Project (PLUREL), which had the participation of 14 European countries and China, and analyzed challenges and consequences of urbanization. The results of the project recommended response strategies including: improved governance and integrated territorial policy approaches; urban containment; the creation of new urban landscapes and a green compact garden city; preservation of green infrastructure and green areas; better understanding the urban-rural interface; and strengthening public sector control over urban sprawl.

Jay Bolthouse, University of Tokyo, illustrated how forests can bridge the urban/rural divide and that managing urban forests can be treated not only as work, but a leisure activity as well. He presented the results of a study on a new Japanese urban forest paradigm characterized by volunteer management of urban and peri-urban woodlands, focusing on the role of scientists in establishing and strengthening community forestry networks that link disperse and fragmented volunteer groups.

Michelle Gautier, FAO, joined the panelists for the discussion. In contrast to panelists' focus on wealthy nations, she said requests are increasingly coming to the FAO from less wealthy countries to assist with rural-urban linkages primarily

related to chronic urban watershed mismanagement, leading to sinking water tables, desertification and landslides. Discussions focused on: the importance of partnerships; the need to develop internationally standardized assessment tools; the focus on matching policy to the needs and aspirations of the public; and integrating forestry issues into school education.

CAN FORESTRY AND FOREST SECTOR ACTIVITIES CONTRIBUTE TO MITIGATING CLIMATE CHANGE?:

Werner Kurz, Natural Resources Canada, moderated the session and emphasized the importance of educating policy-makers about the forest sector's contributions to climate change mitigation. Additionally, he warned that oversaturating forest carbon sinks beyond tipping points could negate mitigation effects. He also highlighted the substitution benefits of using wood rather than energy-intensive materials.

Frank Werner, independent consultant, explained a model for effective long-term forest and wood management for GHG mitigation, emphasizing that an optimized life cycle of wood products should include a maximum but sustainable increment of harvestable wood, continuous downcycling through a use "cascade" terminating as fuel for bioenergy.

Reid Miner, National Council for Air and Stream Improvement, reviewed the global forest industry's impact on GHGs, highlighting that increasing the use of forest products can produce large benefits to society via GHG reductions. He lamented a lack of quantitative data on forest carbon stocks and landfill design and management.

Ben de Jong, El Colegio de la Frontera Sur, reported on the readiness of Mexico to begin carbon accounting based on REDD assessments. He revealed that a national REDD scenario and robust monitoring system are forthcoming, and concluded by elaborating on ten elements necessary to create Mexico's REDD profile and monitoring system.

Richard Harper, Murdoch University, spoke on bio-mitigation and, noting that forestry alone will not be able to solve carbon imbalances, he proposed research on using abandoned farmland for mitigation to avoid the problem of the food versus fuel debate.

William Keeton, University of Vermont, introduced a new study on the carbon storage potentials of temperate old growth forests based on an aggregated global dataset, saying there is a high potential for their conservation to increase carbon storage with a variety of ecosystem co-benefits, but that variability in stand structure must be noted.

IUFRO AWARD WINNERS – THE NEXT

GENERATION: Co-chair Su See Lee, IUFRO, introduced this year's awardees, remarking that female and developing-country students were well represented. Co-chair, Michael Rivoire, International Forestry Students' Association, moderated a discussion on the students' research.



Kjell Nilsson, University of Copenhagen



Winners of IUFRO's Student Award for Excellence in Forest Science and Outstanding Doctoral Research participated in a panel discussion on their motivations, challenges and experiences in conducting their research projects.

There were three recipients of the Student Award for Excellence in Forest Science. Lee Hong Tnah, Forest Research Institute Malaysia, won for her work on a DNA database designed to help stop illegal logging. Macro Contreras, University of Montana, won for using an innovative optimization technique to determine least-cost and environmentally friendly routes for wood transportation. Mahbuhul Alam, Ehime University, won for work characterizing the ecology and significance of "home gardens" in Bangladesh.

There were eight Outstanding Doctoral Research Award recipients. Guillermo Gea Izquierdo, Swiss Federal Research Institute, won for research advancing an ecosystem model in the silvopastoral system of West Iberian open woodlands. Finnvid Prescher, Svenska Skogplantor AB, won for research on the genetic functions and management of seed orchards and procurement. Jürg Andreas Stückelberger, EcoEng Ltd., won for work on optimizing road networks for ecological and economic priorities in mountainous European areas. Guillermo Trincado, Universidad Austral de Chile, won for a dynamic model capturing branch and knot formation in Loblolly pine. Jiali Jiang, Research Institute of Wood Industry, China, won for work on the effects of temperature, time and frequency of the dynamic viscoelasticity of wood. Feng'e Yang, Ontario Ministry of Natural Resources, won for work on the welfare and competitiveness impacts of Ontario's stumpage pricing system. Marieka Gryzenhout, University of Pretoria-FABI, won for evaluating the taxonomy of a group of important tree pathogens. Andreas Schindlbacher, Federal Research and Training Centre for Forests, Austria, won for work on the effects of global warming on carbon turnover in a limestone forest soil.

In the discussion, the awardees stressed the value of international collaborations.

TECHNICAL SESSIONS

CHALLENGES AND ISSUES OF FOREST MANAGEMENT AND UTILIZATION IN ASIAN COUNTRIES:

Matti Palo, independent scientist, discussed deforestation and poverty challenges in the Democratic People's Republic of Korea, Mongolia and tropical Asian countries. He reviewed a theoretical model of deforestation drivers and an empirical model assessing poverty and ecological drivers, and stressed the difficulty of acquiring relevant data.

Ho Sang Kang, Seoul National University, delineated multiple threats to Indonesia's ecologically significant forests. He discussed an ecotourism training programme developed

by the School of Environment Conservation and Ecotourism Management as one possible approach to address these challenges.

Dar-Hsiung Wang, Taiwan Forestry Research Institute, discussed the history and evolution of Japanese cedar plantations in Taiwan, linking them to Japan's occupation of Taiwan and a forest management paradigm prioritizing the replacement of "unproductive" native forests with "productive" plantations. He ended by noting that degradation in their quality has necessitated proposals to replace them.

Shirong Liu, Chinese Academy of Forestry Sciences, reviewed China's forest resources, legislation, production and trade. He highlighted 2003 forest governance reforms, including transforming collective ownership into individual ownership, and underscored China's low forest productivity and forest area per capita, and the damages caused by pests, diseases and invasive species.

Juan Chen, University of British Columbia, discussed China's national forest protection and conversion of cropland back to forest programmes. Despite successes with afforestation of degraded lands, she noted challenges regarding unemployed forest workers and in ensuring the longer-term vitality of planted forests.

Nabaghan Ojha, Regional Centre for Development Cooperation, India, discussed the evolution of Indian forests and forest laws, including provisions for participatory forest management and the Forest Rights Act that recognizes rights of forest dwelling peoples, stressing implementation challenges.

Mohammad S.H. Chowdhury, Shinshu University, Japan, discussed medicinal plants and forest protection in Bangladesh. He described their use in 36 villages surrounding the Rema-Kalenga Wildlife Sanctuary, and closed with recommendations on balancing community and conservation needs.

BIODIVERSITY AND CLIMATE CHANGE: DIRECT AND INDIRECT LINKAGES IN ADAPTATION AND MITIGATION: M. Danesh Miah, University of Chittagong, presented challenges of harmonizing requirements of the Kyoto Protocol's Afforestation/Reforestation (A/R) Clean Development Mechanism (CDM) and those of the CBD. Bangladesh, he said, with a gross plantation carbon stock of 190 tons of carbon per hectare, has great opportunity to benefit from A/R carbon credits, but that this will come at the cost of introducing alien species in the plantation process.

Similarly, Jürgen Bauhus, University of Freiburg, noted conflicts between silviculture strategies that change ecosystem structure to maintain select functions, and nature conservation that maintains historical conditions. He indicated that a focus on desired ecosystem functioning may reduce these conflicts.



Participants looking at posters submitted to the IUFRO XXIII Congress.

David Flaspohler, Michigan Technical University, spoke on intensive forest management for bioenergy. He noted that expanding markets for plant-based biofuels have the potential to intensify forest management in ways that harm native species, but said other models exist in which intensively managed forests sustain many ecosystem services furnished by unmanaged forests.

Eckehard Brockerhoff, New Zealand Forest Research Institute, said impacts of climate change on forest biodiversity include range-boundary changes and phenological shifts of 279 species, causing increased breeding cycle frequency, population booms and migration. In turn this creates new patterns of invasive species. He highlighted the value of mixed stands for climate adaptation and mitigation.

Chan Ryul Park, Korea Forest Research Institute, presented research on changing bird distribution patterns caused by climate's effect on metabolic rates. He said forest declines also influence distribution and that eco-tourism may enable habitat transition.

Alexander Belokurov, WWF, stressed that, though the potential of protected areas has only partially been realized, they remain the most important tool for biodiversity conservation and provide vital climate change mitigation and adaptation benefits.

HEALTH BENEFITS OF FORESTS: Won Sop Shin, Chungbuk National University, facilitated the session.

Si Hyung Lee, Research Institute for Korea Natural Medicine, proposed that a 2-3 day wilderness retreat positively increases levels of human serotonin, a neurotransmitter which reduces depression, eating disorders, and aggression.

Kjell Nilsson, University of Copenhagen, presented on the role of the environment in healthy lifestyles. He mentioned that several international working groups are looking at research on the prevention of illness, the importance of green spaces, and the effect of the environment on mental status.

Tatsuya Kushida, NalaPro Technologies, summarized biochemical research on flavonoids, substances contained in tree bark, which have been seen to improve human immune functions.

Nor Azah Mohamad Ali, Forest Research Institute Malaysia, presented on her institute's work on bioprospecting, i.e. the search for applications, processes or products in nature with useful health benefits. She said her team assists in the

development, and quality and safety assurance, of products for cosmetics and toiletries manufacturers, especially lotions and creams, anti-inflammatory agents and mosquito repellants.

Julius Adebayo John, Forest Research Institute, Nigeria, talked about perceptions and use of traditional herbal medicines in Nigeria, the popularity of which is returning as health risks of fake pharmaceuticals become more apparent. He recommended that policy-makers take steps to formally recognize herbal medicines to encourage their use.

INNOVATIVE APPROACHES TO FOREST

ECOSYSTEM RESTORATION: The session was moderated by Stephen Syampungani, Copperbelt University.

John Stanturf, US Forest Service, said that forest landscape restoration can serve to restore forest functions and meet human needs, but that there has so far been little success in systematically integrating these two complementary aims. He reviewed existing research and suggested ways to integrate social and natural science approaches with a resiliency science framework, such as reconstructing biotic/abiotic thresholds, colonization and afforestation, and repairing watershed functions.

Ekeoba Isikhuemen, Ministry of Environment and Public Utilities, Nigeria, discussed a pilot study on reversing biodiversity loss and degradation of agricultural lands in southern Nigeria. He said the project demonstrated that with appropriate eco-friendly cropping mixtures and agroforestry practices, degraded forest land can recover from a disturbed state.

Keiko Nagashima, Kyushu University, presented on a study examining abandoned plantation clearcuts on Kyushu Island of Japan to understand early stage vegetation recovery processes. She said deer browsing was the main factor inhibiting tree species recovery, and that slope form, adjacent natural broadleaf forests and abandoned sites influence vegetation types that emerge.

Arno Thomaes, Research Institute for Nature and Forest, Belgium, introduced a research project examining tree species as "ecosystem engineers" for restoration. He explained the specific influence of oak and poplar species on soil pH, which shapes the abundance of ancient forest herbs in post-agricultural forests.

Coert J. Geldenhuys, University of Stellenbosch, discussed a forest rehabilitation approach that emulates natural disturbance regimes and utilizes the benefits of secondary forests and locally developed slash-and-burn agriculture systems. Drawing on examples from the Congo Basin and South Africa, he used species richness in secondary forests as an indicator of recovery and explained how such recovery could serve as the basis for restoration projects matched with local agro-forestry systems.

Participants heard presentations on two related posters and in the ensuing discussion, considered, *inter alia*: appropriate measures of biodiversity, such as richness and endemism; and how the session informs discussions about REDD.



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IUFRO delegates with the IUFRO Congress mascot mixing a giant serving of "Bibimbap". Photo courtesy of Reem Hajjar.

PLENARY SESSION

John Parrotta, US Forest Service, chaired Wednesday's plenary, introducing Keynote Speaker José Joaquín Campos Arce, Centro Agronómico Tropical de Investigación y Enseñanza (CATIE).

Campos Arce presented on the integration of scales and sectors to improve sustainability of livelihoods, landscapes and forests. He highlighted that system approaches are necessary for addressing the complex set of challenges facing the world, as well as achieving sustainable development, which requires interdisciplinary multi-stakeholder platforms, mechanisms and intense coordination. Campos Arce said there is a need to find

sustainable rural solutions to global challenges and local needs, requiring integrated and collaborative solutions on all scales, from local to global. He underlined that rural areas provide important ecological services.

Agroforestry systems, he said, are key to improving livelihoods of poor rural families. He identified several components of such systems including: managing tree density and growth to enhance carbon storage without affecting yields; linking local communities with socially responsible companies; finding innovative approaches to lower transaction costs; and ecosystem approaches to SFM, forest conservation, and establishment of biological corridors.

Campos Arce stressed the importance of PES, especially for small farmers and forest-dependent people. Scientific support, he said, will improve effectiveness of SFM, and he underlined the importance of forestry education and training of new forestry professionals.

Campos Arce concluded that social and ecological resilience are interdependent and the key for sustainable livelihoods, landscapes and forests.

SUB-PLENARY SESSIONS

On Wednesday afternoon, three simultaneous sub-plenary sessions convened around the bustling COEX complex in Seoul.

IUFRO DIRECTORS FORUM: FOREST MONITORING IN TIMES OF CLIMATE CHANGE:

Co-moderator Konstantin von Teuffel, Forest Research Institute Baden Württemberg, called the Forum a place to exchange views on management of forest research. Co-moderator Ann Bartuska, US Forest Service, added that another aim of the Forum is to make the theoretical practical.



José Joaquín Campos Arce, CATIE, accepted a token of appreciation from IUFRO President Don Koo Lee.

The *IUFRO World Congress Bulletin* is a publication of the International Institute for Sustainable Development (IISD) <info@iisd.ca>, publishers of the *Earth Negotiations Bulletin* © <enb@iisd.org>. This issue was written and edited by Graeme Auld, Ph.D., Aaron Leopold, Liz Willetts, and Kunbao Xia. The Digital Editor is Francis Dejon. The Editor is Robynne Boyd <robynne@iisd.org>. The Director of IISD Reporting Services is Langston James "Kimo" Goree VI <kimo@iisd.org>. Funding for coverage of this meeting has been provided by the International Union of Forest Research Organizations (IUFRO). IISD can be contacted at 161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba R3B 0Y4, Canada; tel: +1-204-958-7700; fax: +1-204-958-7710. The opinions expressed in the *Bulletin* are those of the authors and do not necessarily reflect the views of IISD. Excerpts from the *Bulletin* may be used in other publications with appropriate academic citation. Electronic versions of the *Bulletin* are sent to e-mail distribution lists (in HTML and PDF format) and can be found on the Linkages WWW-server at <http://www.iisd.ca/>. For information on the *Bulletin*, including requests to provide reporting services, contact the Director of IISD Reporting Services at <kimo@iisd.org>, +1-646-536-7556 or 300 East 56th St., 11A, New York, New York 10022, United States of America. The IISD team at the XXIII IUFRO World Congress can be contacted by e-mail at <aaron@iisd.org>.



Mette Loyche Wilkie, FAO

Peter Mayer, IUFRO, discussed the outcome of the 2009 World Forestry Congress regarding forest monitoring, emphasizing funding, climate change and significant regional differences in monitoring capacities.

Mette Loyche Wilkie, FAO, reminded participants that monitoring takes

place on different scales under different conditions. She said FAO supports formation of technologically-centralized but bottom-up global monitoring. Wilkie underscored the enormous data gaps researchers faced preparing for FAO's Global Forest Resources Assessment (FRA) 2010, especially on: net changes in carbon stocks; previous and current deforestation rates; and carbon emissions from deforestation.

Ben Chikamei, Kenya Forestry Research Institute, spoke on forest monitoring in Kenya and Africa. He noted that despite progress made in his country, only 11 African countries are set to benefit from REDD projects through the World Bank, saying complicated procedures and methodologies hinder expansion of CDM and REDD activities, recalling that according to UNEP's methodology, Kenya has 2 % forest cover but using FAO's it has 5.9 %.

José Joaquín Campos Arce, discussed forest monitoring in Latin and Mesoamerica, stressing it is an adaptive management tool, not a luxury. Aside from capacity deficits outside Mexico, he also noted difficulties agreeing on regional definitions for indicators, criteria and principles due to differences in Latin American national interests.

Joon Hwan Shin, Korea Forest Research Institute, stressed the need to address four questions: what forest information is important for climate change? What is the appropriate structure of a global forest monitoring system? How can the needs of developing countries be met? Who will pay for such a system?

Klaus-Herman von Wilpert, Forest Research Institute Baden Württemberg, presented the outcome of forest monitoring in Central Europe as a basis for SFM. He purported that forest decline is the result of air pollution and soil degradation, and emphasized that monitoring should be a continuous bottom-up endeavor. He concluded by voicing frustration that the EU refused to fund regional monitoring because of a lack of political appeal, and urged IUFRO to send a clear message to policymakers on this issue.

George Sam Foster, US Forest Service, said there is a critical demand for forestry monitoring information and that expanding interest is generated by rapid changes in global markets and environments. He stressed the need for, *inter alia*: further integrating satellite data with ground level information; a focus on innovations to lower monitoring costs; and better understanding what forest change really means.

FOREST BIOMASS UTILIZATION FOR BIO-ENERGY: TECHNOLOGY, ECONOMICS AND ENVIRONMENT:

Woodam Chung, University of Montana, moderated this session, explaining that biomass can be used as a tool for mitigating climate change.

Nathaniel Anderson, University of Montana, explained it was cost-effective and feasible to supply timber residue at \$43 per ton in Oregon. He concluded that pyrolysis production of biochar has great potential.

Christian Suchomel, University of Freiburg, described harvesting firewood via the coppice method, which generates dense and sustainable re-sprouting of forest stands, providing sustainable bioenergy. He described different harvesting technologies and concluded that coppice is good for conservation.

Han-Sup Han, Humboldt State University, emphasized that non-uniform forest residues are difficult and expensive to handle, and described challenges with four current residue collection and transport systems: centralized processing; on-site processing; slash bundling; and integrated systems.

Xueyong Ren, Beijing Forestry University, presented fast pyrolysis bio-oil production. Using this method, he said, biomass can be converted to biochar, bio-oil, or combustible gas in a single chemical reaction.

Using a life cycle approach, Young-Seop Choi, Kangwon National University, compared wood fuels, concluding that the distance to the consumer and income level of the consumer are important.

On bioenergy in Japan Kazuhiro Aruga, Utsunomiya University, lamented that although forest, sawmill, and construction waste residues largely go unused, subsidies necessary to make them economically viable, are unlikely to be introduced.

Deborah Page-Dumroese, Michigan Technological University, highlighted the importance of soil science in forestry management and biomass harvest, stating that both alter soil processes physically, chemically, and biologically. She said retaining the forest floor is key to forest health and recommended practitioners create site-specific risk ratings to promote sustainability.

Lisa Sennerby-Forse, Swedish University of Agricultural Sciences, for Helene Lundkvist, summarized bioenergy development in Sweden, noting it had surpassed hydropower and nuclear power, and accounts for more than 25% of total energy supply. She also outlined the environmental concerns of producing bioenergy.

CONSERVATION AND SUSTAINABLE USE OF FOREST GENETIC RESOURCES:

Heok-Choh Sim, Asia Pacific Association of Forest Research Institutions, moderated the session.

Zohra Bennadji, Instituto Nacional de Investigación Agropecuaria, Uruguay, detailed a project identifying critical problems in forest genetic resource (FGR) conservation and sustainable use, which will inform the first FAO assessment on the global status of FGRs. She noted: the need for standardized indicators for forest species priorities and genetic diversity; a lack of good exchange mechanisms for information sharing; and weak links between policy and science



Participants posing questions to a poster presenter.



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Judy Loo, Bioversity International, presented an approach for managing conservation of genetic diversity when reliable information on variability is lacking, underscoring that due to high costs and difficulties of obtaining genetic information, it is often neglected by forest managers. She suggested assuming that genetic diversity correlates with environmental variability until more information is available on FGR.

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Kyu-Suk Kang, Korea Forest Research Institute, reviewed the history and aims of tree breeding in the Republic of Korea, including work on breeding indigenous timber species and the establishment of seed orchards. He discussed advances made over the years and stressed that seed orchards play a key role in preserving FGR.

Yongqi Zheng, Chinese Academy of Forestry, reviewed changes associated with climate change, and detailed the role FGR can play in ensuring species and ecosystems are adaptable and resilient in the face of changing climatic conditions and greater variability in these conditions. He stressed that diversity is the basis for evolution and resiliency to changing demands we place on forests.

IUFRO PRESIDENT'S DISCUSSION: FUTURE CHALLENGES FOR FOREST EDUCATION:

Meeting in the late afternoon, this special session was moderated by Peter Mayer, IUFRO.

Florent Kaiser, International Forestry Students' Association, lamented that current forestry curricula lack: practical learning opportunities for students; a global focus; and student exchange opportunities.

Yoon Soo Kim, Chonnam National University, said forestry graduates worldwide have declined by 30% since the 1990s. Additionally, to meet industry demand, he suggested a three-year technical education as more relevant.

Hosny El-Lakany, University of British Columbia, on improving forestry education, commented on the need for: halting over-specialization of departments; increased national and international collaborations; job preparation in and outside of specific fields of training; and improved marketing by universities.

Emmanuel Ze Meka, ITTO, discussed what students should know about international forest-related agreements. He emphasized that in reality, international agreements are often constrained and undermined by sovereignty issues, and said although their overall impact has been questionable, their role and relevance is becoming more central due to concerted international efforts to resolve global problems.

Hideki Nose, Sumitomo Forestry Group, said highly specialized students often lack comprehensive judgment on contemporary forest industry issues and it must be remembered that one "cannot see the forest by only looking at the trees."

Gerald Steindlegger, WWF, stated that forestry must demonstrate that "it no longer serves only a sector but an entire landscape-of values and people." He also noted that primary drivers of deforestation lie outside the forest sector and SFM alone is not the answer.

Don Koo Lee, IUFRO President, concluded the session by proposing the creation of an IUFRO e-learning tool and IUFRO Task Force on Forest Education.

TECHNICAL SESSIONS

Participants hustled to 20 technical sessions first thing in the morning and again to 20 more at the close of a very busy Wednesday.

TO WHAT EXTENT CAN PAYMENTS FOR FOREST ENVIRONMENTAL SERVICES BE PRO-POOR?:

Moderator Terry Sunderland, CIFOR, opened the session by highlighting continuing controversies over the validity of PES as a pro-poor approach.

Sim Eun Suh, Seoul National University, questioned motivations for linking poverty to PES, saying that PES' focus on cost efficiency actually benefits from poverty, and theoretically incentivizes locking the poor into environmentally "sustainable poverty."

Lisa Petheram, Charles Darwin University, shared lessons from engaging communities on PES near a Vietnamese national park. She found that: lack of trust in government led respondents to favor payments from other sources; a combination of monetary and in kind payments is preferred; and continued forest access for household products is desired. Petheram also speculated that respondents' motivation to participate in PES and forest preservation was influenced by her presence.

Stephen Garnett, Charles Darwin University, on behalf of Pham Thu Thuy, shared findings of a pro-poor PES case study in Vietnam. Main messages included that: influential stakeholders can fuel inequity and inhibit participation; neutral intermediaries are hard to find; PES may not cover opportunity and transaction costs of poor households, but monetary gain is not the sole motivation to participate; and that understanding locals' definition of poverty should be central to project planning.

Mariëka Sandker, CIFOR, presented on participatory modeling of potential REDD outcomes in Ghana. She discovered that in areas with high population, low forest density and valuable cash crops, REDD does not offer enough incentives to overcome planned conversion. Additionally, in her case study area, the poor have little access to REDD

proceeds because 90% of forest carbon is stored on land owned by the wealthy, creating the danger that landowners may repatriate land currently leased to poor farmers to benefit from REDD themselves.

MANAGING ASIAN BAMBOO FOREST IN A CHANGING WORLD: Yaoqi Zhang, Auburn University, moderated this session.

Jian Gao, International Center for Bamboo and Rattan, China, reviewed water quality problems in China's Chaohu Lake and described results from area forest plots. She said bamboo forests are useful for water conservation and reducing pollutant runoff because they retain more water in the litter layer than other forest types.

Masaharu Sakai, Forestry and Forest Products Research Institute, Japan, detailed a study of soil and water conditions in bamboo and conifer forests. He noted the problem of bamboo encroachment lowering soil moisture content, owing to higher water transportation in bamboo stands, and said that bamboo soils are at low risk of acidification.

Yueqin Shen, Zhejiang Forestry University, reviewed reforms in the bamboo sector. Drawing on a household survey, she discussed how different management approaches for bamboo affect economic benefits, local employment opportunities, and income distribution.

Ramasamy Yasodha, Institute of Forest Genetics and Tree Breeding, India, noted high demand for bamboo is complicated by its unpredictable reproductive cycle, limiting production. She explained the intricacies of *in vitro* micropropagation and said *Bambusa nutans* works well with these methods, but stressed that costs limit commercial production.

Benzhi Zhou, Zhejiang Forestry University, China, said bamboo is China's most important forest type, and reviewed its carbon sequestration properties. He discussed dry-weight biomass and carbon content to soil depth of 60 cm of a *Dendrocalamopsis vario-striata* plantation, finding 95.5 tonnes of carbon per hectare, with a third captured in plant biomass and two thirds by soil.

Guomo Zhou, Zhejiang Forestry University, China, discussed carbon storage of *Phyllostachys pubescens*, an economically important bamboo, which since the 1990s has come to account for 75% of Chinese and 40% of global bamboo forests. He revealed that the carbon storage capacity of this species can increase up to 40 fold in one month due to its quick growth rate.

IDENTIFYING AND MONITORING OLD GROWTH FORESTS IN BOREAL, TEMPERATE AND MEDITERRANEAN ENVIRONMENTS: Anna Barbati, University of Tuscia and Thomas Spies, US Forest Service, co-moderated the session.

Thomas Spies focused on old growth forests in the US Pacific Northwest, highlighting varied and complex definitions for old growth and different pathways by which these forests develop. For effective monitoring, he recommended a simple, structurally focused definition.

Rod Keenan, University of Melbourne, discussed events leading to Australia's policies for old growth protection. Detailing operational definitions used to map and designate protected areas, he stressed the need for adaptive approaches, particularly given climate change.

Anna Barbati said a structural approach is a fast and practical way to identify old growth forests, emphasizing that finding European old growth forests requires looking in hard to access places, at forests that have been under limited management, and at remnants of previous forests.

William Keeton, University of Vermont, explained that forests in the US Northeast were almost entirely cleared but are now re-growing. He discussed a study examining harvesting treatments designed to encourage development of old growth attributes in secondary forests.

Grant Wardell-Johnson, Curtin University, discussed tall open forests in southwest and southeast Australia. He stressed the importance of climate change when thinking about the conservation of old growth, noting, *inter alia*, carbon retained in old growth forest soils and changing temperature and precipitation affecting viability of protected forests.

Jan Bannister, University of Freiburg, reviewed research investigating the development of swamp and upland stands of old growth *Pilgerodendron wiferum* forests in Patagonia, showing the tree species is stress and shade tolerant and can regenerate without large disturbances.

Alfredo Di Filippo, Università della Tuscia, Italy, described findings from a study of old-growth beech forests in northern and central Italy that reconstructed tree-life histories to analyze the transition of these forests towards old growth status from their previous state as managed forests.

Kris Verheyen, Ghent University, discussed long-term changes in understory vegetation in European forests based on an analysis of archived plots. He offered a synthesis quantifying the rate and nature of change in understory vegetation and their key environmental drivers.

ADVANCES IN FOREST PEST SURVEILLANCE AND MONITORING: Olle Anderbrant, Lund University, talked about forest insects in pest control and conservation, and the use of pheromone trap-catch at large scales.

Richard Hofstetter, Northern Arizona University, summarized that there is a positive correlation between trap-catch and infestation density, and that trap-catch may be a good large-scale predictor of beetle abundance and tree mortality.

Hongbin Wang, Chinese Academy of Forestry, described research to identify beetle population density at different elevations and cardinal directions in a forest using pheromone bait methods.

Steven Seybold, US Forest Service, reviewed invasive beetle populations, explaining that an "improved" rather than commercial pheromone bait showed better empirical results than models predict.

Robert Rabaglia, US Forest Service, presented on an early detection and rapid response project for non-native bark beetles that can severely impact the health of US forests. He relayed that the project had identified a list of 10 high-risk species, and traps baited with either species-specific pheromones or generally attractive host volatiles had been used in forest areas around high-risk sites in 17 states every year in the country.

Zhen Zhang, Chinese Academy of Forestry, presented work on detecting and trapping the red turpentine beetle introduced to China from North and Central America that caused serious damage to the Chinese pine.

Wonhoon Lee, Korea Forest Research Institute, reported the work of his research team in the construction of a Korean Forest Insect Pest DNA barcode database. He noted that DNA barcoding has potential applications in insect pest monitoring and quarantine.

Natalia Kirichenko, Institute of Forests, Russian Federation, reported on her work in detection of alien insect pests and diseases on European and North American woody plants in Siberia. The purpose of the study was to identify poorly known pests and diseases that, if introduced to Europe or North America, may present a threat.

Choi Won IL, Korea Forest Research Institute, reported findings of a study conducted by his research group on the occurrence and distribution of invasive insect pests in Korea after 2000.



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Moderator Terry Sunderland, CIFOR, opened the session by highlighting continuing controversies over the validity of PES as a pro-poor approach.

Sim Eun Suh, Seoul National University, questioned motivations for linking poverty to PES, saying that PES' focus on cost efficiency actually benefits from poverty, and theoretically incentivizes locking the poor into environmentally "sustainable poverty."

Lisa Petheram, Charles Darwin University, shared lessons from engaging communities on PES near a Vietnamese national park. She found that: lack of trust in government led respondents to favor payments from other sources; a combination of monetary and in kind payments is preferred; and continued forest access for household products is desired. Petheram also speculated that respondents' motivation to participate in PES and forest preservation was influenced by her presence.

Stephen Garnett, Charles Darwin University, on behalf of Pham Thu Thuy, shared findings of a pro-poor PES case study in Vietnam. Main messages included that: influential stakeholders can fuel inequity and inhibit participation; neutral intermediaries are hard to find; PES may not cover opportunity and transaction costs of poor households, but monetary gain is not the sole motivation to participate; and that understanding locals' definition of poverty should be central to project planning.

Mariëka Sandker, CIFOR, presented on participatory modeling of potential REDD outcomes in Ghana. She discovered that in areas with high population, low forest density and valuable cash crops, REDD does not offer enough incentives to overcome planned conversion. Additionally, in her case study area, the poor have little access to REDD

proceeds because 90% of forest carbon is stored on land owned by the wealthy, creating the danger that landowners may repatriate land currently leased to poor farmers to benefit from REDD themselves.

MANAGING ASIAN BAMBOO FOREST IN A CHANGING WORLD: Yaoqi Zhang, Auburn University, moderated this session.

Jian Gao, International Center for Bamboo and Rattan, China, reviewed water quality problems in China's Chaohu Lake and described results from area forest plots. She said bamboo forests are useful for water conservation and reducing pollutant runoff because they retain more water in the litter layer than other forest types.

Masaharu Sakai, Forestry and Forest Products Research Institute, Japan, detailed a study of soil and water conditions in bamboo and conifer forests. He noted the problem of bamboo encroachment lowering soil moisture content, owing to higher water transportation in bamboo stands, and said that bamboo soils are at low risk of acidification.

Yueqin Shen, Zhejiang Forestry University, reviewed reforms in the bamboo sector. Drawing on a household survey, she discussed how different management approaches for bamboo affect economic benefits, local employment opportunities, and income distribution.

Ramasamy Yasodha, Institute of Forest Genetics and Tree Breeding, India, noted high demand for bamboo is complicated by its unpredictable reproductive cycle, limiting production. She explained the intricacies of *in vitro* micropropagation and said *Bambusa nutans* works well with these methods, but stressed that costs limit commercial production.

Benzhi Zhou, Zhejiang Forestry University, China, said bamboo is China's most important forest type, and reviewed its carbon sequestration properties. He discussed dry-weight biomass and carbon content to soil depth of 60 cm of a *Dendrocalamopsis vario-striata* plantation, finding 95.5 tonnes of carbon per hectare, with a third captured in plant biomass and two thirds by soil.

Guomo Zhou, Zhejiang Forestry University, China, discussed carbon storage of *Phyllostachys pubescens*, an economically important bamboo, which since the 1990s has come to account for 75% of Chinese and 40% of global bamboo forests. He revealed that the carbon storage capacity of this species can increase up to 40 fold in one month due to its quick growth rate.

IDENTIFYING AND MONITORING OLD GROWTH FORESTS IN BOREAL, TEMPERATE AND MEDITERRANEAN ENVIRONMENTS: Anna Barbati, University of Tuscia and Thomas Spies, US Forest Service, co-moderated the session.

Thomas Spies focused on old growth forests in the US Pacific Northwest, highlighting varied and complex definitions for old growth and different pathways by which these forests develop. For effective monitoring, he recommended a simple, structurally focused definition.

Rod Keenan, University of Melbourne, discussed events leading to Australia's policies for old growth protection. Detailing operational definitions used to map and designate protected areas, he stressed the need for adaptive approaches, particularly given climate change.

Anna Barbati said a structural approach is a fast and practical way to identify old growth forests, emphasizing that finding European old growth forests requires looking in hard to access places, at forests that have been under limited management, and at remnants of previous forests.

William Keeton, University of Vermont, explained that forests in the US Northeast were almost entirely cleared but are now re-growing. He discussed a study examining harvesting treatments designed to encourage development of old growth attributes in secondary forests.

Grant Wardell-Johnson, Curtin University, discussed tall open forests in southwest and southeast Australia. He stressed the importance of climate change when thinking about the conservation of old growth, noting, *inter alia*, carbon retained in old growth forest soils and changing temperature and precipitation affecting viability of protected forests.

Jan Bannister, University of Freiburg, reviewed research investigating the development of swamp and upland stands of old growth *Pilgerodendron wififerum* forests in Patagonia, showing the tree species is stress and shade tolerant and can regenerate without large disturbances.

Alfredo Di Filippo, Università della Tuscia, Italy, described findings from a study of old-growth beech forests in northern and central Italy that reconstructed tree-life histories to analyze the transition of these forests towards old growth status from their previous state as managed forests.

Kris Verheyen, Ghent University, discussed long-term changes in understory vegetation in European forests based on an analysis of archived plots. He offered a synthesis quantifying the rate and nature of change in understory vegetation and their key environmental drivers.

ADVANCES IN FOREST PEST SURVEILLANCE AND MONITORING: Olle Anderbrant, Lund University, talked about forest insects in pest control and conservation, and the use of pheromone trap-catch at large scales.

Richard Hofstetter, Northern Arizona University, summarized that there is a positive correlation between trap-catch and infestation density, and that trap-catch may be a good large-scale predictor of beetle abundance and tree mortality.

Hongbin Wang, Chinese Academy of Forestry, described research to identify beetle population density at different elevations and cardinal directions in a forest using pheromone bait methods.

Steven Seybold, US Forest Service, reviewed invasive beetle populations, explaining that an "improved" rather than commercial pheromone bait showed better empirical results than models predict.

Robert Rabaglia, US Forest Service, presented on an early detection and rapid response project for non-native bark beetles that can severely impact the health of US forests. He relayed that the project had identified a list of 10 high-risk species, and traps baited with either species-specific pheromones or generally attractive host volatiles had been used in forest areas around high-risk sites in 17 states every year in the country.

Zhen Zhang, Chinese Academy of Forestry, presented work on detecting and trapping the red turpentine beetle introduced to China from North and Central America that caused serious damage to the Chinese pine.

Wonhoon Lee, Korea Forest Research Institute, reported the work of his research team in the construction of a Korean Forest Insect Pest DNA barcode database. He noted that DNA barcoding has potential applications in insect pest monitoring and quarantine.

Natalia Kirichenko, Institute of Forests, Russian Federation, reported on her work in detection of alien insect pests and diseases on European and North American woody plants in Siberia. The purpose of the study was to identify poorly known pests and diseases that, if introduced to Europe or North America, may present a threat.

Choi Won IL, Korea Forest Research Institute, reported findings of a study conducted by his research group on the occurrence and distribution of invasive insect pests in Korea after 2000.



IUFRO World Congress Bulletin

A Daily Report of the XXIII IUFRO World Congress

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iisd Reporting Services



XXIII IUFRO WORLD CONGRESS HIGHLIGHTS: FRIDAY, 27 AUGUST 2010

Back in the COEX complex on Friday after a damp day of field trips, participants filled 20 early morning technical sessions before hearing the keynote speech by Nobel Laureate Elinor Ostrom in plenary, who also participated in a sub-plenary on new frontiers of forest economics. The two other sub-plenaries focused on agroforestry: the way forward, and enhancement of service life of wood in an environmentally conscious global society. Another 18 technical sessions met in the afternoon, as did numerous side events and business events.



IUFRO participants in a field trip to the World Cup Park, a landfill site turned Eco-Park.

FIELD TRIPS

The IUFRO XXIII Congress was on hiatus Thursday, as participants braved the elements and headed into the field on eight trips organized to experience innovative forest-related projects around the Republic of Korea. Of the eight field trips, IISD Reporting Services was there to cover two: Landscape Restoration and Sub-alpine Forest; and Old-aged Natural Forests and Landfill Restoration. Remaining field trips included excursions about: a protected area for biological diversity; non-timber forest products; conservation and utilization of forest genetic resources; forests and human health; sustainable forest management and the ecosystem approach; and the wood processing industry.

During the old-aged Natural Forests and Landfill Restoration trip, participants visited the World Cup Eco-Park, a former landfill transformed into an environmentally friendly park, where wind energy and biogas from stored waste stored is produced. In addition, participants traveled to the Gwangneung Experimental Forest, registered as an international Long-Term Ecological Research for biodiversity study in 1998.

The Landscape Restoration field trip brought participants to Mt. Balwang in the Baekdudaegan Mountain Range where they observed a typical Korean sub-alpine forest ecosystem. Participants also viewed the Daegwallyeong plantation project, which illustrated various stages of forest restoration, including a stand of 20 meter conifer sentinels on land which had been a desert only 40 years ago.

PLENARY SESSION

THE POTENTIAL ROLE OF COMMUNITIES IN SUSTAINABLE FOREST RESOURCES: Chair John Innes, University of British Columbia, introduced the keynote speaker Elinor Ostrom, Indiana University and Arizona State University, 2009 Nobel Prize laureate in economics.

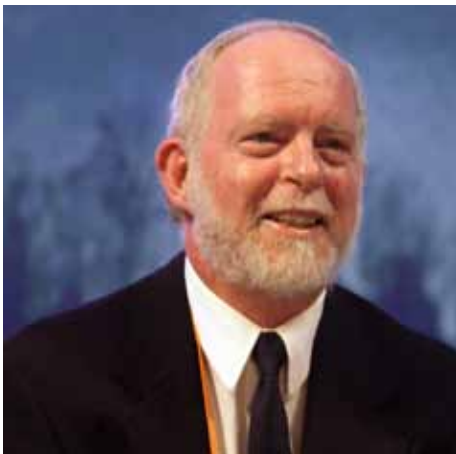
Ostrom addressed the role of communities in sustaining forest resources. Multiple factors create forest conditions, she explained, meaning a simple management model is neither useful nor satisfactory. After stating that studying socio-ecological interactions requires both understanding of dynamic processes and adaptive policies, she advocated avoiding the "paper park," a static solution, as a panacea for conservation.

Ostrom then presented several case studies addressing the following: how alternative systems of governance affect social and ecological conditions; conditions favoring collective action for the provision of resource management; how people



Elinor Ostrom, 2009 Nobel Prize laureate in economics, stressed that it was feasible to be multidisciplinary.

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David Laband, Auburn University

respond to changing ecological and social conditions; and how diverse actors jointly affect forest conditions.

Within these case studies, she highlighted three indicators central to her research: tree density and richness; forest user behavior; and illegal forest activity. She stated that these played out in her case studies as follows:

first, comparing official parks to non-parks, ownership made no statistical difference to vegetative density; second, forests lacking effective law enforcement are more susceptible to degradation and those with effective enforcement mechanisms, including user monitoring, have a higher probability of regeneration; and third, conservation potential is highly dependent upon an effective combination of official and local user involvement.

She highlighted that privately owned forests had significantly less illegal activity when local users were permitted access to forest products, as do government forests where indigenous communities provide monitoring services. She said enabling communication between forest users and authoritative agencies enhances cooperation and conservation results even if sanctions are involved. However, she added, conservation is highest when local users can choose their own sanctioning methods.

Concluding, Ostrom stressed the feasibility of multidisciplinary and underlined the importance of careful designs, proper training and consistency. Innes echoed that it was time natural and social sciences worked together.

SUB-PLenary SESSION

NEW FRONTIERS OF FOREST ECONOMICS:

Moderator Shashi Kant, University of Toronto, announced that IUFRO has founded a new group on forest economics in recognition that "You cannot create new policies based on old science, and we must step up to the plate."

Ostrom spoke about challenges of establishing whether a forest is deteriorating or improving over time. Sharing results from an 11-country study, she recognized that plot-based measurements are widely accepted but expensive, and that foresters measuring plots often lack local forest knowledge. As an alternative she highlighted how long term forest users can also provide information on forest condition, and opined on how and why their assessment of forest health may vary from foresters'.

David Laband, Auburn University, presented on public choice theory, focusing on political rent seeking activities in the forest sector, which see politicians more interested in the short term political and economic gains of the timber industry than the long-term goals of SFM. He also noted that the democracy's inability to account for intensity of voter preference can lead to a weakly motivated majority outvoting a highly motivated minority, and an overall decrease in societal welfare.

Urs Fischbacher, University of Konstanz, spoke about benefits of economic experiments in understanding how long-term forest objectives can be managed. Their value, he said, lies in the ability of the experimenter to control the situation to test for various influences. His models illustrated how conditional

cooperation is possible to preserve common pool resources, but that enforcement can be a potential issue, concluding that institutions that promote cooperation are necessary.

Karl-Gustaf Löfgren, Umeå University, considered economic modeling in forestry to avoid the "Lucas critique," which says that when policies change, one must change the parameters of the model because using previously observed behavior is no longer adequate. He said Finnish forestry, and forestry in general, can largely avoid this problem due to the richness of historical data.

AGROFORESTRY: THE WAY FORWARD: Tony Simons, ICRAF, and Ramachandran Nair, University of Florida, moderated the session.

Nair described development of agroforestry as an approach for: poverty alleviation; attainment of Millennium Development Goals (MDGs); food security; carbon sequestration; combating deforestation and desertification; fodder and fuel-wood supply; and environmental protection. He said the acquisition, effective transfer and feedback of such knowledge from practitioners are important.

Eike Luedeling, ICRAF, discussed a study on the carbon sequestration potential of agroforestry systems in African Sahel. He noted that recent conversion of large areas of Sahelian cropland to agroforestry has shown that adding trees to agricultural areas can be a strategy for sequestering atmospheric carbon, but concluded that climate change adaptation effects might be more important than mitigation.

Fergus Sinclair, ICRAF, spoke on the potential timber supply from agroforestry, saying only a proportion of tree cover has any timber value. After stating that there is a variable level of local knowledge on farm timber, he called for farmers and policy-makers to make explicit tradeoffs between trees and the agricultural landscape.

Shibu Jose, University of Missouri, presented on North American agroforestry practices, claiming they need to overcome many barriers, including a lack of public awareness.

Francisco Javier Silva Pando, University of Santiago, Spain, spoke on silvipastoral systems for forest fire prevention.

Simons summarized the history of agroforestry and listed several future recommendations including looking at agroforestry systems as a way to "bullet-proof" farms in the face of climate change.

In the panel discussion, participants debated PES' role in this field and the optimization of land use in the context of climate adaptation and mitigation needs. Many emphasized the need to attract new researchers and enlist more universities in helping communities with the complex analysis of these issues.



Majja Faehle, University of Helsinki, won the IUFRO poster award for Division 6: Social aspects of forests and forestry.



L-R: IUFRO participants Jung-Hwan Park, Republic of Korea; Frances Seymour, CIFOR; José Joaquín Campos Arce, CATIE; Niels Elers Koch, Forest and Landscape, Denmark; Don Koo Lee, IUFRO President, and Su See Lee, Malaysia.

ENHANCEMENT OF SERVICE LIFE OF WOOD IN AN ENVIRONMENTALLY CONSCIOUS GLOBAL SOCIETY:

Andrew Wong, Universiti Malaysia Sarawak, D. Pascal Kamdem, University of Michigan, and Jöran Jermer, SP Technical Research Institute, moderated the session, and Jermer described the work of the International Research Group on Wood Protection, including a collaboration with IUFRO that made the session possible.

Gerard Deroubaix, Technical Industrial Center for Forest, Wood and Furniture (FCBA), explained that wood product carbon storage is small relative to forest stocks, but there are ways to increase it, including by extending the life of wood products in use, enhancing recycling and using wood products



Francisco Aguilar, University of Missouri, talked about forest products, market shares and consumer preferences.

over other carbon-intensive materials.

Koichi Yamamoto, Forestry and Forest Products Research Institute, said Japan is working to enhance forest carbon via: forest management; wood promotion policies to store carbon in products, such as by requiring 100% wood construction in government buildings of four stories or less; and expanding Japan's forest area.

Henrik Heräjärvi, Finnish Forest Research Institute, presented on the strength of wood-based construction materials compared to other materials. He reviewed the life-cycle of construction timber from forest to disposal, assessing opportunities for improving environmental performance of timber, including increasing the recycling of construction wood.

Wong said ways need to be found to couple wood protection and wood durability, either via wood treatment or using naturally durable species. He reviewed durability of different tropical species and pushed for use of durable wood over non-durable and non-renewable building materials.

Kamdem said durability must involve protecting against biological, physical, chemical and mechanical degradation and noted four ways to address this: proper design; use of naturally durable species; physical-chemical-mechanical modification; and use of wood preservatives. He reviewed development of micronized copper preservatives and noted their application requires careful attention to, *inter alia*, the pH of wood species.

Gyu-Hyeok Kim, Korea University, discussed work looking at fungi capable of degrading wood treated with copper chromium arsenate as a means to safely dispose of waste wood. He said they found eight fungi strains which were deemed effective in rotting the wood and that fungi were more effective in extracting chromium and arsenic than copper.

TECHNICAL SESSIONS

GREEN FOREST PRODUCTS MARKETING AND BUSINESS MANAGEMENT:

Richard Vlosky, Louisiana State University, moderated the session.

Bob Smith, Virginia Tech, said the hardwood industry was slow to adopt the "greening" movement, which is perceived as more regulation. He discussed low interest in green products among US consumers, noting that companies know more about forest certification than green building initiatives, and recommended better educating the hardwood industry on these issues.

Lei Wang, University of Helsinki, said corporate social responsibility (CSR), as a western concept has not done well in the Chinese market. He proposed a "harmony" CSR based on a yin-yang theory combining Confucianism and Taoism, inherent to Chinese culture, as a more natural approach.

Masami Shiba, University of Kyoto, examined certification as a marketing tool for Japanese pulp and paper companies. He said 4.3% of Japanese forests are certified, mostly through the Forest Stewardship Council (FSC), but that Japan accounts for roughly 10% of all global chain of custody certificates. He said market demand and societal expectations were key drivers of corporate interest in certification.

Francisco Aguilar, University of Missouri, detailed a study of how product origins, certification agencies, and timber prices affect market shares and UK and US consumer preferences. He noted that, *inter alia*, government agency and NGO certifications were favored in the UK, and that government schemes and temperate forest products were favored in both countries.

Ashlee Tibbets, Oregon State University, reported on interviews with US and Australian architects, engineers, builders and developers probing environmental impacts of building materials. She said interviewees felt the use of timber is a “double-edge sword,” bearing environmental benefits but also historical conflicts over forest practices.

Alison Kriscenski, FSC, emphasized that certification is more than verifying practices, involving a multi-stakeholder governance process for deliberating forest management issues. She highlighted challenges FSC faces in communicating its benefits to consumers and called for research directed to improving FSC’s work.

COMPETING ROLES OF FORESTS IN CLIMATE CHANGE MITIGATION: The session was moderated by Lauri Valsta, University of Helsinki.

Marc Hanewinkel, Forest Research Institute of Baden-Württemberg, presented on predicted harvest volume and carbon stocks in Germany. He concluded that prolonging business as usual would increase carbon stocks through to 2026 on a level above national Kyoto Protocol targets.

Bishnu Chandra Poudel, Mid Sweden University, reported a study on integrated carbon analysis of forest production and utilization in Sweden. She showed that increased temperature will significantly increase forest biomass production and that a large net reduction of carbon emissions is possible if wood replaces concrete and biomass residues replace fossil fuels.



Vanda Santos, FAO, spoke about forestry web education.

Valsta demonstrated case studies integrating SFM, wood products, and biofuels into climate change mitigation. He illustrated a need for integrated forest management and said climate policy must recognize forests provide multiple benefits.

Hans Verkerk, European Forest Institute, discussed European forests’ contribution to climate change mitigation, concluding that European forests

are expected to remain a net sink, but that this sink will decline under baseline conditions and increasing harvest levels could exacerbate decline.

Dodik Ridho Nurrochmat, Bogor Agricultural University, spoke about potential socio-economic and political consequences of carbon sequestration schemes, noting that a strong REDD scheme will have negative multiplier effects on associated industries and communities in timber exporting counties, increasing illegal logging.

Yoon Hyung Kim, Ohio State University, discussed the impact of US and European biofuels policies on forest carbon. He said his model incorporates the dynamic nature of forests to establish the geographic extent of biofuels policy impact. Kim found that the US and EU will lose significantly more forests than predicted by other models, and that Southeast Asia will actually gain forest.

Christine Fürst, Dresden University of Technology, spoke about the land-use modeling tool “pimp your landscape” to help communities and decision-makers choose from scenarios to mitigate climate change in Saxony, Germany. This tool uses a visual matrix to illustrate how various scenarios affect:



IUFR0 poster exhibition showing more than 1,100 entries.

effectiveness of climate change mitigation; human well-being; aesthetic value; ecological benefits; bio-resource provision; and economic wealth.

MANAGING THE DATA DELUGE: THE CHALLENGE OF EMERGING TECHNOLOGIES: The session was moderated by Roger Mills, Oxford University. Mills explained the complexity of managing data in the contemporary world. He stressed the need for data-management toolkits built upon a short- and long-term strategy for maintaining, managing and using data.

Margaret Sraku-Lartey, Forestry Research Institute of Ghana, stressed the need for institutional repositories to preserve forestry information. She described the potential for establishing such a repository in her institute, sketched its contents and possible users, and stated that it ought to concentrate on intellectual knowledge, electronic publishing and open access.

Stella Britwum Acquah, Forestry Research Institute of Ghana, introduced an on-line gateway established by the Forestry Research Network for Sub-Saharan Africa (FORNESSA) for exchanging forestry and natural resource information in the sub-region.

Vanda Santos, FAO, outlined the FAO’s web-based forestry education platform, which serves as a repository for forestry education materials, and links to national, regional, and global forest information bases. She said its objective is to improve access to, and exchange of, information and knowledge in forestry science and technology among developing countries in Central America and the Caribbean.

Andrea Wirth, Oregon State University, discussed the Oregon Spatial Data Library, which provides access to GIS data created and managed by the State of Oregon. She reviewed the library’s searching mechanisms and a new “clip, zip and ship” option that allows users to download small parts of GIS layers.

Mills, for Gillian Petrokofsky, Oxford University, outlined many biases that affect decision-making and discussed evidence-based forestry as a corrective. This approach, he said, involves systematic attention to defining our questions, reviewing the relevant evidence, and disseminating of results. He stressed that the review needs to be rigorous, peer-reviewed, transparent, and repeatable.

Randy McCracken, US Forest Service, said the guiding principle of web design should be: “give the users what they want, and don’t create obstacles.” He reviewed, *inter alia*: key concerns for usability, such as preventing user errors; optimizing site architecture; and writing and organizing text appropriately for online users.



IUFRO World Congress Bulletin

A Summary Report of the XXIII IUFRO World Congress

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SUMMARY OF THE XXIII IUFRO WORLD CONGRESS: 23-28 AUGUST 2010

The XXIII IUFRO World Congress, organized by the International Union of Forest Research Organizations (IUFRO), took place from 23-28 August 2010 in Seoul, Republic of Korea. The Congress was themed, "Forests for the Future: Sustaining Society and the Environment," and it drew over 2,700 participants from 92 countries, the largest number of participants in the Congress' history. There were also 2,027 presentations and 1,053 posters. The six-day event began with a speech from Lee Myung-bak, President of the Republic of Korea, and continued with daily keynote speeches from prominent figures in forestry, 15 sub-plenaries, a special discussion led by IUFRO's President on the future challenges of forest education, 150 technical sessions, many poster sessions, side events, and a trade and exhibition area. Participants also attended eight forest-related field trips on the fourth day of the Congress organized to illustrate innovative forest-related projects around the Republic of Korea.

The Congress and its technical and poster sessions focused specifically on: forests and climate change; biodiversity conservation and sustainable use of forest resources; forest environmental services; Asia's forests for the future; forest products and production processes for a greener future; emerging technologies in the forest sector; frontiers in forest and tree health; forests, communities and cultures; and forests, human health and environmental security.

Despite the intense schedule, sessions were well attended and saw significant discussion on a number of recurring themes during the week. Of particular note were repeated references to the following issues: narrowing knowledge and other gaps between science and policy; the need for the discipline of forestry and forestry education to evolve with changing demands on forests; the need for greater interdisciplinary work efforts; the importance of adopting more socioecological perspectives, which recognize the social embeddedness of efforts to protect and improve forest ecosystems; and the need for, and role and approaches of, forestry in climate change mitigation and adaptation. Beyond these emerging concerns, participants also took time to discuss and review advances in areas of long-standing concern for forest research, including forest health and statistical modeling of forest growth.

During the closing ceremony, the 2010 Congress Resolution was distributed, which details focal areas for future work and institutional commitments for IUFRO as an organization. Finally, new members of IUFRO's decision-making body, the International Council, were approved and a new president-elect announced.



Performance of the traditional Korean dance called the "Lotus Flower"

A BRIEF HISTORY OF THE IUFRO WORLD CONGRESS AND INTERGOVERNMENTAL FOREST-RELATED PROCESSES

IUFRO was founded as the "International Union of Forest Experiment Stations" in 1892, changing its name after the First World War to "International Union of Forestry Research Organizations." Uniting 15,000 scientists from roughly 700 organizations in 110 countries, IUFRO works to promote the coordination and implementation of international cooperative science on research related to forests and trees to advance the wellbeing of forests and the people who depend on them.

The first IUFRO World Congress took place in 1893, with Congresses convening approximately every five years since 1948. Each Congress is organized around a specific theme and serves as an opportunity to discuss, exchange, and disseminate scientific knowledge within and beyond IUFRO's global network of member organizations.

IN THIS ISSUE

A Brief History of the IUFRO World Congress and Intergovernmental Forest-Related Processes	1
Report of the XXIII IUFRO World Congress.	2
Technical Sessions	11
Special Events.	17
Closing Ceremony.	18
Upcoming Meetings	19
Glossary.	20

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IUFRO XX: The twentieth IUFRO World Congress was held in 1995 in Tampere, Finland, and was themed, “Caring for the Forest: Research in a Changing World,” and resolved to: enhance research in key forestry and forest product areas, such as climate change and restoration of degraded lands; expand the research capacity of developing countries, as well as their participation in IUFRO; increase frequency and intensity of interdisciplinary work, as well as communication with organizations outside IUFRO; and emphasize policy and problem oriented research, with a focus on more research in the social sciences.

IUFRO XXI: The twenty-first IUFRO World Congress was held in 2000 in Kuala Lumpur, Malaysia, and was themed “Forests and Society: The Role of Research.” The Congress focused on forest and forestry related issues moving into the 21st century, particularly on the relationship between sustainable forest management and water, fire, genetic resources, pests and pollution, technology, and society.

IUFRO XXII: The twenty-second IUFRO World Congress was held in 2005 in Brisbane, Australia, and was themed “Forests in the Balance: Linking Tradition and Technology.” The Congress adopted resolutions to promote: global cooperation in forest-related research, including by ensuring gender and cultural diversity in research and advancing participation by of developing country researchers; and science for decision making by enhancing provision of problem-oriented forest research and translating research findings into policy-relevant language.

SELECTED INTERGOVERNMENTAL FOREST-RELATED PROCESSES: Global forest policy has developed in a variety of fora, including the Intergovernmental Panel on Forests (IPF), the Intergovernmental Forum on Forests (IFF), the UN Forum on Forests (UNFF), the International Tropical Timber Organization (ITTO), and the Committee on Forestry (COFO).

IPF: At its third session in 1995, the Commission on Sustainable Development (CSD-3) established the IPF. During its two-year mandate, the IPF developed over 100 negotiated proposals for action on sustainable forest management. The IPF’s outcomes were endorsed by CSD-5 in April 1997 and at the Special Session of the UN General Assembly in June 1997. The UN Economic and Social Council (ECOSOC) then established the IFF to continue this work under the auspices of the CSD.

IFF: The IFF met four times between October 1997 and January 2000 to “identify the possible elements of, and work toward consensus on, international arrangements and mechanisms, for example, a legally-binding instrument.” The IFF also proposed the creation of the UNFF and invited relevant international organizations, institutions and instruments and UN organizations to participate in a Collaborative Partnership on Forests (CPF). CSD-8 endorsed these conclusions and invited the President of ECOSOC to initiate informal consultations on options for placing the UNFF within the intergovernmental machinery of the UN system.

UNFF: On 18 October 2000, ECOSOC adopted Resolution E/2000/35, establishing the UNFF as a subsidiary body of ECOSOC. The objective of the international arrangement on forests is to promote the management, conservation and sustainable development of all types of forests and to strengthen long-term political commitment to this end. The

resolution also establishes the CPF to support the work of the UNFF and enhance cooperation and coordination. The UNFF convened nine times between 2000 and 2010.

The IPF/IFF processes produced more than 270 proposals for action towards SFM, which form the basis for the UNFF Multi-Year Programme of Work and Plan of Action. Country- and organization-led initiatives have also contributed to UNFF’s work.

ITTO: The International Tropical Timber Agreement (ITTA), 1983, established the ITTO, headquartered in Yokohama, Japan, to provide a framework for tropical timber producer and consumer countries to discuss and develop policies on issues relating to international trade in, and utilization of, tropical timber and the sustainable management of its resource base. The Agreement was renegotiated during 1993-1994, with a successor agreement, the ITTA, 1994, being adopted on 26 January 1994 and entering into force on 1 January 1997. A second successor agreement was then adopted on 7 January 2006, but has not yet entered into force.

The ITTO’s mandate was expanded to focus on the world tropical timber economy and the sustainable management of the resource base, simultaneously encouraging timber trade and improving forest management. The mandate also allows for consideration of non-tropical timber issues as they relate to tropical timber. The governing body of the ITTO is the International Tropical Timber Council, with 60 members, which has met 45 times.

COFO: The Committee on Forestry (COFO) is the FAO’s most significant Forestry Statutory Body, bringing together heads of forestry services and other senior government officials to identify emerging policy and technical issues, seek solutions and advise the FAO and others on appropriate action. This is achieved through: periodic reviews of international forestry problems and their appraisal; review of the FAO forestry work programmes and their implementation; advice to the FAO Director-General on the FAO’s future work programmes in the field of forestry and their implementation; reviews of and recommendations on specific matters relating to forestry referred to it by the FAO Council, Director-General or member states; and reports to the FAO Council. COFO has met 19 times.

REPORT OF THE XXIII IUFRO WORLD CONGRESS

OPENING CEREMONY

The XXIII International Union of Forest Research Organizations (IUFRO) World Congress opened on Monday, 23 August 2010 with a drum performance and film presentation on the Republic of Korea’s work promoting green growth.



Don Koo Lee, IUFRO President

Don Koo Lee, IUFRO President, highlighted IUFRO’s history of advancing global cooperation on forest science through the activities of its member organizations, saying that only through such cooperation can contemporary global challenges be overcome.

After calling for new strategies for green growth, he declared the Congress officially open.



L-R: Don Koo Lee, IUFRO President, and Su See Lee, IUFRO, presented the Host Scientific Award to Sung Gak Hong, The National Academy of Sciences, Republic of Korea

Eduardo Rojas-Briales, UN Food and Agriculture Organization (FAO), highlighted difficulties faced due to the simultaneous increase in financial constraints on the forest sector and the demand for forest environmental services (FES). He called for, *inter alia*: forests to be recognized as more than simply carbon; reducing emissions from deforestation and forest degradation in developing countries (REDD); and increased forest-related education.

Jan McAlpine, UN Forum on Forests (UNFF), for Ban Ki-moon, UN Secretary General, said IUFRO plays an essential role in promoting sustainable forest management (SFM) through collaborations on forest research activities and in generating knowledge and assistance for improving forest governance.

IUFRO President Lee and Su See Lee, IUFRO, presented the host's scientific award to Sung Gak Hong, National Academy of Sciences, Republic of Korea, in recognition of his work in elevating the profile of forest science and research. They then presented scientific achievement awards to eleven other recipients for their work advancing forest research.

Lee Myung-bak, President of the Republic of Korea, discussed his country's efforts to restore its once barren lands, noting that forests are the foundation of our lives and the source of our basic needs. He said the Republic of Korea now ranks fourth in the Organisation for Economic Co-operation and Development for its ratio of forests to total land area.



Lee Myung-bak, President of the Republic of Korea

PLENARY SESSIONS

Throughout the week participants attended daily plenaries led by a range of experts, from Nobel laureates to renowned scientists and poets.



Ko Un, Korean poet

On Monday morning, Ko Un, a famous Korean poet, called for the development of a Human Charter for the Forest to prevent future atrocities committed against forests, referring to the "cumulative crime of forest destruction perpetrated over previous centuries by human avarice." He stressed that

voluntary institutions are urgently needed to ensure that such a declaration does not become a mere slogan; said that the future of the human race can only be guaranteed by making the forest spirit the very spirit of humanity; and made suggestions on, *inter alia*: educating schoolchildren on the importance of forests; and raising the rank of the Korean Forest Service and other relevant government administrations to that of top government agencies. He concluded by stating that the nations of tomorrow will only succeed if they are nations of the forest.

On Tuesday morning Frances Seymour, Center for International Forestry Research (CIFOR), began by considering



Frances Seymour, CIFOR

lessons learned from forest and communities research for the multiple challenges of integrating climate change into future research, and commended work and progress on understanding the importance of institutions,

rights and market constraints. She highlighted key areas for future research, including investigating: how REDD will shape or be shaped by existing financing institutions; the significance of climate change's political dominance for community forests; possibilities to reduce tradeoffs between climate and community; and social biases entrenched in policy. Seymour emphasized that there is much to be gained from investing in global comparative studies, but because no single organization has the capacity to undertake such an operation on its own, collaborative research must be pursued now more than ever.

On Wednesday morning, José Joaquín Campos Arce, Tropical Agriculture Research and Higher Education Center (CATIE), provided the keynote speech in which he presented on the integration of scales and sectors to improve sustainability of livelihoods, landscapes and forests. He highlighted that system approaches are necessary for addressing the complex set of challenges facing the world, as well as for achieving sustainable development, which requires



Keynote Speaker José Joaquín Campos Arce, CATIE

interdisciplinary, multi-stakeholder platforms, mechanisms and intense coordination. Agroforestry systems, he said, are key to improving livelihoods of poor rural families. He then identified several components of such systems including: managing tree density and growth to enhance carbon storage without affecting yields; linking local communities with socially responsible companies; finding innovative approaches to lower transaction costs; and identifying ecosystem approaches to SFM, forest conservation, and the establishment of biological corridors. He also said social and ecological resiliency are interdependent and the key to sustainable livelihoods, landscapes and forests, and concluded that implementing SFM requires collective and participatory research, capable leadership and long-term commitment of policy makers and researchers.

On Friday morning, Elinor Ostrom, 2009 Nobel Memorial Prize in Economics, addressed the role of communities in sustaining forest resources. She explained that multiple factors create forest conditions, and hence a simple management model is neither useful nor satisfactory. She stressed that studying socio-ecological interactions requires both an understanding of dynamic processes and adaptive policies, and advocated avoiding the “paper park,” a static solution, as a panacea for conservation.

Ostrom then presented several case studies, which addressed, *inter alia*: how alternative systems of governance affect social and ecological conditions; what conditions favor collective action for the provision of common pool resource management; and how people respond to changing ecological and social conditions. She highlighted a number of results, including that: forests lacking effective law enforcement are more susceptible to degradation and that those with effective enforcement mechanisms have a higher probability of regeneration; and conservation potential is highly dependent upon an effective combination of official and local user involvement in management design and implementation. Ostrom stressed the feasibility of multidisciplinary and underlined the importance of careful research design, proper training and consistency in methods across regions.



L-R: Elinor Ostrom, Indiana University and Arizona State University, 2009 Nobel Laureate in economics, accepting a token of appreciation from IUFRO President Don Koo Lee



Peter Shaw Ashton, Harvard University

On Saturday morning, Peter Shaw Ashton, Harvard University, drew on decades of experience in South East Asia to expound on the trajectory of tropical rainforests. He said intact forests only remain on steep slopes or areas with limited access or agriculture potential, which means that the lowland *Dipterocarp* forests, the region’s most productive, have been reduced to small remnants of a former grandeur. He attributed this transformation to low-cost energy. Although temperate forests underwent a similar transformation and have since re-grown, he opined that tropical forests are unlikely to revive.

Shaw also emphasized that conserving tropical forest diversity provides resilience to invasive species outbreaks. To retain this hedge against pathogens, he said small pockets of protection may be sufficient, but that these must be in areas under high threat, such as *Dipterocarpo* forests, and that timber management would be highly risky due to the close coupling of species viability and the structural evolution of forest stands.

A more detailed summary of the presentations is available in the Congress’ daily reports at: <http://www.iisd.ca/ymb/forest/iufro/iufroxxiii/>

SUB-PLenary SESSIONS

Throughout the week, participants attended 15 sub-plenary sessions on research related to forest health and restoration, biodiversity, and climate change. A more detailed summary of these presentations and discussions is available at: <http://www.iisd.ca/ymb/forest/iufro/iufroxxiii/>

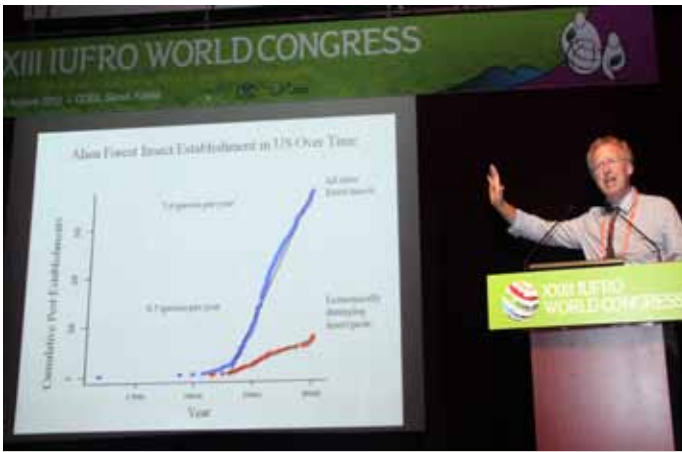
FOREST HEALTH IN A CHANGING

ENVIRONMENT: On Monday, Elena Paoletti, National Research Council Plant Protection Institute, Italy, presented on the compounding effects of air pollution on forest ecosystems given climate change, saying climate change exacerbates ozone and nitrogen impacts forest health and reduces forest-carbon sequestration.

Nicola La Porta, Edmund Mach Foundation, said altered temperature and precipitation patterns may increase the effects of fungal diseases on forests, either because trees will be more stressed or new threats may appear because of changing species composition and the arrival of new pathogens.



Nicola La Porta, Edmund Mach Foundation



Andrew Liebhold, US Forest Service

Andrew Liebhold, US Forest Service, emphasized globalization as a key driver of invasive species. He described varied impacts of invasions on natural, plantation, and urban forests, and said work to prevent arrivals can reduce costs to control or eradicate established invasive species.

Martin Lorenz, Institute for World Forestry, presented on the International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests, describing its work monitoring forest ecosystem conditions and spatial and temporal variation of forest health.

William Orosina, US Forest Service, described how land-use changes, including those resulting from fire suppression and agriculture, create sub-optimal conditions for certain species due to interactive effects with root pathogens.

Andrea Battisti, Padova University, presented on the importance of climate change for forest health, noting that direct and indirect effects of climate change will generally increase the activeness of herbivorous insects. When combined with expanded insect ranges, he said, this is likely to increase insect outbreaks.

KEEP ASIA GREEN: REHABILITATING AND RESTORING FOREST ECOSYSTEMS IN ASIA: On Monday, Don Koo Lee, IUFRO President, highlighted that the session summarized results of IUFRO's "Keep Asia Green" initiative.

Zhiqiang Zhang, Beijing Forestry University, presented on afforestation and ecological restoration in the East Asia region. He noted that despite deforestation and forest-land degradation, extensive forest-related land rehabilitation activities in his region have resulted in significant restoration of forest cover in some countries.

Victor Teplyakov, Seoul National University, discussed forest use and rehabilitation in the Russian Federation's Far East, noting reforestation efforts made.

Lucrecio Rebugio, University of the Philippines, presented successful cases and lessons learned on rehabilitating degraded forests in Southeast Asia, lamenting that in spite of efforts, forest cover decline continues in most of the regions' countries.



Lucrecio Rebugio, University of the Philippines

Promode Kant, Institute of Green Economy, India, reported on rehabilitating forests and extending tree cover in South Asia, highlighting the importance of: forest law and policy; community-based forest management; and establishment of rehabilitation projects.

Khosro Sagheb-Talebi, Research Institute of Forests and Rangelands, Iran, presented on the forest landscape restoration and rehabilitation activities in West Asia, highlighting:

survey and site-specific planning; application of participatory approaches; watershed rehabilitation in mountainous regions; combating desertification; flood-water spreading; and rain-water harvesting.

Almazbek Orozumbekov, Kyrgyz National Agrarian University, presented on rehabilitating degraded forest landscapes in Central Asia, saying centuries of nomadic lifestyles have degraded forests through timber exploitation, uncontrolled grazing and fire. He then discussed rehabilitation efforts undertaken in the region.

BIODIVERSITY, CLIMATE CHANGE AND FORESTRY – PERSPECTIVES OF THE COLLABORATIVE PARTNERSHIP ON FORESTS: On Monday, Eduardo Rojas-Briales, FAO, spoke on the goals and achievements of the Collaborative Partnership on Forests. He also noted that 2011 will be the UN's International Year of Forests, to be organized by UNFF.



Khosro Sagheb-Talebi, Research Institute of Forests and Rangelands, Iran



L-R: Ahmed Djoghlaif, CBD; Bill Jackson, IUCN; Jan McAlpine, UNFF; Peter Mayer, IUFRO; Eduardo Rojas-Briales, FAO; Tony Simons, ICRAF; and Emmanuel Ze Meka, ITTO



L-R: Michelle Gauthier, FAO; Kjell Nilsson, University of Copenhagen; David Nowak, US Forest Service; and Jay Bolthouse, University of Tokyo

Bill Jackson, International Union for Conservation of Nature (IUCN), discussed the landscape approach for linking climate change, forest biodiversity and the needs of people. He recommended “nature-based solutions,” such as REDD, with an emphasis on all forest values.

Ahmed Djoghlaif, Convention on Biological Diversity (CBD), described the importance of the upcoming CBD’s tenth meeting of the Conference of the Parties, taking place in October in Nagoyga, Japan, to adopt a new global strategy for biodiversity, especially for improved access and benefit sharing and conservation of genetic resources. He hoped that an agreement would include a legally-binding monetary evaluation mechanism.

Emmanuel Ze Meka, International Tropical Timber Organization (ITTO), described reducing deforestation and forest degradation and enhancing environmental services in tropical forests (REDDES). He identified several REDDES research priorities, including: multi-purpose forest inventories; enhancement of environmental services in production forests; and capacity building and demonstration.

Tony Simons, World Agroforestry Centre (ICRAF), emphasized the importance of good communication. Saying that although the word “forestry” is now contained in 40 million Internet addresses, some much less inspiring searches bring up many times this number.

Jan McAlpine, UNFF, stressed the need to recognize that large populations depend on forests. On cross-sectoral connections, McAlpine described the UNFF 360 degree perspective on forests as an initiative valuing and creating institutional partnerships beyond the forestry sector, including with several UN conventions and the ITTO.

PROMOTING URBAN FOREST SERVICES IN PARTNERSHIP BETWEEN SCIENTISTS AND COMMUNITIES:

On Tuesday, Chair Cecil Konijnendijk, University of Copenhagen, said urban forestry should strive to be more: integrative, strategic, inter- and multi-disciplinary, participatory, and aware of modern urbanites’ demands, as they make up the majority of foresters’ “customers” today.



Chair Cecil Konijnendijk, University of Copenhagen

David Nowak, US Forest Service, discussed partnering with urban communities to secure data and promote urban management of forest services in the United States using the iTree tool.

Kjell Nilsson, University of Copenhagen, introduced the Peri-urban Land Use Relationships - Strategies and Sustainability Assessment Tools for Urban-Rural Linkages Project in which 14 European countries and China participated, and analyzed challenges and consequences of urbanization. Project results recommended responses, including: improved governance and integrated territorial policy approaches; and strengthening public sector control over urban sprawl.

Jay Bolthouse, University of Tokyo, illustrated how forests can bridge the urban/rural divide. He said managing urban forests can be treated as a leisure activity, presenting results of a study on a Japanese urban forest paradigm of volunteer management.

Michelle Gauthier, FAO, said FAO is increasingly requested to assist with rural-urban linkages in developing countries, primarily related to consequences of chronic urban watershed mismanagement, such as sinking water tables. Discussions focused on: the importance of partnerships; the need to develop internationally standardized assessment tools; the focus on matching policy to the needs and aspirations of the public; and integrating forestry issues into school education.

IUFRO AWARD WINNERS – THE NEXT

GENERATION: On Tuesday, Co-Chair Su See Lee, introduced this year’s awardees, noting that female and developing-country students were well represented. Co-Chair, Michael Rivoire, International Forestry Students’ Association, moderated a discussion on the students’ research.

Three people received the Student Award for Excellence in Forest Science: Lee Hong Tnah, Forest Research Institute Malaysia, for her work on a DNA database designed to help stop illegal logging; Marco Contreras, University of Montana, for using an innovative optimization technique to determine least-cost and environmentally friendly routes for wood transportation; and Mahbulul Alam, Ehime University, for characterizing the ecology and significance of “home gardens” in Bangladesh. Eight people received the Outstanding Doctoral Research Award.



Winners of IUFRO's Student Award for Excellence in Forest Science and Outstanding Doctoral Research participated in a panel discussion on their motivations, challenges and experiences in conducting their research projects

CAN FORESTRY AND FOREST SECTOR ACTIVITIES CONTRIBUTE TO MITIGATING CLIMATE CHANGE?:

On Tuesday, Werner Kurz, Natural Resources Canada, moderated the session and emphasized the importance of educating policy-makers about the forest sector's contributions to climate change mitigation.

Frank Werner, independent consultant, explained a model for effective long-term forest and wood management for GHG mitigation, emphasizing that an optimized life cycle of wood products should include a maximum but sustainable increment of harvestable wood, and continuous downcycling through a use "cascade" terminating as fuel for bioenergy.

Reid Miner, National Council for Air and Stream Improvement, reviewed the global forest industry's impact on greenhouse gasses (GHGs), highlighting that increasing the use of forest products can produce large benefits to society via GHG reductions.

Ben de Jong, El Colegio de la Frontera Sur, reported on the readiness of Mexico to begin carbon accounting based on REDD assessments. Richard Harper, Murdoch University,

spoke on bio-mitigation and, noting that forestry alone will not be able to solve carbon imbalances, proposed research on using abandoned farmland for mitigation to avoid the problem of the food versus fuel debate. William Keeton, University of Vermont, introduced a new study on the carbon storage potentials of temperate old growth forests based on an aggregated global dataset.

IUFRO DIRECTORS FORUM: FOREST MONITORING IN TIMES OF CLIMATE CHANGE:

On Wednesday, Co-moderator Konstantin von Teuffel, Forest Research Institute Baden Württemberg, introduced the Forum as a place to exchange views on management of forest research. Co-moderator Ann Bartuska, US Forest Service, added that the Forum also aims to make the theoretical practical.

Mette Loyche Wilkie, FAO, underscored the enormous data gaps researchers faced preparing for FAO's Global Forest Resources Assessment 2010, especially on: net changes in carbon stocks; previous and current deforestation rates; and carbon emissions from deforestation. She stressed that



L-R: Mette Loyche Wilkie, FAO; Ben Chikamei, Kenya Forestry Research Institute; Peter Mayer, IUFRO; José Joaquín Campos Arce, CATIE; Joon Hwan Shin, Korea Forest Research Institute; Klaus-Herman von Wilpert, Forest Research Institute of Baden-Württemberg; and George "Sam" Foster, US Forest Service

REDD-plus is a window of opportunity to improve forests and forest data that must not be passed over. Ben Chikamai, Kenya Forestry Research Institute, spoke on forest monitoring in Kenya and Africa. He noted that despite progress made in his country, only 11 African countries are set to benefit from REDD projects through the World Bank.

José Joaquín Campos Arce discussed forest monitoring in Latin and Mesoamerica, stressing it is an adaptive management tool, not a luxury, and that this, as well as research results, must be better communicated to stakeholders. Joon-Hwan Shin, Korea Forest Research Institute, stressed the need to answer four questions: What forest information is important for climate change? What is the appropriate structure of a global forest monitoring system? How can the needs of developing countries be met? Who will pay for such a system?

Klaus-Herman von Wilpert, Forest Research Institute of Baden-Württemberg, presented the outcome of forest monitoring in Central Europe as a basis for SFM. He purported that forest decline is the result of air pollution and soil degradation, and emphasized that monitoring should be a continuous bottom-up endeavor. George "Sam" Foster, US Forest Service, said there is a critical demand for increased forestry monitoring information and stressed the need for, *inter alia*: further integrating satellite data with ground level information; a focus on innovations to lower monitoring costs; and better understanding what forest change really means.

FOREST BIOMASS UTILIZATION FOR BIO-ENERGY: TECHNOLOGY, ECONOMICS AND ENVIRONMENT: On Wednesday, Woodam Chung, University of Montana, moderated the session explaining that biomass can be used as a tool for mitigating climate change.

Nathaniel Anderson, University of Montana, explained it was cost-effective and feasible to supply timber residue at US\$43 per ton in Oregon for energy production, and concluded that pyrolysis production of biochar has great potential. Christian Suchomel, University of Freiburg, described harvesting firewood via the coppice method, which generates dense and sustainable re-sprouting of forest stands, providing sustainable bioenergy. He concluded that coppice is good for conservation.

Han-Sup Han, Humboldt State University, emphasized that non-uniform forest residues are difficult and expensive to handle, and described challenges with four current residue collection and transport systems: centralized processing; on-site processing; slash bundling; and integrated systems. Xueyong Ren, Beijing Forestry University, presented on fast pyrolysis bio-oil production. Using this method, he said, biomass can be converted to biochar, bio-oil, or combustible gas in a single chemical reaction. Using a life-cycle approach, Young-Seop Choi, Kangwon National University, compared wood fuels, such as wood pellets and chips, and assessed the conditions, such as transportation distance, which shape the benefits of these fuels for consumers and producers.

On bioenergy in Japan, Kazuhiro Aruga, Utsunomiya University, lamented that though forest, sawmill, and construction waste residues largely go unused, subsidies to make them economically viable are unlikely to be introduced.



Han-Sup Han, Humboldt State University

Deborah Page-Dumroese, Michigan Technological University, highlighted the importance of soil science in forestry management and biomass harvest, stating that both alter soil processes physically, chemically, and

biologically. She said retaining the forest floor is key to forest.

Lisa Sennerby-Forsse, Swedish University of Agricultural Sciences, for Helene Lundkvist, summarized bioenergy development in Sweden, noting it had surpassed hydropower and nuclear power, and accounts for more than 25% of total energy supply.

CONSERVATION AND SUSTAINABLE USE OF FOREST GENETIC RESOURCES: On Wednesday, Zohra Bennadji, National Agricultural Research Institute, Uruguay, detailed a project identifying critical problems in forest genetic resource (FGR) conservation and sustainable use, which will inform the first FAO assessment on the global status of FGRs. She noted: the need for standardized indicators for forest species priorities and genetic diversity; a lack of good exchange mechanisms for information sharing on FGRs; and weak links between policy and science.

Judy Loo, Bioversity International, presented an approach for managing conservation of genetic diversity when reliable information on variability of FGRs is lacking, recommending that management decisions should assume that genetic diversity correlates with environmental variability until better information is available on this important resource.

Dag Lindgren, Swedish University of Agricultural Sciences, discussed how climate change has raised the profile and necessity of seed orchards and said they will become more important



Kyu-Suk Kang, Korea Forest Research Institute

in years to come. Kyu-Suk Kang, Korea Forest Research Institute, reviewed the history, advances and aims of tree breeding in the Republic of Korea, including work on breeding indigenous timber species and the establishing seed orchards. Yongqi Zheng, Chinese Academy of Forestry, detailed the role FGR can play in ensuring

that species and ecosystems can adapt and survive changing climatic conditions and greater variability in these conditions.

ENHANCEMENT OF SERVICE LIFE OF WOOD IN AN ENVIRONMENTALLY CONSCIOUS GLOBAL SOCIETY: On Friday, Gérard Deroubaix, Technical Industrial Center for Forest, Wood and Furniture, explained that the amount of carbon stored in wood products is small relative to forest stocks, but there are ways to increase it, including by extending the life of wood products in use, enhancing recycling and using wood products over other carbon-intensive materials. Koichi Yamamoto, Forestry and Forest Products Research Institute, said Japan is working to enhance forest carbon via:



Deborah Page-Dumroese, Michigan Technological University



Dag Lindgren, Swedish University of Agricultural Sciences

forest management; wood promotion policies to store carbon in products, such as by requiring 100% wood construction in government buildings of four stories or less; and expanding Japan's forest area.

Henrik Heräjärvi, Finnish Forest Research Institute, presented on the strength of wood-based construction materials compared to other materials.



Andrew Wong, Universiti Malasia Sarawak

He reviewed the life-cycle of construction timber from forest to disposal, and assessed opportunities for improving environmental performance of timber.

Andrew Wong, Universiti Malasia Sarawak, highlighted the need

to couple wood protection and wood durability, either via wood treatment or using naturally durable species. D. Pascal Kamdem, University of Michigan, said durability must involve protecting against biological, physical, chemical and mechanical degradation and noted ways to address this: proper design; use of naturally durable species; physical-chemical-mechanical modification; and use of wood preservatives.

Gyu-Hyeok Kim, Korea University, discussed work on fungi capable of degrading wood treated with copper chromium arsenate as a means to safely dispose of treated wood that ends up in the waste stream. He said they found eight fungal strains which were deemed effective in rotting the wood and that these were more effective than copper.



Gyu-Hyeok Kim, Korea University

AGROFORESTRY: THE WAY FORWARD: On Friday, Ramachandran Nair, University of Florida, described development of agroforestry as an approach for: poverty alleviation; attainment of MDGs; food security; carbon sequestration; combating deforestation and desertification; fodder and fuel-wood supply; and environmental protection. Eike Luedeling, ICRAF, discussed a study on the carbon

sequestration potential of agroforestry systems in the African Sahel. He noted that while adding trees to agricultural



Fergus Sinclair, ICRAF

areas can be a strategy for sequestering atmospheric carbon, climate change adaptation might be more important than mitigation. Fergus Sinclair, ICRAF, spoke on the potential timber supply from agroforestry, saying only a proportion of tree cover has any timber value.

Shibu Jose, University of Missouri, presented on North American agroforestry practices, claiming they need to

overcome many barriers, including a lack of public awareness. Francisco Javier Silva Pando, University of Santiago, Spain, spoke on silvopastoral systems for forest fire prevention. Tony Simons, ICRAF, summarized the history of agroforestry and listed several future



Shibu Jose, University of Missouri

recommendations, including looking at agroforestry systems as a way to "bullet-proof" farms in the face of climate change.

In the panel discussion, participants debated payment for environmental services' (PES) role in this field and the optimization of land use in the context of climate adaptation and mitigation needs. Many emphasized the need to attract new researchers and enlist more universities in helping communities with the complex analysis of agroforestry issues.

NEW FRONTIERS OF FOREST ECONOMICS:

On Friday, Moderator Shashi Kant, University of Toronto, announced that IUFRO has founded a new group on forest economics in recognition that "You cannot create new policies based on old science, and we must step up to the plate."

Elinor Ostrom spoke about challenges of establishing whether a forest is deteriorating or improving over time. Sharing results from an 11-country study, she recognized that plot-based measurements are widely accepted as a



L-R: Karl-Gustaf Löfgren, Umeå University; Urs Fischbacher, University of Konstanz; David Laband, Auburn University; and Elinor Ostrom, 2009 Nobel Memorial Prize in Economic Sciences

reasonable measure, but that it is expensive. As an alternative she highlighted how long term forest users can also provide information on forest condition. David Laband, Auburn University, presented on public choice theory, noting that, due to re-election pressures, politicians' are incentivized to care more about the short-term political and economic gains offered by the timber industry, rather than the longer-term goals of SFM.

Urs Fischbacher, University of Konstanz, spoke about benefits of economic experiments in understanding how long-term forest objectives can be managed. He said his models illustrate how conditional cooperation is capable of preserving common pool resources, but that enforcement can be a potential issue. Karl-Gustaf Löfgren, Umeå University, considered economic modeling in forestry to avoid the "Lucas critique," which says that when policies change, one must change the parameters of the model because using previously observed behavior is no longer adequate. He said forestry can largely avoid this problem due to the richness of historical data.

READING THE PULSE OF FOREST SCIENCE – IUFRO PRIORITIES 2010-2014: On Saturday, Moderator Niels Elers Koch, IUFRO, introduced the session and IUFRO research division coordinators and deputy coordinators, who were to describe the outlook for their respective thematic areas.

For Silviculture, Björn Hånell, Swedish University of Agricultural Sciences, said IUFRO should not restrict itself to only financially supporting conference participation of young scientists from developing countries. For Physiology and Genetics, Bailian Li, North Carolina State University, said the division's work is being shaped by increased wood demand, especially for biofuel production, noting intensive genetically modified and cloned plantation forestry is needed to meet increasing demand. For Forest Operations Engineering and Management, Hans Heinemann, ETH Zurich, said his division aims to: increase interdisciplinary work; compile best practices for bioenergy supply; develop inventory input/output models for harvesting; and analyze eco-profiles for eco-efficiency. For Forest Assessment, Modeling and Management, Margarida Tomé, Technical University of Lisbon, highlighted research priorities for her division as: improved forest monitoring; multisource inventories at a reasonable cost; methodologically new, more complex forest modeling; and designs for adaptive forest management.

For Forest Products, Dave Cown, Scion and New Zealand Forest Research Institute, stressed that IUFRO must: improve public outreach by ensuring public access to knowledge and popularizing forests through the media; and find ways to ensure that developing country board members can afford to come to meetings. For Social, Aspects Of Forests and Forestry, Perry Brown, University of Montana, said the way forward is to



Margarida Tomé,
Technical University of
Lisbon



Dave Cown, Scion and New Zealand
Forest Research Institute



IUFRO delegates with the IUFRO Congress mascot mixing a giant serving of "Bibimbap"

improve forest education, stating that "it is only when people realize what they have to lose that they'll get interested." For Forest Health, Mike Wingfield, University of Pretoria, said biological invasions have reached a terrifying state and feared that genetic modification may be the only way to grow trees in the future. For Forest Environment, Jean-Michel Carnus, French National Institute for Agricultural Research, focused on new priorities for the division, including: climate and forest ecosystems; feedback between land cover, disturbances and climate change; forest and water interaction; and effects of land-use change on watershed hydrology.

AN HONEST CONVERSATION ABOUT DECENTRALIZATION AND FOREST LIVELIHOODS IN A GLOBALIZED WORLD: On Saturday, Carol Colfer, CIFOR, moderated the session and introduced the first all-female IUFRO panel.

Reem Hajjar, University of British Columbia, presented findings from six case studies examining the devolution of management authority to community forests in Brazil and Mexico. In spite of variation across the cases, she said the communities have received limited decision-making authority for their forests, as governments remain heavily involved in medium- and long-term planning. Monika Singh, University of British Columbia, presented two case studies on community-forestry experiences of indigenous communities in India and Canada. With both, she said, the final management authority remained with government, albeit with different but minimal processes for involving indigenous people.

Joleen Timko, University of British Columbia, described an assessment of Cameroon's approach to community forestry. She explained that legal, administrative and procedural frameworks for such communities are in place, as well as monitoring and enforcement provisions, but that the model could be further improved by, *inter alia*, reducing administrative costs. Juan Chen, University of British Columbia, reviewed two case studies in China exploring the challenges facing communities in managing collective forests, including illegal activity and unclear or insecure forest tenure.

S. Denise Allen, University of British Columbia, discussed the experiences of the Wet'suwet'en First Nation in Canada in a globalizing world, and called for more culturally sensitive decentralization of land-use management in recognition that cultural and ecological preservation are at stake.



L-R: Joleen Timko, University of British Columbia; Juan Chen, University of British Columbia; Reem Hajjar, University of British Columbia; S. Denise Allen, University of British Columbia; and Monika Singh, University of British Columbia

In the discussion, participants considered, *inter alia*: ensuring community forests are not “designed to fail,” and situations where local elites control decision-making to the detriment of the larger community.

FOREST BIODIVERSITY – THE KEY TO HEALTHY AND RESILIENT FORESTS: On Saturday, Moderator Ian Thompson, Canadian Forest Service, opened the session with a UN Environment Programme (UNEP) film celebrating the UN International Year of Biodiversity. He then presented an overview of the relationship between forest biodiversity, resilience and climate change.

Robert Nasi, CIFOR, Indonesia, presented on defaunation and tropical ecosystem resiliency. He noted biodiversity

as important for ecological, economic and social function, and that certain creatures act as keystone species on which an entire system depends, highlighting the example of bushmeat. He urged for balance between forest conservation

and valuation. Yusuf Bahtimi, International Forestry Students’ Association (IFSA), looked at the effect of invasive *Acacia* species on forest resilience in Indonesia.

Summarizing, Thompson described the session’s three main points: the relationship between biodiversity and resilience; and the great impacts of biodiversity loss and those of invasive species on goods and services.



Robert Nasi, CIFOR, Indonesia

TECHNICAL SESSIONS

On Monday, Tuesday, Wednesday, Friday and Saturday, participants attended 150 technical sessions organized around the Congress’s nine thematic areas. IISD RS covered 15 of these sessions below. A more detailed summary of technical sessions is available in the Congress’ daily reports at: <http://www.iisd.ca/ymb/forest/iufro/iufroxiii/>

FORESTS AND CLIMATE CHANGE

Seventeen technical sessions under the theme forests and climate change discussed topics including: climate change impacts and interactions in the boreal forest zone; adapting to future wildland fire regimes; and impacts of climate change on forest ecology, ecosystem processes, and management.

BIODIVERSITY AND CLIMATE CHANGE: DIRECT AND INDIRECT LINKAGES IN ADAPTATION AND MITIGATION: On Tuesday, M. Danesh Miah, University of Chittagong, presented challenges of harmonizing requirements of the Kyoto Protocol’s Afforestation/Reforestation Clean Development Mechanism (CDM) and those of the CBD. He emphasized potential benefits of Afforestation/Reforestation credits, but cautioned that alien species may arrive via the plantation process. Jürgen Bausch, University of Freiburg, noted conflicts between silviculture, which aims to enhance select forest functions, and nature conservation, which aims to maintain an ecosystem’s historic conditions. He said planning for desired future ecosystem functioning may reduce these conflicts.



M. Danesh Miah, University of Chittagong



Participants heard presentations on linkages between biodiversity and climate change

David Flaspohler, Michigan Technical University, explained that demand for plant-based biofuels could intensify forest management in ways that harm native species, but that well designed intensive management can be developed to sustain ecosystem services.



David Flaspohler, Michigan Technical University

Eckehard Brockerhoff, Scion and New Zealand Forest Research Institute, said impacts of climate change on forest biodiversity include range-boundary changes and phenological shifts, which can create new patterns of invasive species. Chan-Ryul Park, Korea Forest Research Institute, presented on the effects of climate change and forest decline on bird ranges, and said eco-tourism may support retention of habitat.



Eckehard Brockerhoff, Scion and New Zealand Forest Research Institute

Alexander Belokurov, WWF, stressed that protected areas remain paramount for biodiversity conservation, providing vital climate change

mitigation and adaptation benefits.

COMPETING ROLES OF FORESTS IN CLIMATE CHANGE MITIGATION: On Friday, Marc Hanewinkel, Forest Research Institute of Baden-Württemberg, forecasted that Germany's business as usual timber harvest volume and growing forest stock will increase carbon stocks until 2026 on a level above the national cap set by Kyoto Protocol targets. Bishnu Chandra Poudel, Mid Sweden University, showed that temperature rise will significantly increase forest biomass production in Sweden and that a large net reduction of carbon emissions is possible if wood replaces concrete and biomass residues replace fossil fuels.

Lauri Valsta, University of Helsinki, stressed that climate policy must recognize that forests provide multiple benefits. Hans Verkerk, European Forest Institute, explained



Lauri Valsta, University of Helsinki



Hans Verkerk, European Forest Institute

that European forests are expected to remain a net carbon sink, but that this sink will decline with business-as-usual practices and that the increased harvest levels could exacerbate the decline.

Dodik Ridho Nurrochmat, Bogor Agricultural University, warned that a strong REDD scheme will have negative multiplier effects on associated industries and communities in timber exporting countries, thereby increasing illegal logging. Yoon-Hyung Kim, Ohio State University, discussed the impact of US and European biofuels policies on forest carbon. Kim found that the US and EU will lose significantly more forests than predicted by other models, and that Southeast Asia will actually gain forest. Christine Fürst, Dresden University of Technology, spoke about the land-use modeling tool "pimp your landscape" to help communities and decision-makers choose from scenarios to mitigate climate change in Saxony, Germany. This tool uses a visual matrix for assessing trade-offs among social, ecological and economic objectives.



Dodik Ridho Nurrochmat, Bogor Agricultural University

BIODIVERSITY CONSERVATION AND SUSTAINABLE USE OF FOREST RESOURCES

Under this, 28 technical sessions were held on topics, including: long-term forest monitoring and its importance for decision-makers; frontiers in wildlife ecology and management; the contribution of science to the fight against illegal logging; and challenges and progress with silvicultural systems for tropical forests.

INNOVATIVE APPROACHES TO FOREST ECOSYSTEM RESTORATION: On Tuesday, John Stanturf, US Forest Service, highlighted the significant opportunity of forest restoration and suggested ways to integrate social and natural science approaches with a resiliency science framework. Ekeoba Drawing from a study in southern Nigeria on restoration of agricultural lands, Isikhuemen, Ministry of Environment and Public Utilities, Nigeria, explained that appropriate eco-friendly cropping mixtures and agroforestry practices can be effective restoration tools. Keiko Nagashima, Kyushu University, reviewed patterns of vegetation recovery on abandoned plantation clearcuts on the Kyushu Island of Japan. She said deer grazing was the main factor inhibiting tree species recovery, and that slope form, adjacent natural broadleaf forests and abandoned sites influence vegetation types that emerge.



Keiko Nagashima, Kyushu University

Arno Thomaes, Research Institute for Nature and Forest, Belgium, outlined the influence of oak and poplar species on soil pH and how this, in turn, shapes the abundance of

ancient forest herbs in post-agricultural forests. Coert J. Geldenhuys, University of Stellenbosch, discussed species richness in secondary forests of the Congo Basin and South Africa as an indicator of recovery. He explained how such recovery could serve as the basis for restoration projects matched with local agro-forestry systems.



Coert J. Geldenhuys, University of Stellenbosch

IDENTIFYING AND MONITORING OLD GROWTH FORESTS IN BOREAL, TEMPERATE AND MEDITERRANEAN ENVIRONMENTS:

On Wednesday, Thomas Spies, US Forest Service, focused on old growth forests in the US Pacific Northwest, highlighting varied and complex definitions for old growth and different pathways by which these forests develop. Rod Keenan, University of Melbourne, reviewed the operational definitions used to map and designate protected areas in Australia and stressed the need for adaptive management approaches, particularly given



Rod Keenan, University of Melbourne

climate change. Anna Barbati, University of Tuscia, said a structural approach is a fast and practical way to identify old growth forests, emphasizing that to find European old growth forests one needs to look in hard-to-access or unmanaged areas. William Keeton, University of Vermont, discussed a study on harvesting treatments designed to encourage development of old growth attributes in secondary forests of the US Northeast.

Grant Wardell-Johnson, Curtin University, outlined the importance of climate change for old growth protection given that shifting temperature and precipitation regimes will alter the viability of protected areas to sustain specific ecosystems. He also stressed that forest protection plays a role in mitigating climate change given the large carbon storage of their soils. Jan Bannister, University of Freiburg, discussed stand dynamics of swamp and upland *Pilgerodendron uviferum*



Grant Wardell-Johnson, Curtin University



Jan Bannister, University of Freiburg

forests in Patagonia and said, counter to previous knowledge, the tree species is stress and shade tolerant and can regenerate in the absence of large disturbances, such as fire. Alfredo Di Filippo, University of Tuscia, described work on life histories of beech stands in Italy where he used to analyze the transition of these forests towards old growth status.

Kris Verheyen, Ghent University, reviewed long-term changes in understory vegetation in European forests and offered a synthesis quantifying the rate and nature of change and the key environmental drivers.

FOREST ENVIRONMENTAL SERVICES

Sixteen technical sessions were held under the theme, "Forest Environmental Services," and examined such topics as: the impact of global environmental change on forest ecosystem services; agroforestry for climate change adaptation; and forest carbon credit markets and the forest sector.

ECONOMIC VALUATION OF FOREST ECOSYSTEM SERVICES: On Monday, Larry Mason, University of Washington, sketched the policy challenges to successfully valuing and compensating for FES, citing administrative costs of forest certification and carbon markets. He advocated, place-based approaches to forest management instead. He advocated, place-based approaches to forest management instead. Richard Yao, Scion and New Zealand Forest Research Institute, discussed research on non-market valuation of recreational use of New Zealand's Whakarewarewa forest, and noted, *inter alia*, differences in how users valued recreational opportunities and forest characteristics.

Peter Herbst, IUFRO, described the habitat-scoring methods used to determine the offsets needed to compensate for forest habitat destruction in Georgia related to an international pipeline right-of-way. Robert Deal, US Forest Service, described the challenge of coordinating across regulatory agencies, avoiding double counting and demonstrating additionality when valuing bundles of ecosystem services.

Shuirong Wu, Chinese Academy of Forestry, presented a meta-analysis of FES valuation in China. She concluded that there is great variation in FES



Shuirong Wu, Chinese Academy of Forestry

values, and that predicting values based on previous studies is unreliable. Eduardo H. Ditt, Ecological Research Institute, Brazil, discussed valuation and policy in the context of the Atlantic Forest of Brazil and presented a range of ecosystem value scenarios - US \$49-60 million per year - differentiated by land use type and valuation method.

TO WHAT EXTENT CAN PAYMENTS FOR FOREST ENVIRONMENTAL SERVICES BE PRO-POOR?:

On Wednesday, Sim Eun Suh, Seoul National University, questioned motivations for linking poverty to PES, saying that PES' focus on cost efficiency actually benefits from

poverty and may create an environmentally "sustainable poverty." Lisa Petheram, Charles Darwin University, shared lessons from engaging communities on PES near a Vietnamese national park. She noted, *inter alia*, limited trust in government led respondents to favor payments from other sources and a combination of monetary and in kind payments was preferred.



Lisa Petheram, Charles Darwin University



Stephen Garnett, Charles Darwin University

Stephen Garnett, Charles Darwin University, on behalf of Pham Thu Thuy, shared findings of a pro-poor PES case study in Vietnam. Main messages included that: influential stakeholders can fuel inequity and inhibit participation; neutral intermediaries are hard to find; PES may not cover opportunity and transaction

costs of poor households, but monetary gain is not the sole motivation to participate; and that understanding locals' definition of poverty should be central to project planning.

Marieka Sandker, CIFOR, presented on participatory modeling of potential REDD outcomes in Ghana. She discovered that in areas with high population, low forest density and valuable cash crops, REDD does not offer enough incentives to overcome planned conversion. Additionally, she said that the limited ownership of forests by the poor will limit their access to REDD proceeds, creating the danger that landowners may repatriate leased lands in order to collect these proceeds.

ENERGY FORESTS – SOCIAL IMPACTS AND ENVIRONMENTAL SERVICES: On Saturday, David Neil Bird, Joanneum Research, discussed using forests to provide energy for climate change mitigation. He said using transient biomass, which decays quickly, shows short-term emissions increases but these decrease significantly over time. Ioannis Dimitriou, Swedish University of Agricultural Science, illustrated that short rotation willow coppicing can have positive impacts on water quality in Sweden when using water from wastewater storage ponds. He said more innovation in multifunctional biomass production systems is needed.

Graham von Maltitz, Council for Scientific and Industrial Research, South Africa, talked about potential impacts of *Jatropha* plantations on key ecosystems services in South Africa, including that: yields are likely to be an order of magnitude less than expected; water impacts are negligible; and biodiversity impacts are similar to other woody crops. Arviand Reddy, Winrock International India, presented an investigation of social impacts of bio-energy programmes in India, finding that the government's programme offers the least social benefit, using the indicators of: community and institutional structure; political and social resources;



Jennifer Harrison, Newcastle University

community and family change; and community resources.

Jennifer Harrison, Newcastle University, spoke about social impacts and need for stakeholder involvement in Indian and Ugandan bioenergy production. Heru Komarudin, CIFOR, analyzed expanding oil palm plantations in Indonesia's Papua region, finding that while some communities enjoyed

economic and social benefits from such plantations, others experienced restrictions on or loss of traditional land uses. Yufang Su, ICRAF, China, discussed energy challenges facing China and options for developing forest-based energy in the country. She recommended that policy focus on, and



Yufang Su, ICRAF, China

support research and development of, decentralized wood-based energy technology as well as implementation of small to medium-scale bioenergy projects. Jolien Schure, CIFOR, reported that fuelwood is the main source of energy in the Democratic Republic of Congo, even among large urban populations. She said this decimates local forests and policies must be developed to reconcile tradeoffs between environment and livelihoods.

ASIA'S FORESTS FOR THE FUTURE

Seventeen technical sessions were held in which participants discussed: recreation management in protected areas: Asian perspectives; biology, ecology and management of *Pinus koraiensis* in East Asia; and advances in plantation forest management in Asia.

CHALLENGES AND ISSUES OF FOREST MANAGEMENT AND UTILIZATION IN ASIAN COUNTRIES: On Tuesday, Matti Palo, independent scientist, discussed deforestation and poverty challenges in the Democratic People's Republic of Korea, Mongolia and tropical Asian countries. He reviewed deforestation drivers, an empirical model assessing poverty and ecological drivers, and the difficulty of acquiring relevant data. Ho Sang Kang, Seoul National University, discussed an ecotourism training programme as one possible approach to addressing the challenges to Indonesia's forests.

Dar-Hsiung Wang, Taiwan Forestry Research Institute, discussed Japanese cedar plantations in Taiwan, linking them to Japan's occupation of Taiwan and a forest management paradigm prioritizing the replacement of "unproductive" native forests with "productive" plantations. Shirong Liu, Chinese Academy of Forestry Sciences, reviewed China's 2003 forest governance reforms, including transforming collective ownership into private



Ho Sang Kang, Seoul National University



Dar-Hsiung Wang, Taiwan Forestry Research Institute



Shirong Liu, Chinese Academy of Forestry Sciences

ownership, and underscored China's low forest productivity and forest area per capita, and the damages caused by pests, diseases and invasive species.

Juan Chen, University of British Columbia, discussed China's national forest protection and conversion of cropland back to forest programmes. Despite successes with afforestation of degraded lands, she noted challenges regarding unemployed forest workers and in ensuring the longer-term vitality of planted forests.

Nabaghan Ojha, Regional Centre for Development Cooperation, India, discussed the evolution of Indian forests and forest laws, including provisions for participatory forest management and the Forest Rights Act that recognizes rights of forest dwelling peoples, stressing implementation challenges.

Mohammad S.H. Chowdhury, Shinshu University, Japan, described the use of medicinal plants in 36 Bangladeshi villages surrounding the Rema-Kalenga Wildlife Sanctuary, and made recommendations on balancing community and conservation needs.

MANAGING ASIAN BAMBOO FOREST IN A CHANGING WORLD:

On Wednesday, Jian Gao, International Center for Bamboo and Rattan, China, reviewed water quality problems in China's Chaohu Lake. Drawing on field plots, she said bamboo forests are useful for water conservation and reducing pollutant runoff because they retain more water in the litter layer than other forest types. Masaharu Sakai, Forestry and Forest Products Research Institute, Japan, detailed a study of soil and water conditions in bamboo and conifer forests, and explained the problem of bamboo encroachment lowering soil moisture content owing to higher water transportation in bamboo stands.



Masaharu Sakai, Forestry and Forest Products Research Institute, Japan

Yueqin Shen, Zhejiang Forestry University, drew on a household survey to discuss how different management



Ramasamy Yasodha, Institute of Forest Genetics and Tree Breeding, India

approaches for bamboo affect economic benefits, local employment opportunities, and income distribution in China. Ramasamy Yasodha, Institute of Forest Genetics and Tree Breeding, India, noted high demand for bamboo is complicated by its unpredictable reproductive cycle, limiting production. She explained the intricacies of in vitro micropropagation and said

Bambusa nutans works well with these methods, but stressed that costs limit commercial production.

Benzhi Zhou, Zhejiang Forestry University, said bamboo is China's most important forest type, and reviewed its carbon sequestration properties. He discussed dry-weight biomass and carbon content to soil depth of 60 cm of a *Dendrocalamopsis vario-striata* plantation, finding 95.5 tonnes of carbon per hectare, with a third captured in plant biomass and two thirds by soil. Guomo Zhou, Zhejiang Forestry University, discussed carbon storage capacity of *Phyllostachys pubescens*, an economically important bamboo and said its carbon storage capacity can increase up to 40 fold in one month due to its quick growth rate.

FOREST PRODUCTS AND PRODUCTION PROCESSES FOR GREENER FUTURE

Ten technical sessions were held under this theme on topics including: green forest products marketing and business management; value chain optimization in the forestry industry context; and sustainability impact assessment of the forest based materials to promote sustainability.

GREEN FOREST PRODUCTS MARKETING AND BUSINESS MANAGEMENT: On Friday, Bob Smith, Virginia Tech, said the hardwood industry was slow to adopt the "greening" movement, which is perceived as more regulation. He discussed low interest in green products among US consumers, and that companies know more about forest certification than green building initiatives. Lei Wang, University of Helsinki, said corporate social responsibility (CSR) is a western concept and has not done well in the Chinese market. He proposed a culturally recognizable approach to CSR that draws on Confucianism and Taoism.

Masami Shiba, University of Kyoto, said 4.3% of Japanese forests are certified, mostly through the Forest Stewardship Council (FSC), but that Japan accounts for roughly 10% of all global chain of custody certificates. He said market demand and societal expectations were key drivers of corporate interest



Masami Shiba, University of Kyoto

in certification. Francisco Aguilar, University of Missouri, detailed a study of how product origins, certification agencies, and timber prices affect market shares and UK and US consumer preferences. He noted that, *inter alia*, government agency and NGO certifications were favored in the UK, and that government schemes and temperate forest products were favored in both countries.



Francisco Aguilar, University of Missouri

Ashlee Tibbets, Oregon State University, reported on interviews with US and Australian architects, engineers, builders and developers probing environmental impacts of building materials. She said interviewees felt the use of timber is a "double-edge sword," bearing environmental benefits but also historical conflicts over forest practices. Alison Kriscenski, FSC, emphasized that certification is more than verifying practices as it involves a multi-stakeholder governance process for deliberating forest management issues. She highlighted challenges FSC faces in communicating its benefits to consumers and called for research directed to improving FSC's work.

EMERGING TECHNOLOGIES IN THE FOREST SECTOR

Eleven technical sessions were held under this theme on topics including: detecting, monitoring and modeling forest fire and carbon emission using remote sensing; and biotechnology applications in forest breeding and plantation management.

MANAGING THE DATA DELUGE: THE CHALLENGE OF EMERGING TECHNOLOGIES:

On Friday, Roger Mills, Oxford University, stressed the need for data-management toolkits built upon a short- and long-term strategy for maintaining, managing and using data. Margaret Sraaku-Lartey, Forestry Research Institute of Ghana, stressed the need for institutional repositories to preserve forestry information. She described the potential for establishing such a repository in her institute, sketched its contents and possible users, and stated that it ought to concentrate on intellectual knowledge, electronic publishing and open access.

Stella Britwum Acquah, Forestry Research Institute of Ghana, introduced an on-line gateway established by the Forestry Research Network for Sub-Saharan Africa for exchanging forestry and natural resource information in the sub-region. Vanda Santos, FAO, outlined FAO's web-based forestry education platform, which serves as a repository for forestry education materials, and links to national, regional, and global forest information and reviewed its work in Central America and the Caribbean.



Vanda Santos, FAO

Andrea Wirth, Oregon State University, discussed the Oregon Spatial Data Library, which provides access to GIS data created and managed by the State of Oregon. She reviewed the library's searching mechanisms and a new "clip, zip and ship" option that allows users to download small parts of GIS layers.



Andrea Wirth, Oregon State University

Mills, for Gillian Petrokofsky, Oxford University, outlined many biases that affect decision-making and discussed evidence-based forestry as a corrective. This approach, he said, involves systematic attention to defining our questions, reviewing the relevant evidence, and disseminating of results. He stressed that the review needs to be rigorous, peer-reviewed, transparent, and repeatable.

Randy McCracken, US Forest Service, said the guiding principle of web design should be: "give the users what they want, and don't create obstacles."

FRONTIERS IN FOREST AND TREE HEALTH

On this theme, 20 technical sessions were held on topics including: damage caused by insect pests, pathogens and air pollution; invasive species; and climate change.

ADVANCES IN FOREST PEST SURVEILLANCE AND MONITORING: On Wednesday, Olle Anderbrant, Lund University, talked about forest insects in pest control and conservation and the use of pheromone bait trap-catch at large scales. Richard Hofstetter, Northern Arizona University, said trap-catch yields correlate with infestation density, meaning that trap-catch may be a good large-scale predictor of beetle abundance and tree mortality. Hongbin Wang, Chinese Academy of Forestry, described research to identify beetle population density at different elevations and cardinal directions in a forest using pheromone bait methods. Steven Seybold, US Forest Service, reviewed invasive beetle populations, explaining that an "improved" rather than commercial pheromone bait showed better empirical results than models predict.

Robert Rabaglia, US Forest Service, presented on an early detection and rapid response project that had identified 10 high-risk bark beetle species. He said traps baited with either



Zhen Zhang, Chinese Academy of Forestry

species-specific pheromones or generally attractive host volatiles are monitoring high-risk sites in 17 states. Zhen Zhang, Chinese Academy of Forestry, presented work on detecting and trapping the red turpentine beetle introduced to China from North and Central America and the damage it inflicted on the Chinese pine.

Wonhoon Lee, Korea Forest Research Institute, reported the work of his research team in the construction of a Korean Forest Insect Pest DNA barcode database. He noted that DNA barcoding has potential applications in insect pest monitoring and quarantine.



Wonhoon Lee, Korea Forest Research Institute

Natalia Kirichenko, Institute of Forests, Russian Federation, detailed work to identify poorly known pests and diseases that, if introduced to Europe or North America, may present a threat. Choi Won IL, Korea Forest Research Institute, reported findings of a study conducted by his research group on the occurrence and distribution of invasive insect pests in Republic of Korea after 2000.

FORESTS, COMMUNITIES AND CULTURES

On this theme, 23 technical sessions were held on topics including: the importance of traditional knowledge in forest management and biodiversity; community management of forests; the role of small-scale forest-based enterprises; and emerging issues and opportunities for forest users in the trend towards decentralized forest management.

INCOME FROM SMALLHOLDER FORESTRY – CAN IT BE A DRIVER OF POVERTY ALLEVIATION?:

On Monday, Divine Foundjem-Tita, Ghent University, discussed how creating institutional arrangements for informal NTFP markets can improve livelihoods of farmers in Cameroon through increased point of sale prices, market certainty and bargaining power.

In two case studies, Verina Ingram, CIFOR, found only small financial benefits and even economic losses arise from shifting to communal forest usage in some cases, but estimated that communal farming is more sustainable than traditional methods in Cameroon. Dede Rohadi, CIFOR, discussed the role of teak harvesting in income generation, and introduced a tree valuation system to ensure smallholders receive fair market prices. He concluded that though teak is financially feasible it is often not the best source of income for smallholders.



Kazuhiro Harada, University of Hyogo

Kazuhiro Harada, University of Hyogo, highlighted that small group timber certification can play a role in poverty alleviation in Indonesian communities by providing financial support, income security, and reducing in illegal logging due to improved income from certified products. Aziza Rbivate, University of Johann Heinrich von Thünen-Institut, analyzed the Malagasy

forest fringe and the development of adaptation incentives in the context of REDD. She noted that motivations to deforest or degrade forests are highly dependent on social and economic structures, and that these should form the basis of any REDD related incentives or alternatives.

Kazi Kamrul Islam, Kyushu University, talked about how participatory agroforestry in Bangladesh is hindered by: bureaucracy; monopoly market structures; poor infrastructure; and exploitation by middlemen.

Shoana Humphries, FSC, expounded on the economic feasibility of community-based forest enterprises in Brazil. She found that although these enterprises can be successful, donors must incorporate options for long-term support in order to alleviate poverty sustainably. Sushila Kumari Thapa Magar, ForestAction, discussed community forest enterprises in Nepal, noting their success is a function of appropriate regulation, stakeholder participation in decision-making and project ownership. Ousseynou Ndoye, FAO, discussed the need for regulatory policy reform in the development of NTFP enterprises in Central Africa. He highlighted that current use-right law criminalizes the sale of NTFPs by smallholders and that mid-level corruption creates financials burden for smallholders.

CONTRIBUTION OF POLITICAL THEORY TO POLICIES FOR SUSTAINABLE USE OF FOREST RESOURCES:

On Saturday, Bas Arts, Wageningen University, compared five theories used in policy sciences and assessed their use in forest policy research: the advocacy coalition framework; network analysis; and rational, institutional and critical policy analyses. Wil De Jong, Kyoto University, introduced the idea of "territorialization," the process of imposing territorial control over, resources or people, in pursuit of national increased security. He examined this process in the Bolivian Amazon, a porous territorial border over which the Bolivian government is attempting to exert increasing territorial control.



Bas Arts, Wageningen University

Mistuhiko Nose, Research Institute for Humanity and Nature, Japan, analyzed financial constraints facing the Japanese forest administration and its impacts on forest sector productivity. He said forestry investment has not been successful in improving economic productivity and advocated for directed investments to enhance the viability of certain local forest areas. Dodik Ridho Nurrochmat, Bogor Agricultural University, presented three practical options for converting political theory on green fiscal policy into practice in Indonesia: implement PES via a conservation fund; enforce the liability rule through revision of fiscal balance law; regulate the mechanism for purchasing land use rights; and greening the gross domestic product calculation.

Bruno Salomon Ramamonjisoa, University of Antananarivo, illustrated the relevance of sociocultural institutionalism to forest policy management in Madagascar, which, he said, is a way to better integrate local knowledge into policy. Olufunso Somorin, CIFOR, presented three climate policy discourses: mitigation policy only; adaptation and mitigation policy separately; and integrated adaptation and mitigation policy. He proposed that the separatist policies of the North and South cause political problems in the analysis of climate change solutions.

FORESTS, HUMAN HEALTH AND ENVIRONMENTAL SECURITY

On this theme, eight technical sessions were held on topics including: the interrelationships between forests and human health; the impacts of environmental changes on the well-being of social groups in and around forests; and the role of forests in promoting community health, security and well-being.

HEALTH BENEFITS OF FORESTS: On Tuesday, Si Hyung Lee, Comprehensive Research Institute for Korea Natural Medicine, proposed that a 2-3 day wilderness retreat may positively increase levels of human serotonin, a neurotransmitter which reduces depression, eating disorders and aggression. Kjell Nilsson, University of Copenhagen, presented on the role of the environment in healthy lifestyles. He mentioned that several international working groups are evaluating forests' role in the prevention of illness and its effect on mental status. Tatsuya Kushida, NalaPro Technologies, summarized biochemical research on flavonoids, substances contained in tree bark, amongst others, which have been found to improve human immune function.

Nor Azah Mohamad Ali, Forest Research Institute Malaysia, presented her institute's work on bioprospecting, i.e. the search for applications, processes or products in nature with useful health benefits. She said her team assists in the development, and quality and safety assurance, of products for cosmetics and toiletries manufacturers, especially lotions and creams, anti-inflammatory agents and mosquito repellants. Julius Adebayo John, Forest Research Institute, Nigeria, talked about perceptions and use of traditional herbal medicines in Nigeria, the popularity of which is returning as health risks of fake pharmaceuticals become more apparent. He recommended that policy-makers take steps to formally recognize herbal medicines and encourage their use.

SPECIAL EVENTS

FIELD TRIPS

On Thursday participants braved the rainy, foggy weather and headed into the field on eight trips organized to illustrate innovative forest-related projects around the Republic of Korea. Of the eight field trips, IISD RS covered two: Landscape Restoration and Sub-alpine Forest; and Old-aged Natural Forests and Landfill Restoration. The remaining field trips included excursions about: a protected area for biological diversity; non-timber forest products (NTFPs); conservation and utilization of forest genetic resources; forests and human health; SFM and the ecosystem approach; and the wood processing industry.



IUFRO participants in an excursion to the World Cup Park, a landfill site turned Eco-Park

IUFRO PRESIDENT'S DISCUSSION: FUTURE CHALLENGES FOR FOREST EDUCATION:

On Saturday, Florent Kaiser, IFSA, lamented that current forestry curricula lack: practical learning opportunities for students; adequate global focus; and student exchange opportunities. Yoon Soo Kim, Chonnam National University, said forestry graduates worldwide have declined by 30% since the 1990s, and that students cannot find jobs after graduation because current university programs are not matched to modern demands. He suggested a three-year technical education as more relevant.

Hosny El-Lakany, University of British Columbia, criticized that although forestry is now high on the global agenda, foresters are not adequately incorporated into these discussions. He highlighted the need for, *inter alia*: halting over-specialization of departments; and increased national and international collaboration. Emmanuel Ze Meka, ITTO, emphasized that, in reality international agreements are often constrained and undermined by sovereignty issues, and said although their overall impact has been questionable, their role and relevance is becoming more central due to concerted international efforts to resolve global problems.

Hideki Nose, Sumitomo Forestry Group, said highly specialized students often lack comprehensive judgment on contemporary forest industry issues and it must be remembered that one "cannot see the forest by only looking at the trees." Gerald Steindlegger, WWF, said forestry must change to demonstrate "it no longer serves only a sector but an entire landscape— of values and people." He also noted that primary drivers of deforestation lie outside the forest sector and that, therefore, SFM alone is not the answer.

CLOSING CEREMONY

On Saturday, the ceremony opened with a medley of songs sung by Lee Tae Won, singer and actress, accompanying a video compilation of Congress highlights.

Jung-Hwan Park, Chair of the Congress Organizing Committee, thanked the government of the Republic of Korea and the Korea Forest Research Institute for their contributions, and acknowledged efforts of: John Parrotta, Chair of the IUFRO Congress Scientific Committee; IUFRO President Don Koo Lee and the IUFRO team; the Korea Forest Service; and all participants and exhibitors. He also acknowledged IUFRO for financing participation of 182 developing country participants.

Su See Lee, IUFRO Board member, then announced the IUFRO 2010 Best Poster Award winners:



Korean musician and actress Lee Tae Won entertained participants during the closing plenary of XXIII IUFRO World Congress

- Pifeng Lei, University of Freiburg: Belowground niche separation and productivity in tree species mixtures;
- Yoshihiro Hosoo, Shinshu University: Isolation and analysis of a gene encoding a potassium membrane transport protein from *Cryptomeria japonica*;
- Sungcho Choi, Korea University: Predicting the changes in forest distribution using the thermal and hydrological indices;
- Lee Su-Yeon, Seoul National University: Analysis of terpenoids released during the drying process of *Cryptomeria japonica*;
- Maija Faehnle, Finnish Forest Research Institute: Evaluating the use of social information in urban forest planning;
- Takahashi Yukiko, University of Tokyo: Genetic diversity of the pathogen of Japanese oak wilt, *Raffaelea quercivora*, in the gallery bored in an oak tree, and mycangia of the ambrosia beetle, *Platypus quercivorus*; and
- Ahn Young San, Korea Forest Research Institute: Historical change in sediment yield in Lake Toro catchment, Kushiro-mire, northern Japan, over the past 300 years.

Don Koo Lee announced that the IUFRO International Council had met and adopted the 2010 Congress Resolution and approved its new Council members. Risto Seppälä and Eric Teissier du Cros were acknowledged as honorary Council members. He then revealed that the 2014 XXIV IUFRO World Congress will be held in Salt Lake City, Utah, USA.

Parrotta presented the 2010 Congress Resolution, stating that IUFRO will strive to promote the themes of: forests for people; climate change and forestry; bio-energy; forest biodiversity conservation; forests and water interactions; and forest resources for the future. The Resolution also commits IUFRO to:

- improving communication within and outside of IUFRO;
- expanding work on the science-policy interface;
- renewing and strengthening forest monitoring activities;
- expanding the IUFRO membership; and
- promoting high-quality forest-related research and interdisciplinary cooperation.

Incoming IUFRO President Niels Elers Koch introduced the new Board of Directors and President's nominees. He acknowledged the accomplishments of Don Koo Lee. In closing, Koch highlighted the strength and dedication of



L-R: Risto Seppälä and Eric Teissier du Cros, received Honorary memberships to IUFRO from IUFRO President Don Koo Lee and Peter Mayer, IUFRO



IUFRO President Don Koo Lee handed over the IUFRO flag to Ann Bartuska, US Forest Service on behalf of Salt Lake City, US, the host of the XXIV IUFRO World Congress

IUFRO's international network and volunteers, and called on members to "look outside the forest box," across sectors and at the science-policy interface.

IUFRO President Lee handed over the IUFRO flag to Ann Bartuska, US Forest Service, who invited participants on behalf of the host city Salt Lake City to the XXIV IUFRO World Congress in 2014.

President Lee delivered closing remarks, expressing his appreciation to participants for their contribution to the success of the Congress, and closed the Congress at 5:15pm.

UPCOMING MEETINGS

Workshop on Forest Governance, Decentralisation and REDD in Latin America: This workshop will discuss regional perspectives on REDD and help prepare for the 9th session of the UN Forum on Forests. **dates:** 31 August - 3 September 2010 **location:** Oaxaca, Mexico **contact:** Claudia Greco, Intercooperation **phone:** +41 31 385 10 60 **email:** claudia.greco@intercooperation.ch **internet:** <http://www.cifor.cgiar.org/Events/CIFOR/decentralisation-redd.htm>

Japan-CARICOM Public Symposium on Climate Change and Biodiversity: This symposium will bring together the foreign ministers of CARICOM's 15 member countries and explore further cooperation between CARICOM and Japan. **date:** 2 September 2010 **location:** Tokyo, Japan **contact:** Yaeko Higo, UNU-ISP **phone:** +81-(0)3-5467-1212 **fax:** +81-(0)3-3499-2828 **email:** higo@unu.edu **internet:** http://unu.edu/events/#caricom_201009

Seminar on the Vulnerability of International Trade to the Carbon Footprint: This seminar will examine the possible impacts of the "carbon footprint" on trade in Latin America and the Caribbean.

dates: 2-3 September 2010 **location:** Santiago, Chile **contact:** Joseluis Samaniego **phone:** +56-2-210-2291 **email:** joseluis.samaniego@cepal.org **internet:** <http://www.eclac.org/default.asp?idioma=IN>

Workshop on a Practical Guide for Integrating Climate Change into National Forest Programmes: This workshop will bring together results from four previous workshops in Cambodia, Paraguay, South Africa and Tanzania to develop generic guidelines for integrating climate change into national forest policy. **dates:** 20-21 September 2010 **location:** Rome, Italy **contact:** Jerker Thunberg **fax:** +39 06 570 55137 **email:** Jerker.Thunberg@fao.org **internet:** <http://www.nfp-facility.org/63721/en/>

Workshop on Improving the Regional Distribution of CDM Projects in Asia and the Pacific: This workshop aims to actively increase the number of Clean Development Mechanism (CDM) projects in countries currently hosting fewer than ten registered CDM projects. **dates:** 8-9 September 2010 **location:** Manila, Philippines **contact:** Alma Cañarejo **email:** acanarejo.consultant@adb.org **internet:** <http://www.adb.org/>

International Seminar on the Role of Agrobiodiversity in Addressing Hunger and Climate Change: This seminar will highlight the role of agricultural biodiversity for food security in the context of climate change and the importance of international cooperation for its protection and sustainable use. **dates:** 13-15 September 2010 **location:** Cordoba, Spain **contact:** International Treaty on Plant Genetic Resources for Food and Agriculture Secretariat **phone:** +39 06 570 53441 **fax:** +39 06 570 56347 **email:** pgrfa-treaty@fao.org **internet:** http://www.planttreaty.org/gbnex_en.htm

Global Expert Workshop on Biodiversity Benefits of Reducing Emissions from Deforestation and Forest Degradation in Developing Countries: This workshop supports the efforts of parties in addressing Reducing Emissions from Deforestation and forest Degradation in developing countries (REDD) in the framework of the UN Framework Convention on Climate Change (UNFCCC) in a way that contributes to the implementation of the CBD programme of work on forest biodiversity. **dates:** 20-23 September 2010 **location:** Nairobi, Kenya **contact:** CBD Secretariat **phone:** 1-514-288-2220 **fax:** 1-514-288-6588 **email:** secretariat@cbd.int **internet:** <http://www.cbd.int/doc/?meeting=EWREDD-01>

World Habitat Day 2010: The theme of this event is "Better City, Better Life." **dates:** 5 October 2010 **location:** Shanghai, China **contact:** The Coordinator, World Habitat Day **phone:**



Niels Elers Koch, President elect of IUFRO, introduced the members of the new IUFRO Board

(254 20) 762 5311 **fax:** (254 20) 762 3477 **email:** whd@unhabitat.org **internet:** <http://www.unhabitat.org/categories.asp?catid=643>

UNECE Timber Committee Market Discussions and Policy Forum: The forum, under the theme “Innovative Wood Products are the Future,” will address: wood energy, carbon markets and certified forest products markets, and the role of wood products in mitigating climate change. **dates:** 11-15 October 2010 **location:** Geneva, Switzerland **contact:** UNECE Forestry and Timber Section **phone:** +41-22-917 1286 **fax:** +41-22-917 0041 **email:** info.timber@unece.org **internet:** <http://timber.unece.org/index.php?id=302>

5th Latin American Carbon Forum: This forum promotes knowledge and information sharing on the CDM while facilitating business-opportunity environments among main carbon market stakeholders. **dates:** 13-15 October 2010 **location:** Santo Domingo, Dominican Republic **contact:** Miriam Hinostroza **email:** milh@risoe.dtu.dk **internet:** <http://www.latincarbon.com/2010/english/index.htm>

CBD COP 10: This meeting is expected to assess progress on the 2010 target to reduce significantly the rate of biodiversity loss, adopt an international regime on access and benefit-sharing and celebrate the International Year of Biodiversity 2010. **dates:** 18-29 October 2010 **location:** Nagoya, Japan **contact:** CBD Secretariat **phone:** 1-514-288-2220 **fax:** 1-514-288-6588 **email:** secretariat@cbd.int **internet:** <http://www.cbd.int/meetings/>

UNECE Forum on the Potential of Forests in Europe for Climate Change Mitigation and Adaptation: **dates:** 22-24 November 2010 **location:** Geneva, Switzerland **contact:** UNECE Secretariat **phone:** +41(0)22 917 44 44 **fax:** +41(0)22 917 05 05 **email:** info.ece@unece.org **internet:** <http://www.unece.org/meetings/meetgen.htm>

International Conference on Forestry Education and Research for the Asia-Pacific Region: This conference aims to assess the state of forestry education and research in the Asia-Pacific, identify priorities, and make recommendations on future goals. **dates:** November 23-25, 2010 **contact:** Forestry Development Center, University of the Philippines **location:** Laguna, Philippines **email:** fored2010@uplb.edu.ph **phone:** +63 49 536-3097 | 536-2341 **internet:** <http://www.jericotolentino.com/fored.uplb.edu.ph/>

Forest Day 4: This event will be held alongside the 16th session of the Conference of the Parties to the UNFCCC. **dates:** 5 December 2010 **location:** Cancun, Mexico **internet:** <http://www.cifor.cgiar.org/Events/ForestDay4/>

46th meeting of the International Tropical Timber Council: This meeting will take place together with associated sessions of the four committees. **dates:** 13-18 December 2010 **location:** Yokohama, Japan **contact:** ITTO **phone:** 81-45-223-1110 **fax:** 81-45-223-1111 **internet:** <http://www.itto.or.jp>

9th Session of the UN Forum on Forests: The theme for UNFF 9 is ‘Forests for people, livelihoods and poverty eradication’ and the forum is expected to complete discussions on approaches for implementing sustainable forest management. **dates:** 24 January - 4 February 2011 **location:** New York, USA **contact:** UNFF Secretariat **phone:** 1-212-963-3401 **fax:** 1-917-367-3186 **email:** unff@un.org **internet:** <http://www.un.org/esa/forests/>

XXIV IUFRO World Congress: The XXIV IUFRO World Congress location and approximate date was announced at the close of the XXIII Congress, further details are currently unavailable. **dates:** August 2014 **location:** Salt Lake City, Utah, USA **internet:** <http://www.iufro.org/>

GLOSSARY

CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
FAO	Food and Agriculture Problem of the United Nations
FES	forest environmental services
FGR	forest genetic resources
FSC	Forest Stewardship Council
PES	payment for environmental services
ITTO	International Tropical Timber Organization
IUFRO	International Union of Forestry Research Organizations
MDGs	Millennium Development Goals
NTFP	non-timber forest product
REDD	reducing emissions from deforestation and forest degradation
SFM	sustainable forest management
UNFF	United Nations Forum on Forests



Children reminding Congress participants that children are the future