



Summary Report of the IUFRO Regional Congress for Asia and Oceania 2016

1. Introduction

The IUFRO Regional Congress for Asia and Oceania 2016 (IUFRO-AO 2016) "Forests for Sustainable Development: the Role of Research", organized by the International Union of Forest Research Organizations (IUFRO) and the Chinese Academy of Forestry (CAF) was held from 24 – 27 October in the China National Convention Center (CNCC), Beijing, China. It was the first Regional Congress held in Asia and Oceania as well as the largest international event on forest science ever held in China. The milestone Congress generated great attention within the Chinese government. Mr. Luo Fuhe, Vice Chairman of Chinese People's Political Consultative Conference (CPPCC) attended the opening ceremony and delivered a speech, and representatives from the State Forestry Administration, China Association for Science and Technology and Chinese Society of Forestry also presented and delivered speeches at the opening ceremony. The Congress was designed in three streams, namely the IUFRO-AO 2016, the All Division 8 Conference themed "Forest Environment under Changing Climates and Societies" and the 4th Forest Science Forum of the Chinese Society of Forestry (CSF) entitled "Multi-functional Forest Management". The event attracted the participation of over 1,200 scientists, professional foresters, policy-makers and forestry students from 56 countries, and explored the role of forest-related researches in pursuing the sustainable development embracing the following eight sub-themes:

- (1) Sustainable forest management for enhanced provision of ecosystem services;
- (2) Forest and landscape rehabilitation and restoration;
- (3) Combating desertification, disaster and risk management, and climate change mitigation and adaptation;
- (4) Planted forests for fostering a greener economy;
- (5) Innovative technologies for bio-energy, bio-materials and other products;
- (6) Urban forestry for human health and community well-being;
- (7) Social and cultural aspects of forests, including traditional knowledge, human health, community participation and gender roles; and
- (8) Forest and agro-forest management for food security, enhanced livelihoods and non-timber forest products.

Focusing on the sub-themes above, four keynote plenary sessions and 98 scientific sessions were organized, in which 530 oral presentations were given, plus an additional 200 posters presented in the poster session.



Opening ceremony of IUFRO-AO 2016



Exhibition



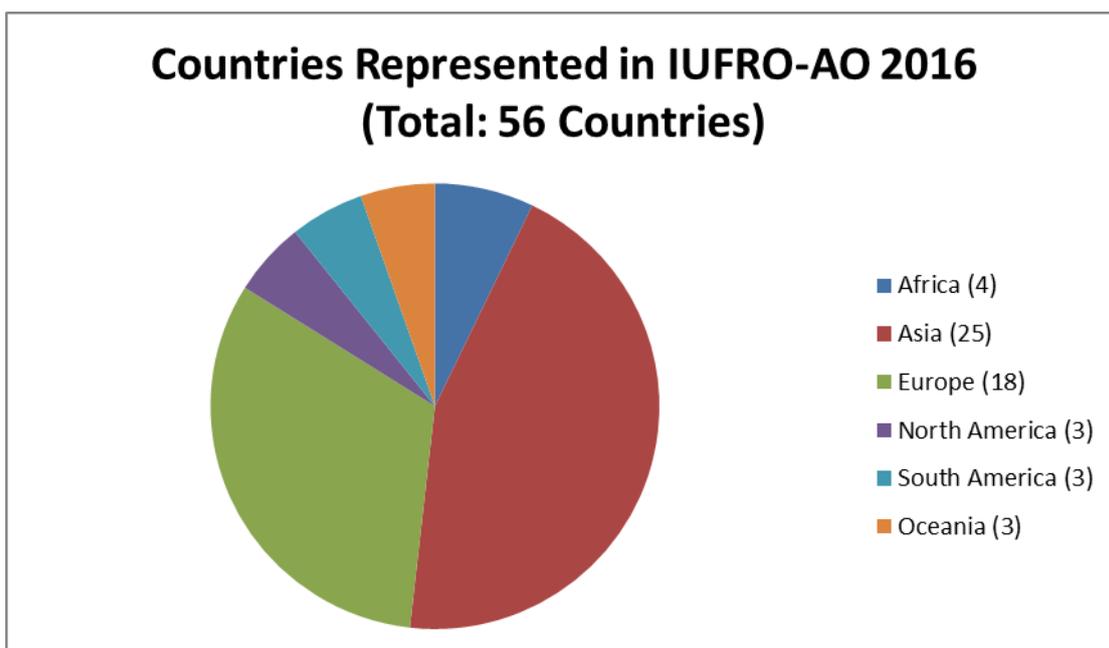
Pre-Congress excursion

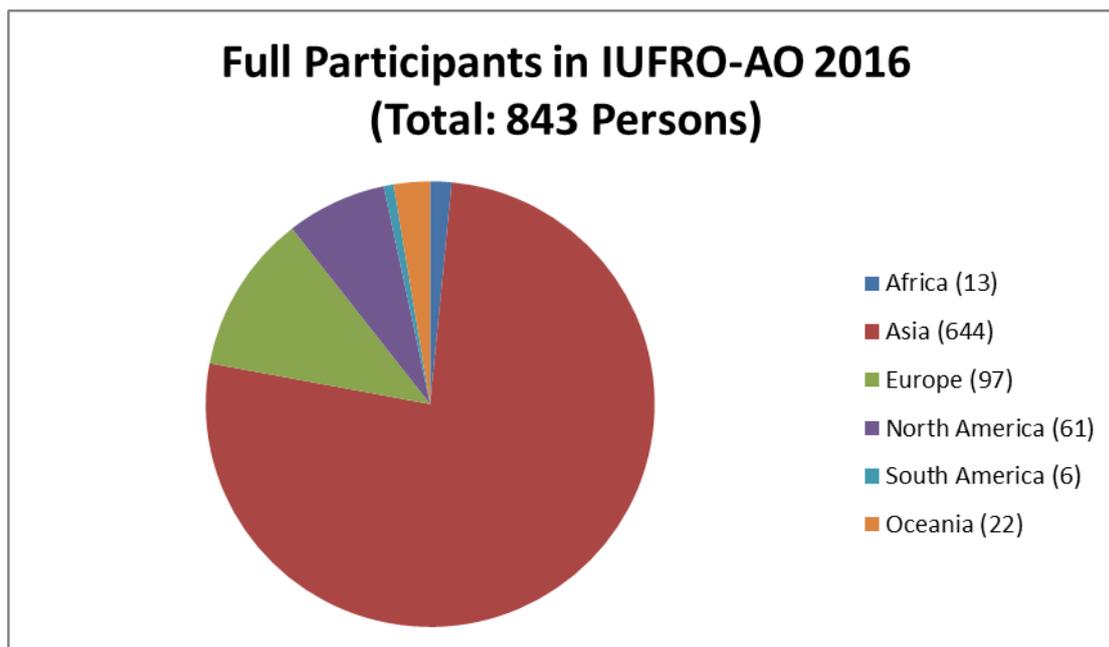
2. Statistics

2.1 Participation

Total participants: Approximately 1,200, among who were 843 full participants

Countries represented by participants: 56, from 6 continents





2.2 Congress Components

Keynote plenary sessions: 4

Scientific sessions: 98

Oral presentations: 530

Posters: 200

Exhibitions: 24 (Displayed in 30 booths)

Pre-Congress Tours: 6 Routes

Parallel conferences: 2 (All-Division 8 Conference and the 4th Forest Science Forum of CSF)

Business meetings: 6 (Divisions 1, 4, 5, 7 and 8 and APAFRI)

3. Opening Ceremony

The milestone Congress attracted high-level attention from the Chinese government and representatives working at the interface between science and policy.

Mr. Luo Fuhe, Vice Chairman of the Chinese People's Political Consultative Conference (CPPCC) and Executive Vice Chairman of the Central Committee of China Association for Promoting Democracy, attended the opening ceremony. His opening address underlined the great importance attached to sustainable forest development by the Chinese government through implementation of a series of key national forestry programs to conserve natural forests, develop planted forests and restore ecosystems, and acknowledged the role played by scientific research in protecting and restoring forest, desert and wetland ecosystems. Mr. Luo also highlighted the significance of the first IUFRO Regional Congress held in this region as a platform for forest scientists worldwide to focus on regional forest development and its environmental benefits, share their expertise, know-how and experience, and form collaborative synergies in forest-related scientific research.

Prof. Michael Wingfield, IUFRO President, as one of the Congress' hosts, stressed that the region was facing challenges in a wider global context and thus research collaboration efforts were urgently needed to tackle these problems and ultimately attain the Sustainable Development Goals. Therefore, he expected the platform provided by the Congress would be fully used to share experience and build partnerships.

Mr. Peng Youdong, Vice Administrator of the State Forestry Administration (SFA) also gave an address on the opening ceremony. He emphasized the role of forest research in informing decision and policy-making for sustainable forest development and expressed the wish of both Chinese forestry authorities and forest scientists to cooperate with the international forest science community to promote the sustainable forest development.

Prof. Chen Zhangliang, on behalf of the Chinese Society of Forestry, pointed out that although China had become the country with the fastest growth in forest restoration, with the largest area of planted forests in the world, it still faced challenges of uneven forest distribution and poor forest quality. He urged the strengthening of regional and international scientific cooperation for the sake of forests, the environment and people's livelihoods.

At the end of the opening ceremony, Prof. Michael Wingfield conferred the IUFRO Honorary Membership to Dr. Su See Lee, Former Vice President of IUFRO and retired researcher from the Forest Research Institute Malaysia.



Mr. Luo Fuhe, Vice Chairman of CPPCC, delivered a welcoming speech at the opening



Prof. Michael Wingfield, IUFRO President, delivered a welcoming speech at the opening.



Mr. Peng Youdong, Vice Administrator of SFA, delivered an opening address



Dr. Su See Lee, Former Vice President of IUFRO, received the IUFRO Honorary Membership

4. Scientific Contributions

4.1 Keynote Presentations

Keynote 1: *Latest Progress of Silviculture Research in China* by Prof. Zhang Shougong (China).

The keynote session was chaired by Björn Hånell from the Swedish University of Agricultural Sciences. Prof. Zhang Shougong provided an overview of forest resources and distribution in China, followed by a discussion of China's experimental and demonstration work on forest sustainable management. On tree breeding, he noted new approaches to forest genetic resources, research and development related to whole-genome sequencing and analysis, genetically improved tree species, establishing timber-oriented and/or multi-level tree breeding systems, as well as the breeding for resistance (including to drought, salinity, and heavy metals). He further described the management techniques used for planted forests and natural forests in China. He highlighted the approaches to protect the forest resources in China, from the establishment of monitoring stations, biodiversity protection, forest fire prevention, and control of forest pests and diseases. He concluded that significant progress has been made on forest silviculture, but that there is a still long way to go, including a need to strengthen cooperation on sustainable forest management.



Prof. Zhang Shougong gave a keynote presentation on China's silviculture research

Keynote 2: Research and Development for Sustainable Forest in Asia by Prof. Don Koo Lee (Republic of Korea)

This session was chaired by Liu Shirong from the Chinese Academy of Forestry. Reporting on research and development for sustainable forest in Asia, Prof. Don Koo Lee introduced the roles of forest and basic information about Asia. He stressed the importance of forest sustainability from generation to generation, and sketched what we have done and what remains to be done within the theme of forest sustainability. He suggested a roadmap for sustainability to be tackled, considering the attainment of 17 Sustainable Development Goals at the local and global level. Prof. Lee further shared with the participants Korea's forest restoration success story highlighting the so-called Saemaul spirit or "Can Do spirit" of "diligence, self-help and cooperation" that made growing stock changes of 6 m³/ha in 1953 to 146 m³/ha in 2014 possible. He concluded by underscoring the importance of capacity building, research and development, good governance and the role of green leaders as fundamental driving forces behind national greening and development in Asia.



Prof. Don Koo Lee gave a keynote presentation on research and development of sustainable forests in Asia

Keynote 3: *How Far Should We Go "Native"?* Re-conceptualizing Biodiversity Restoration in Urban Forests by Prof. Makoto Yokohari (Japan)

This session was chaired by John Parrotta from USDA Forest Service. Prof. Makoto Yokohari indicated that Tokyo is becoming an ideal habitat for species introduced from southern Japan and even for tropical species, although climate change and rising temperature due to urbanization might lead to lost habitats for some species. By referring to prominent reforestation projects recently undertaken in downtown Tokyo, as well as in North American and European cities, Prof. Yokohari argued that reforestation projects aiming to restore biodiversity should be conducted by re-conceptualizing "urban" biodiversity and "native" species.



Prof. Makoto Yokohari gave a keynote presentation on urban forests

Keynote 4: *Forests and the Bioeconomy: Challenges and Opportunities* by Dr. Elspeth MacRae (New Zealand)

The last plenary presentation was chaired by Jean-Michel Carnus from the Institut National de la Recherche Agronomique (INRA) in France. Dr. Elspeth MacRae reviewed the challenges and opportunities for forests and the bioeconomy. She indicated that there are more challenges for softwoods than for hardwoods in the processing and reduction of cellulose and hemicellulose to sugars for onwards fermentation, or the modification of lignin to make new products, although economic solutions are increasing. She stressed the fact that the world was placing great hopes in the development of materials, chemicals and fuels made of renewable resources, and forests were probably the best option for providing consistent and long-term easily available materials. With the help of biotechnology, planted forests can be designed to provide the key materials needed. However, the establishment of such commercial plantings of biotech trees is limited by national legislation and market responses, including acceptance and uptake of biotechnological solutions.



Dr. Elspeth MacRae gave a keynote presentation on forests and bioeconomy

4.2 Congress Highlights

4.2.1 Scientific Discussions

A total of 98 concurrent scientific sessions were organized, in which 530 oral presentations were given. As summarized below, presenters and participants at these sessions explored 8 sub-themes and the two themes of the All-Division 8 Conference and the 4th Forest Science Forum, providing their inputs and insights, including but not limited to:

Sub-theme 1: Sustainable forest management for enhanced provision of ecosystem services

Participants agreed that forests should be an important consideration for sustainable development. Discussions were held on technologies and methodologies applied in forest resources inventory and long-term monitoring and how to use GEP (Gross Ecosystem Product) in accounting for the value of forest ecosystem services in different countries. The latest research findings and progress on forest physiological genetics were presented and discussed, including the application of genomics in understanding the fundamental processes of tree growth, development, adaptation and resistance to diseases and pests to accelerate tree breeding for the purpose of sustainable management of planted forests. Experience and lessons learned in organizing and supporting smallholders to manage planted forests in a sustainable way were shared. The sustainable management and utilization of bamboo and rattan was also discussed.

Sub-theme 2: Forest and landscape rehabilitation and restoration

Participants exchanged research results and experiences with the methods applied in Northeast Asia and Central Asia for evaluating forest landscape restoration in hilly and alpine regions. Discussions included risk-based evaluations, which not only focus on ecological benefits, but also taking into account the socio-economic effects and long-term environmental impacts. The

importance of inter-disciplinary research in support of forest landscape restoration was emphasized.

Sub-theme 3: Combating desertification, disaster and risk management, and climate change mitigation and adaptation

Several presenters used artificial simulation experiments and/or modeling to showcase the impacts of climate change on forest ecosystem structure and functions, including warming, drought, nitrogen deposition, etc. Impacts of climate change in different countries were shared and participants reached consensus on the great need to promote adaptive forest management. Enhanced policy support for multi-purpose forest landscapes was also urged. The use of genetically modified (GM) forest trees in silviculture for adaptation to climate change to improve forests' resilience to both biotic and abiotic environmental stresses was discussed. Discussions and exchanges also included REDD+, the life cycle of forest products under climate change, disease and pest control, conservation and management of microbial diversity and other interesting topics. The current status and trends of desertification on the earth in the context of climate change were introduced and some typical cases studies highlighting the reduction or losses of ecosystem services caused by changes occurring in ecosystems were presented. Progress made by UNCCD on Land Degradation Neutrality (LDN) was also reported, and research experience and viewpoints on conservation, restoration and sustainable development of dryland ecosystems were exchanged.

Sub-theme 4: Planted forests for fostering a greener economy

The important role of forest biomass in developing the bioeconomy and improving rural livelihoods as well as the importance of biological diversity conservation at the regional level was well acknowledged during these sessions. Eco-friendly technologies for conserving wood from planted forests and developing green economy were presented. A full picture of what China had achieved over more than one decade in the development of its own forest certification scheme was showcased under this sub-theme, and the broad perspectives for its future development after the mutual recognition with PEFC were also presented. In-depth discussions covered a broad range of topics, including the current status of forest certification in different countries, public procurement policy for certified products, Chain of Custody certification criteria, wood legality tracing, etc.

Sub-theme 5: Innovative technologies for bio-energy, bio-materials and other products

Research findings and technical breakthroughs on development and production of biomass energy and bioproducts, e.g. wood and bamboo scrimber and adhesives, and application of new technologies such as wood nanotechnology were shared. Scientific, environmental and legal issues including wood legality verification systems were discussed.

Sub-theme 6: Urban forestry for human health and community well-being

Conceptual frameworks as well as practices in using urban forests to improve urban air quality, human health and community well-being were presented and discussed. It was agreed that better design of urban forests to maximize their recreational functions was needed, that urban forestry education should be developed, and that urban forests should be managed in a

sustainable way.

Sub-theme 7: Social and cultural aspects of forests, including traditional knowledge, human health, community participation and gender roles

The experience in using participatory methods in promoting the application of traditional knowledge in forest management in various countries for local sustainable forestry development was shared, covering the historic evolution and traditional techniques of ancient wooden products, e.g. wooden tools, wood structures used in houses, handicrafts, etc. The origin of the World Wood Day and its future direction were introduced. Other topics discussed under this sub-theme included: forestry policy and governance, forest tenure reform, forestry education, science research management, forest recreation and tourism, social responsibilities of forestry corporations, the role of gender in forestry development, natural resources management and wood industry.

Sub-theme 8: Forest and agro-forest management for food security, enhanced livelihoods and non-timber forest products

Diverse sustainable agro-forest management models and practices were presented and relevant experience was shared, including how to maximize the role of agro-forests in ensuring food security, improving livelihoods and mitigating climate change.

All Division 8 Conference "Forest Environment under Changing Climates and Societies"

Three keynote talks were presented at the All Division 8 Conference: (1) "*Will Rising [CO₂] Affect Forest Species and Function in Large-scale Forest CO₂ Enrichment Experiments? The Next-generation of Forest Experiments*" by David Ellsworth, a plant eco-physiologist at Western Sydney University, (2) "*Effects of Climate Change and Disturbances on Forests of Northeastern China and Eastern U.S.*" by Hong S. He, a professor at Northeast Normal University and University of Missouri-Columbia, and (3) "*Biodiversity and Regulating Ecosystem Services in Forests*" by Hervé Jactel, a Senior Scientist (Research Director) at INRA Bordeaux. The Conference also included 18 technical sessions, 122 presentations and associated discussions on forest ecosystem functions, forest biological diversity, natural hazards and risk management, and other interested topics.

The 4th Forest Science Forum of the Chinese Society of Forestry (CSF) "Multi-functional Forest Management"

The Forum consisted of 4 keynote presentations, 6 concurrent sessions and 55 oral presentations, exploring (1) the role of forestry society organizations in forestry innovation, (2) control of invasive forest pests and diseases and sustainable forest management, (3) multi-functional forests and forestry, (4) role of genetics and physiology in sustainable forest management, (5) multi-target tree breeding and molecular techniques for SFM, and (6) decentralization and forest governance in Asia and Pacific Region. Participants presented the latest research findings and progress on multi-functional forest management in different countries and the development direction for forest management at the global level. Viewpoints were shared and expectations for strengthened international cooperation were expressed.

4.2.2 Poster Session and Best Poster Awards

A total of 200 posters were presented during the Congress. The following 9 posters were voted as the Best Poster for each IUFRO Division:

Division 1: *Effects of Dynamic Processes of Wind Erosion on Sand Particle Distribution on the Stoss Slope of Migratory Dunes in the Mu Us Desert, China* (Bao Yanfeng, Institute of Desertification Studies, Chinese Academy of Forestry)

Division 2: *Seed Quality Traits of Two Distinctive Saxaul (*Haloxylon ammodendron*) Populations of Mongolia* (Batkhuu Nyamosor, et. al., National University of Mongolia)

Division 3: *Design of Multi-Functional Forest Management (MFFM) at Scale of Forest Management Unit* (Liu Xianzhao et al., Chinese Academy of Forestry)

Division 4: *Analysis on Growth Trend of Mongolian Forests for Sustainability* (Bayarbaatar Soronzonbold et al., National University of Mongolia)

Division 5: *Investigating Chemical Properties and Combustion Characteristics of Torrefied Masson Pine* (Hu Wanhe et al., International Center for Bamboo and Rattan, China)

Division 6: *Adaptation of Asia-Pacific Forests to Climate Change* (John Innes et al., University of British Columbia)

Division 7: *Effects of Air Pollution on Morphological Characteristics of Cones and Pollens of *Pinus sylvestris* L.* (Tsengel. B et al., National University of Mongolia)

Division 8: *Regional Cooperation on Plant Biodiversity Conservation in Response to Climate Change in East Asia* (Ho Sang Kang et al., Seoul National University, Republic of Korea)

Division 9: *State Forest Management Conflicts in the Media and Litigations* (Mi Sun Park et al., Konkuk University, Republic of Korea)



IUFRO Directors' Forum



Panel discussion during IUFRO Directors' Forum



Scientific session on conservation, restoration and sustainable use of dryland ecosystems



Scientific session on forest certification



Scientific session on microbial diversity



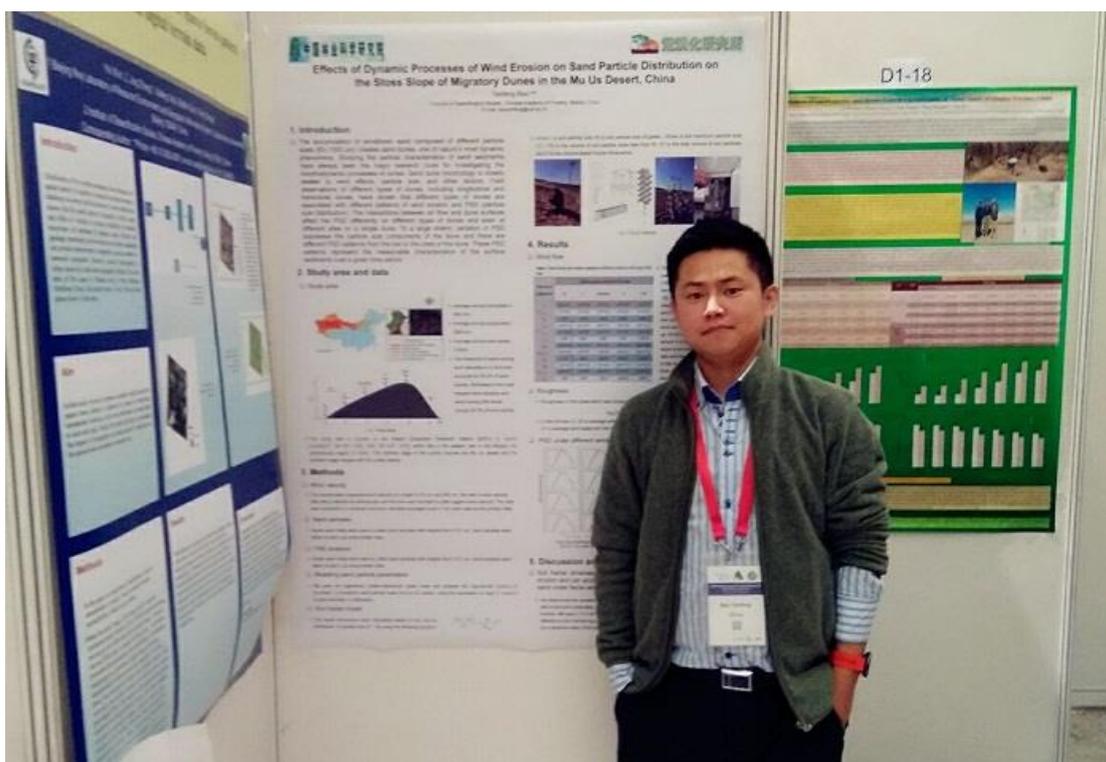
Scientific session on forest tenure reform



Scientific session on application of remote sensing in forest management



Scientific session on forest genetics



Best poster of Division 1

5. Congress Resolution

The Congress passed and adopted a resolution, the Beijing Declaration (for the full version, see: <http://www.iufro.org/news/article/2016/10/27/beijing-declaration/>). The Beijing Declaration reaffirmed the need for:

- (1) Improved forest management for multiple purposes through long-term planning and practical implementation that is well-informed by science. In this way, it can help societies meet the rising demand for forest ecosystem services, increased production of forest products and incomes especially for forest-dependent communities and indigenous people, greater recreation and tourism opportunities, and respect for social and cultural values in relation to forests and trees;
- (2) Restored forest landscapes in areas faced with vulnerable ecosystems through increased expertise, know-how and experience exchanges, and improved collaborative capacity building, in order to improve local livelihoods and contribute to a greener economy in the region as a whole;
- (3) A greater role for forests in mitigating and adapting to climate change through concerted research efforts to improve forest health, resilience, and adaptability, which can be achieved by increasing forested area and improving forest productivity of forests to enhance carbon capture and storage and help to regulate regional climate;
- (4) Growing more robust, healthy urban forests in response to rapid urbanization to improve community well-being and contribute significantly to human health and quality of life. Understanding and optimizing the structure and functions of urban forests will maximize economic, social, cultural, environmental, aesthetic and spiritual values, and better meet the needs of urbanized societies;
- (5) A better cross-discipline understanding of trade-offs and synergies between different ecosystem services (and products) as well as of the socio-economic implications of emerging biotechnology and bio-economy; and
- (6) Enhanced sub-regional, regional and international collaboration through forest-related scientific research, increased knowledge, experience sharing and communications.

6. Other Results

The journal of *Forest Ecology and Management* organized a special event on the Congress, where Prof. Dan Binkley, Editor-in-Chief, introduced the FEM publication project. A special issue to be published on FEM is now being organized.

7. Conclusion

IUFRO-AO 2016, the largest international Congress on forest science ever held in China, achieved a number of important objectives in terms of:

- (1) The high attention paid by the international forest science community and representativeness of different geographical regions and professional circles. A total of 1,200 participants from 56 countries and 6 continents were involved, representing governments, research organizations, universities, international organizations, NGOs, forest industries, and

scientific journals, among others;

- (2) The consensus reached about the need for more concerted research efforts and enhanced regional and global collaboration in pursuit of sustainable forest management and the Sustainable Development Goals;
- (3) The wide range of topics explored and dynamic discussions and experience-sharing among participants through the six pre-Congress fieldtrips, the 3-stream programme with plenary keynote presentations and 98 scientific sessions, posters, exhibitions, exchanges in and outside the meeting rooms, and social events;
- (4) The presentation of China's achievements in forestry development, forest-related research, industry and governance to the world. Among the 98 scientific sessions, 530 oral presentations and 200 posters in total, 52 sessions, 225 oral presentations and 81 posters were provided by Chinese forest research organizations and universities and their scientists. China's experience in SFM, wetland conservation, wildlife conservation, urban forests, wood industry and other related areas was fully communicated;
- (5) The strong emphasis on the interface between forest science, policy-making and industry. Representatives from different circles, e.g. governments, research organizations, universities, international organizations, NGOs, forestry enterprises and science journals, shared their viewpoints and insights on how to strengthen the linkage between research, governance and business and to better apply the research results in well-informed decision making for forestry governance and business development; and
- (6) The wide media coverage in China and worldwide, which helped arouse extensive attention and reverberation from the global forest science community and all people interested in forests.