

***“Sustainable Wood for a Sustainable World”***

***Initiative***

# **Workshop Summary Report**

***“Wood products in the sustainable bioeconomy”***

***10&11 December 2019***

***Food and Agriculture  
Organization***

***Rome, Italy***



***Sustainable Wood for a Sustainable World (SW4SW) partners :***



**Food and Agriculture  
Organization of the  
United Nations**



**WORLD BANK GROUP**



**CITES**  
**Contents**

List of Acronyms and Abbreviations..... 3

Workshop report..... 4

Annex 1 : Agenda..... 20

Annex 2 : Participants..... 22

Annex 3 : “Sustainable Wood for a Sustainable World” Initiative web portal ..... 25



Photos from Joëlle Bernard

## List of Acronyms and Abbreviations

<b>CIFOR</b>	Centre for International Forestry Research
<b>CITES</b>	The Convention on International Trade in Endangered Species of Wild Fauna and Flora
<b>CPF</b>	Collaborative Partnership on Forests
<b>EC</b>	European Commission
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FFSPAK</b>	Farm Forestry Smallholder Producers Association of Kenya
<b>FSC</b>	Forest Stewardship Council
<b>IFDD</b>	Institut Francophone pour le Développement Durable (OIF)
<b>ITTO</b>	International Tropical Timber Organization
<b>JRC</b>	Joint Research Centre (European Commission)
<b>OIF</b>	Organisation Internationale de la Francophonie
<b>SDGs</b>	Sustainable Development Goals
<b>SW4SW</b>	Sustainable Wood for a Sustainable World
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>UNEP</b>	United Nations Environment Programme
<b>WB</b>	The World Bank
<b>WWF</b>	World Wildlife Fund

# Workshop report

## Background

The benefits from forest products to sustainable development have been widely acknowledged. The 2030 Agenda for Sustainable Development places sustainable use of natural resources, including forest products, as a key tenet of the development vision. The Paris Agreement also highlights the contributions of forests to climate change mitigation and adaptation, as countries put forward their forest sector in drawing up their nationally determined contributions to mitigation. Technical and methodological progress allows for better monitoring of harvested wood products' life-cycle as well as for new usages and increased efficiency, giving them a key role in strategies for transitioning to low-carbon economies.

The Joint Initiative of the Collaborative Partnership on Forests (CPF) **“Sustainable Wood for a Sustainable World” (SW4SW - 2018-2021)** aims at implementing collaborative activities and catalyse efforts to strengthen sustainable wood value chains. Led by the Food and Agriculture Organization of the United Nations (FAO), in collaboration with the Center for International Forestry Research (CIFOR), the International Tropical Timber Organization (ITTO), the World Bank (WB), the World Wildlife Fund (WWF) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the initiative shall promote positive linkages between wood value chains and poverty reduction, sustainable landscapes, cities and growth. As part of the main outcomes of the initiative, the promotion of forest-based bioeconomy is contributing to generate and disseminate knowledge and good practices for increased use of sustainable wood products in value chains, with amplified generation of local and global socioeconomic and environmental benefits.

## Bioeconomy work in FAO

As specialized UN organization for food, agriculture, fishery, forestry and wood products, FAO received a mandate to coordinate international work on sustainable bioeconomy by 62 Ministers at the Global Forum for Food and Agriculture (GFFA) meeting in Berlin in 2015. As a follow up action, FAO has been coordinating an international working group on sustainable bioeconomy formed by 13 countries, focused on the development of guidelines on sustainable bioeconomy, funded by the German Ministry of Food and Agriculture. This work is now reinforced by the Forestry Department, through the SW4SW Initiative outcome “Sustainable wood products contributions to the bioeconomy and the circularity approach are strengthened in both developed and developing countries sustainable wood value chains through improved awareness and knowledge”.

There are several definitions of bioeconomy, but with a common underlying goal of increasingly substituting sustainable renewable bio-based goods for non renewable products based on fossile resources. The *2018 Global Bioeconomy Summit* defined bioeconomy as “The production, utilization and conservation of biological resources, including related knowledge, science, technology and innovation, to provide information, products, processes and services across all economic sectors aiming at a sustainable economy” (*Communiqué of the Global Bioeconomy Summit. 2018. Innovation in the Global Bioeconomy for Sustainable and Inclusive Transformation and Wellbeing*. Berlin. 24 pp.).

In the European Union (2018 updated bioeconomy strategy), bioeconomy is described as covering all sectors and systems that rely on biological resources (animals, plants, micro-organisms and derived

biomass, including organic waste), their functions and principles. It includes and interlinks : land and marine ecosystems and the services they provide ; all primary production sectors that use and produce biological resources (agriculture, forestry, fisheries and aquaculture) ; and all economic and industrial sectors that use biological resources and processes to produce food, feed, bio-based products, energy and services. A first evaluation by the European Commission (JRC) in 2016 showed that EU bioeconomy represented 4% of EU value-added. Forest-based industries represented 0,8% of total economy, 19% of EU bioeconomy and 15% of EU bioeconomy jobs. Within bioeconomy as a whole, forest products (wood and non-wood) have a key role to play to expand their contribution. A lot remains to be done for global monitoring of bioeconomy and forest-based bioeconomy.

Finally, forest-based bioeconomy is a key contributor to Sustainable Development Goals (SDG) of the 2030 UN Agenda, in particular for SDG 9 “promoting inclusive and sustainable industrialization and fostering innovation”, SDG 12 “sustainable consumption and production”, SDG 13 “mitigation of climate change through carbon sequestration in forests and wood products” and SDG 15 “sustainable management of forests, halting biodiversity loss and restoring degraded land”.

### **Objectives and outputs**

The workshop gathered 33 participants (21 non-FAO from 17 countries and 6 continents including 6 women, 12 from FAO including 4 women), representatives of public and private sectors, as well as representatives of academia and international organizations, all experts or of relevance to advancement of the bioeconomy.

These experts with a great variety of backgrounds and achievements could discuss strategies for sustainability and dissemination of wood-based bioeconomy in developing and developed countries, with focuses on :

- i) The potential wood products contribution to expansion of the bioeconomy ;
- ii) Sustainability of wood value chains in the bioeconomy, including indicators and monitoring ;
- iii) Strategies and other policy institutions framework for disseminating the bioeconomy in developing and developed countries ;
- iv) Catalyzing investment in sustainable wood value chains
- v) The SW4SW programme of work on forest-based bioeconomy.

During this one and half-a-day workshop, dense presentations and discussions provided the basis for establishment of an informal international working group on wood products in the sustainable bioeconomy. In-depth contributions from participants brought concrete inputs to FAO and partners in the implementation of the Initiative “Sustainable wood for a sustainable world”.

## I- Opening of the workshop

**Thais Linhares-Juvenal** (FAO, Forestry department, Team Leader “Forest governance and economics”) welcomed participants in FAO and congratulated their motivation to discuss contributions from wood products to a sustainable bioeconomy. Though benefits associated with the use of forest products are well known, a lot remain to be achieved from awareness raising to action, with a view to expand sustainable wood-based circular bioeconomy worldwide.

The 2030 UN Agenda for Sustainable Development places sustainable use of natural resources, including forest products, as a key tenet of the development vision. The Paris Agreement on climate highlights the contributions of forests to climate change mitigation and adaptation, as countries put forward their forest sector in drawing up their nationally determined contributions to mitigation. The SW4SW initiative aims at strengthening sustainable wood value chains in the bioeconomy.

FAO activities on sustainable use of bioresources are achieved according to cross-sectoral approaches. As an illustration, Thais Linhares-Juvenal quoted the combination of biodegradable wood-based packaging with collection of food waste in order to increase recycling of organic material through recyclable packaging. However, she recognized that huge efforts have still to be done globally, to collect more wood products after use, with a view to develop a more circular wood-based bioeconomy.

The concept of bioeconomy is not familiar to forest and wood sector actors yet. But as they are quite familiar with sustainable forest management, it may not be so difficult to convince them to be part of the implementation of sustainable bioeconomy strategies.

Priorities of this first FAO workshop were to describe innovative wood-based sectors, opportunities and challenges for wood in bioeconomy, policies and measures to enable forest-based bioeconomy. The enabling conditions for enhancing bioeconomy were also a key item to be discussed. This can be done through sharing case studies, policy experiences and lessons learnt.

Wood-based bioeconomy will only expand based on sustainable value chains. This encompass many forestry compounds, such as sustainable forest management, long-term strategy for near-by sustainable wood supply, efficient wood and by-products processing, well-organized collection and re-use of wood material at products’ end-of-life, etc... Among final goals is the will to give more value to forests. As a consequence to protect them from deforestation for other land uses. Wood is suitable to bioeconomy. Its potential for circularity is excellent (as already shown by paper products). Sustainable wood products have a strongly underestimated contribution to mitigation of climate change, in particular through increased use in the construction sector. This has to be urgently better promoted, in combination with positive interactions contributing to achieve several SDGs, in particular “Progress towards sustainable forest management” (FAO is custodian organization for UN forest indicators 15.1.1, 15.2.1 and 15.4.1).

**Anne Bogdanski** (FAO, Natural Resources Officer, Project Coordination “Towards Sustainable Bioeconomy Guidelines”), presented the broader FAO work on bioeconomy, through a presentation on “Mainstreaming sustainability into the global bioeconomy”.

She stressed that there is growing international consensus on the definition of bioeconomy, following the suggestion of the GBS in 2018. In the 2018 Global bioeconomy summit (GBS), the group defined

the bioeconomy as “the production, utilization and conservation of biological resources, including related knowledge, science, technology, and innovation, to provide information, products, processes and services across all economic sectors aiming toward a sustainable economy.” She also introduced FAO’s International Sustainable Bioeconomy Working Group, composed of policy makers, NGOs, the private sector and academia from around the world. One of the first outputs of this working group was the development of a set of Aspirational Principles and Criteria for a Sustainable Bioeconomy, that can serve as a conceptual framework for monitoring and evaluation. FAO has used the conceptual framework as a basis for several technical knowledge products, among them a recently published report on “Indicators to monitor and evaluate the sustainability of bioeconomy” (2019) and “Lessons Learnt from 26 Case Studies”(2019). The FAO project on “Bioeconomy Guidelines”works closely with the Government of Uruguay and Namibia.

## **Item 1 – Innovative wood-based sectors throughout the world**

- **Europe**
  - **The European wood waste platform : wood waste recycling for circular bioeconomy : Magdalena Borzęcka (Institute of Soil Science and Plant Cultivation · Department of Bioeconomy and Systems Analysis – Pulawy, Poland)**

Magdalena Borzęcka introduced the European wood waste management platform (<http://bioreg.eu/platform/>) and the high potential contribution from wood waste to European circular bioeconomy. Three main wood waste sources were identified : old housing demolition wood, wood industries and municipal waste. Based on resource analysis in several European regions, the total theoretical potential of wood waste in the EU was estimated at nearly 50 million tonnes (24 Mt from municipal waste, 19 Mt from demolition and construction, 6 Mt from industry). A major issue is wood waste sorting and classification (developing more standardized description categories, also addressing possible uses). A geoportal was created to geographically locate these wood resources, including the creation of a typology of possible new uses of wood waste : recycling (panels, paper and paperboard, ...), energy or mixed uses with both recycling and energy. A toolbox of success factors was built addressing key roles for all stakeholders (policy makers, waste management and recycling units actors, energy processing managers, research and academia, general public). Many questions were raised on methodology (how to get more homogeneous standardization between countries) and on practical implementation. Hüseyin Güler mentioned that there are European research projects with participation of companies whose aim is to define possible business models for wood products recycling.

- **Asia**
  - **Coconut Palm Wood - a goldmine waiting to boost the parallel coastal economy of coconut growing countries : Dr Elaveetil Vasu ANOOP (Professor and Head of wood science department, Kerala Agricultural University, India)**

Dr Elaveetil Vasu ANOOP introduced through a presentation and a magnificent video the huge potential of coconut palm wood to respond to various population needs. As forest cover is still decreasing in India, coconut palm cover is quite stable along a vast coastline of 7,500 km. This coconut tree cover is hosting a fantastic but undervalued resource : coconut palm wood and in particular from senile trees. India has the third largest coconut area in the world (2.1 Mha) and is the world’s leading coconut producer (22 million nuts). From these coconut groves, coconut wood is a by-product with huge development potential. Its mechanical properties can for example compete with teak wood in

static bending, compression parallel to grain and even has a higher basic density. It has many possible uses in construction and in furniture sectors. Coconut palm can thus bring multiple benefits to populations, not only for food security, but also as fibre for textiles, ropes and as wood material. Discussions focused on the technical properties of coconut wood and on the substitution benefits brought by coconut-wood-based products.

- **Oceania**

- **Innovations with engineered wood products in New Zealand : Andrea Stocchero (Scion Forest Research Institute, New-Zealand)**

Andrea Stocchero introduced new technological advances opening wide opportunities for wood use in the construction sector. Through a variety of high-quality new engineered wood products such as cross-laminated timber, screw-laminated hardwood lamella, banded hardwood, pre-stressed laminated timber, plywood structural frames, wood-framed construction is entering a new era based on :

- Highly automatized manufacturing ;
- Use of performing, resilient, stable and sustainable wood products (high mechanical resistance, low damage seismic performance, less structural bracing required, reduced manufacturing waste, possibly glued with biobased adhesives, using minimized metal fixings, light weight and fast assembling, designed for disassembling and possible recycling ;
- Creative and maximized-timber structural design ;
- Carbon sequestration in wood products.

From the presentation arose many questions, as much technical (low-damage seismic performance, high-rise construction, ...), as on the key factors to be addressed in order to expand the use of these innovative engineered wood products for new construction techniques. The answer is a combination of public policy including technical regulations updates (construction codes), training (architects, construction companies, ...), needed investments in the wood sector and price competitiveness in comparison with other materials and construction techniques.

- **North America**

- **Innovation and development of forest products industries in Québec : Vincent Rochette (Formabois, Québec, Canada)**

Vincent Rochette introduced the history of development of wood industries in the Canadian province of Québec, hosting a quarter of canadian forest (90 Mha). From a limited internal market with huge distances from forests to industries and to urban markets, the only choice is innovation. Industries first developed from log to sawnwood and paper production. Then the 2009 economic crisis underlined the urgent need for strengthening innovation and products' quality, as well as finding new markets.

Innovation derives from research and development but cannot be successful without a complete investment strategy, including export market analysis and labor force training. Formabois is Québec's organization helping wood sector companies (60 000 employees) to improve labor force qualification, human resources management and access to labor market. Examples were given on how to combine modernization investments and training programmes to transform a sawmill company into a glue-laminated timber and cross-laminated timber producer, or to shift from paper to cardboard production, or from pulp production to a biorefinery (processing various cellulose- and lignin-based new products including nanocellulose). New wood products and uses require new skills. R&D investments, market knowledge, appropriate training and human resources management, innovation and quality-control policies, are key success factors to strengthen all along the wood value chain.



- **South America**
  - **The rise of sustainable wood-based industries in Brazil : Mike May (IBA, Association of brazilian wood-based industries, Brazil)**

Mike May introduced key facts on wood-based industry in Brazil. This industry is almost exclusively based on planted trees. In total, Brazil has 7.83 million hectares of planted forests of mostly eucalyptus and pine to produce wood panels, laminated floors, pulp, paper, energy, and biomass. This area is less than 1% of the total land area of Brazil, and yet, planted trees are responsible for 91% of all wood used for industrial purposes in Brazil. The remaining 9% comes from legally managed natural forests. Because of strict enforcement of environmental legislation, planted trees play an important role in providing environmental services : they avoid deforestation of natural habitats and protect biodiversity by recovering degraded areas where 0.7 hectares are set aside as protected reserves for every hectare planted, creating 5.6 million hectares of secondary forests. By careful zoning, tree plantations preserve soil and river resources by avoiding catchment areas and preservation of riparian zones, and help to reduce greenhouse gas emissions, since they naturally store carbon (1.7 billion tons of CO<sub>2</sub> equivalents in 2017). Other forest products are also developed from these areas, including flowers, fruits, leaves, bark and resin.

The sector heavily invests in innovation and technology to improve forest productivity and processing efficiency to develop alternatives to the use of fossil fuels within finite resource constraints, in efforts to move towards a low-carbon economy. Investments, generation of jobs and incomes and collected taxes, make the sector one of the pillars of Brazilian industry. The forest-based sector closed 2018 with a surplus of US\$ 11.4 billion, with 26% growth over the previous year. Exports totaled US\$ 12.5 billion, equivalent to 5.2% of Brazilian exports. The planted tree sector is also responsible for approximately 3.8 million jobs, through direct and indirect employment (from income effect). The wood sector generates US\$ 3.2 billion in federal, state and municipal taxes: 0.9% of taxes collected in Brazil. As a major national economic asset, pulp production reached 21 billion tonnes in 2018 and Brazil is now ranking as second world producer and first exporter.

Mike May highlighted communication, governance, legislation and innovation as key factors for advancing wood in the bioeconomy. He mentioned that the Brazilian industry organized regional and national dialogues to develop a sustainable wood sector based on planted forest. To fulfill their needs in wood, forest investors should in particular set aside and restore a significant percentage of purchased degraded land for conservation of native species. A combination of public and private investments were focused on innovation, in particular on breeding, intensive silviculture, efficient harvesting and mill processing. Another enabling condition is the development of a positive partnership with local communities, in order to avoid conflictual situations. As an example, in 2018, by outsourcing production, 25,000 people benefitted through 447,000 partnerships with small and medium sized producers. An additional 1.5 million people benefitted through investments of R\$ 482 million in social and environmental programs.

As a conclusion, Mike May highlighted three points:

- developing a sustainable bioeconomy and in particular a wood-based bioeconomy shall be a priority to build a sustainable economy for future generations ;
- global timber demand is projected to almost triple from 3,400 million cubic metres in 2010 to over 13,000 million in 2050 (WWF report, 2012). If 10 billion m<sup>3</sup> is to be reached, the wood will not come from natural forests, but from planted forests, for which urgent investments are needed on land that is not used for agriculture ;
- communication is a key issue for forest and wood sector stakeholders. “Wood consumption is good” is a key message to continuously release towards citizens and consumers.

The presentation was followed by questions on sustainability and biodiversity in plantations. Mike May stressed that Brazil is opposed to conversion of natural forest into plantation forest and that most (6.3 million hectares) of the plantations are certified. New plantations are established only on degraded land abandoned by agriculture. Regarding biodiversity, he explained that the industry invests in biodiversity, not in the plantations but through setting aside areas for conservation with a total of 5.6 million hectares preserved. He mentioned that 60% of Brazilian bird species can be found in forest areas owned by the forest industry.

- **Africa**
  - **Developing sustainable wood value chains among smallholder forest producers in Kenya : Geoffrey Wanyama (Farm Forestry Smallholder Producers Association of Kenya)**

Geoffrey Wanyama made a presentation on how to develop smallholder farm forestry and wood value chains in Africa, in order to increase income levels and improve rural livelihoods. He introduced the example of the Farm Forestry Smallholder Producers Association of Kenya (FF-SPAK), an umbrella organization based in Nairobi and working with Smallholder farmers to promote farm forestry and improve livelihood of its members. The association is a platform providing various advisory services such as market information and trends, silviculture, weather forecast, finding input suppliers, financial partners, research collaborations. The FF-SPAK started its operations in 2014 with 6 associations and currently has 15 registered affiliate associations and 3 cooperatives covering 19 Counties. The total forest farmers membership is now reaching 26,100.

Geoffrey Wanyama underlined the need for well-coordinated policies at all stages of the value chain for successful development of farm forestry. He mentioned the consequences of a governmental ban on logging from natural forest, that generated a sudden boom in demand for wood, even for non-mature trees from plantations. He concluded that investments in plantations are increasing but there remain huge needs in more capacity building, improved governance and transparency (to reduce investment risks) and better access to finance for smallholders.

A dialogue took place with Lawrence Damnyag on how to tackle the land tenure issue.

## **Item 2 - Opportunities and challenges for wood in bioeconomy**

- **Monitoring the use of wood in the German bioeconomy and its global footprint : Stefan Bringezu (UNEP/ International Resource Panel – Kassel University/ Germany)**

Stefan Bringezu introduced achievements from the SYMOBIO project, on modelling and monitoring the German bioeconomy, focusing on the use of wood. He described the footprint of the bioeconomy, the primary timber footprint of Germany and aspects for assessing sustainability of wood

consumption. He explained how complex is modelling the bioeconomy, from production to consumption, and additionally to monitor the national footprint in a context of global production and consumption markets. The social, environmental and economic dimensions of sustainable bioeconomy were detailed, as well as stakeholders' priorities dealing with UN SDGs. He alerted on statistical gaps between sources dealing with wood harvest and wood products (underestimated consumption). Possible increases of wood harvest may be more difficult than expected and less sustainable in a context of climate change. Increasing cascading and circularity should be the priority for improved resource efficiency and better climate footprint. He cautioned that long-term productivity of forests is at risk due to climate change.

Discussions focused on the possible better knowledge of wood sources (Thais LinharesJuvenal), country comparisons on per capita wood consumption, comparisons between sustainable consumption and sustainable production (Sheam Satkuru).

- **Wood as Low-Carbon Material for housing needs : Christina Cheong (Global Green Growth Institute/ South-Korea)**

Christina Cheong introduced the intergovernmental organization GGGI and underlined the urgent need for low-carbon materials as 300 million homes have to be built in the coming decade (rising demography and fast urbanization), in a context of material depletion and climate change. She mentioned GGGI 2019 publication on "Meeting Global Housing Needs with Low-Carbon Materials", outlining material options, selection framework and key considerations in supporting industrywide transition towards low-carbon building materials. The example of Rwanda was given where global green growth has been fostered through production of bricks with lower energy consumption.

GGGI strategy is :

- to meet housing needs of low-income city dwellers with lower environmental (energy) requirements ;
- to promote innovative and scalable practices for replicable housing solutions with reduced financial and environmental costs ;
- to support the local economy through job creation, skills upgrading and support to micro, small and medium enterprises (SMEs).

When comparing wood products to other construction materials, wood has many assets, such as being often a sustainable local raw material source, produced with low energy consumption, processed with low waste & pollution, recyclable and biodegradable. It is source of many benefits for development of local bioeconomy. But just considering that it is a low-carbon material is not sufficient. All stakeholders, from governments and foresters to architects and engineers, have to facilitate and promote its use and at the end, design, produce and build with local labor, for attractive, comfortable, resilient and low-cost housing. She mentioned that surveys on wood housing received fewer positive responses than expected, as wood is still seen as traditional, not so modern or comfortable material, indicating the need for a change of consumers' perception.

Anoop stressed that after several assessments in India, it remains difficult to use more than 45% wood for construction in humid tropical climate. Discussions then took place on how to better incentivize low-carbon materials.

- **Current contribution of forest management to climate-change mitigation and REDD+ : Marieke Sandker (FAO)**

Marieke Sandker introduced the crucial contribution from sustainable forest management to reach the carbon sequestration goals of the Paris Agreement on climate. Forests remove from the atmosphere 30% of all global emissions annually. REDD+ is the main vehicle to provide incentives for mitigation efforts in forestry. Thus a growing number of countries submitted Forest Reference Levels contributions to the UNFCCC. In total, submitted results in 2019 amounted at 8.8 billion tonnes CO<sub>2</sub>, Brazil being the biggest contributor. For increased carbon sequestration and monitoring, FAO developed a portfolio of activities, including tailored GIS tool SEPAL, deforestation prevention, enhancing sustainable forest management and reducing uncertainty reporting around activity data reference levels.

- **Land use competition in Central Africa and bioeconomy development : Jean Bakouma (WWF-France)**

Jean Bakouma focused on land use competition as priority issue to address sustainable bioeconomy. He pointed out that in developing countries land is an ultimate resource strongly connected to people's feeling, identity and culture. The poor land governance is causing many tenure-related conflicts and social problems, that can strongly hamper development of sustainable forest value chains.

He recalled that in South-East Asia, natural rubber crops compete with palm oil on forest land, to the detriment of small farmers and lead to deforestation. In Central Africa, the great dependence of economies on exploitation of natural resources, reveals weaknesses of the economic diversification strategies. Today most of natural resources exploitation benefits are captured by governments, while leading to overlapping land uses and to social conflicts and ecosystems' increased vulnerability. Africa is home to 60% of the world's unused, but potentially available agricultural land. In the next 30 years, about half of the world's new agricultural land will come from Africa.

The way Africa manages its land is therefore crucial for its future social, economic and environmental well-being. Several countries developed forest and land policy reforms, recognizing rights of use for communities and indigenous people, but with weak implementation. An increasing number of multinational and national investors are getting concessions on fertile land or old cropland or forest (Decommissioned Forest Concessions due to degradation), involving strong competition between commercial interests, local livelihoods and preservation of ecosystem services. Each country in Eastern and Western Africa has its own strategic focus : bioenergy, biotechnology, but not bioeconomy and bio-based products yet. COMIFAC countries have strategies for economic diversification that do not refer explicitly to development of bio-based products, so that land allocations are not clearly indexed to the development of bio-economy. Jean Bakouma recommended to clarify the concept of bioeconomy, to improve the legal safety for land tenure, to help governments develop "Bioeconomy strategies" and in particular sustainable wood value chains, through specific international trainings. Such strategies could make the synthesis and endorse existing strategies in a better way than current action plans. Partnership and multi-stakeholder platforms should be set up to tackle land use issue, sustainable management of natural resources and to move towards sustainable wood-based bioeconomy.

Following this presentation, a debate took place on the sustainability and poor governance issues.

- **Developing wood-based biorefineries : Nikolaus Schwaiger (SAPPI, South-Africa/Austria)**

Nikolaus Schwaiger introduced the transformation of the global paper company Sappi into a more and more diversified producer of wood-based solutions in an expanding bioeconomy. In 2020, paper

represents approximately 60% of turnover and 40% of profits, while specialized cellulose account for 40% of turnover and 60% of profits. Nikolaus Schwaiger described new opportunities through chemical engineering progress to develop wood-based biorefineries and expand the set of products derived from wood. As printing paper markets are regularly decreasing, dissolving pulp is under pressure, packaging, specialty paper markets and most of all biorefinery products' markets are on the rise.

The many chemical processes derived from cellulose, hemicellulose and lignin were described. Thus paper mills developing biorefinery activities in addition to their traditional paper and paperboard productions, become suppliers of diversified specialty papers, of raw materials for textiles, pharmaceuticals, of cellophane, of fibre composites for automotive parts, furniture and audio speakers, of nanocellulose (reinforcing agent, control release agent, viscosity modifier), of xylitol and other chemicals from sugars (low calorie sweetener, toothpaste, recyclable plastics), of chemicals from lignin (binding agent, dispersion agent, emulsion stabilizer).

Massive investments in R&D are required to create substitution conditions of wood raw material for oil. It is now possible to produce polyurethane foams from wood-based sodium lignosulfonate instead of using oil-derived polyols. Among many examples, major achievements will soon be possible, even in the field of wood-based sustainable fertilizers (on-going EU project "SusFert"). Through massive investments in technology, opportunities for expanding bio-based chemistry and wood-based biorefineries are becoming reality. They will undoubtedly contribute to the rise of a wood-based bioeconomy.

- **Which methodology for sustainability indicators and monitoring of forest-based bioeconomy ? Holger Weimar (Thünen Institute for International Forestry and Forest Economics, Germany)**

Starting from the whole bioeconomy scope (bioresources from agriculture, forestry, fisheries, leading to material and energetic uses, feed and food), Holger Weimar introduced a monitoring methodology including definitions, material flows, data base, estimated shares of activities and products, quantification of economic, social and environmental contributions. He distinguished biomass production from biomass processing and bio-based services, then explained the general material flow of the German bioeconomy and finally the wood-based bioeconomy flow. He mentioned necessary coherence controls between official statistics compared with other relevant data sources. Deep NACE codes analysis (Statistical classification of economic activities in the European Community) has to be accurately driven, in order to reach relevant and coherent flows and bio-based shares in manufacturing. These shares can be applied for quantification of indicators such as e.g. turnover, gross-value-added, jobs.

Monitoring sustainable bioeconomy is based on identification of the most relevant SDGs and indicators. 27 out of 66 subindicators were identified as relevant at sectoral level (8 directly applicable, 16 quantifiable and 3 with insufficient data availability).

Based on the case of Germany, a discussion took place, in particular between Stefan Bringezu and Holger Weimar, on how to deal and coordinate between national and global indicators. Petri Lehtonen and Anne Bogdanski had a discussion with Stefan Bringezu in the interpretation of the primary timber footprint.

### **Item 3 – Policies and measures to enable forest-based bioeconomy**

Introducing this item, Thais Linhares-Juvenal explained that sustainable bioeconomy approach is gaining attention worldwide, as an alternative development path for more sustainable economic development. She clarified that one of the objectives of this workshop was to set up a global state of knowledge on wood-based bioeconomy and to discuss possible further steps. Do we need a dedicated FAO informal working group ? Would building such a network help countries to develop national bioeconomy strategies ? How to increase contribution from wood products to the bioeconomy ? And to the overall economy ? Do countries need specific international works on monitoring sustainable wood-based bioeconomy ?

All presentations are contributing to set up the scene and will help us answer these questions.

Stefan Bringezu explained that it would make sense that UNEP/International Resource Panel and FAO work together to provide guidance to governments on the sustainable management and efficient use of their natural resources. A blueprint on efficient processing and circular use of wood products could be prepared for governments. Lawrence Damnyag agreed with the importance of the topic and the need for a working group in order to enhance sustainable wood-based bioeconomy in developing countries. He recommended to work with the African Union, to develop specific statistics, including on ecotourism and ecosystemic services, to better assess the full (direct and indirect) contribution to GDP and to national wealth of countries.

- **From bioeconomy definitions to bioeconomy strategies targeted on promoting forest-based bioeconomy : Pierre Bouillon (FAO)**

Pierre Bouillon introduced various definitions and status of “bioeconomy” throughout the globe, finally highlighting the increasing consensus around the definition from Global bioeconomy summit in Berlin (2018). He explained differences between green economy and bioeconomy (focused on production, utilization and conservation of bioresources only), and between forest-based and wood-based bioeconomy.

Based on International Resource Panel figures, a focus was given on why it is urgent to develop a sustainable circular bioeconomy and on how to enhance sustainable forest value chains through bioeconomy policies. An overview of national bioeconomy strategies in the world and of their forest-based content showed a diversity of national goals and of implementation strategies (different leading ministries and agencies according to priority goals).

There are two pioneer countries in the world with national strategies specifically dedicated to forest-based bioeconomy : in Finland « Wood-based bioeconomy solving global challenges » and in Canada « A forest bioeconomy framework for Canada ».

As way forward, Pierre Bouillon proposed to develop FAO activities preparing guidance and indicators for sustainable wood-based bioeconomy, supporting inclusion of wood in national bioeconomy strategies, working with developing countries to mainstream efficient use of sustainable wood products in the national and regional economies, creating a working group for sustainable wood in the bioeconomy.

- **Favoriser l'émergence de chaînes de valeurs liées à l'utilisation du matériau bois dans le bâtiment. Par où commencer ? (*Fostering the emergence of value chains linked to wood use in construction sector. Which first steps ?*) Nicolas Biron (Institut Francophone du Développement Durable, Québec, Canada)**

Nicolas Biron introduced the Sustainable Development Francophone Institute (IFDD), created in 1988 within Organisation Internationale de la Francophonie (OIF) and based in Canada, Québec City. The organization has 54 member States and 27 observer members. Starting with activities connecting countries through cultural links around a common language, OIF decided to add in 1988 a new field of activity, sharing experiences of sustainable development among francophone member states.

IFDD mission is to develop cooperation for energy transition and sustainable development for a green economy, therefore including sustainable bioeconomy. The major strategic goal is to contribute to UN 2030 Sustainable Development Goals and to the implementation of multilateral agreements for the Environment, such as UNFCCC and CBD. How to achieve these contributions in a context of soaring demography and urbanization ?

Indeed, according to UN forecast, population from francophone African countries may rise from 427 million in 2019 to 840 million in 2050. According to UN-Habitat, 60% of mankind will be city dweller in 2030. 90% of this growth will take place in Africa, Asia and Latin America. In Africa, urban population (500 million inhabitants in 2020) will double by 2040. This corresponds to the building of a new 2 million inhabitant city each month and to welcoming nearly 70 000 new city dwellers each day.

As the construction sector is generating 33% of GHG, 12% of water consumption and 40% of waste, how to sustainably build these new cities and districts ? From which material resources ? How to sustainably plan and install water, electricity and communication networks ? UN-Habitat estimates that 80% of dwellings to be inhabited in 2050 are not built yet.

IFDD considers that wood as a material is a major sustainable solution for sustainable cities. This requires construction stakeholders to think differently. Using more wood in the construction sector requires heavy investments all along the value chain, strengthening R&D and training, knowledge and technological transfer to developing countries. In order to sustainably connect forest, wood and construction sectors, choosing sustainable wood for construction sites will foster sustainable forest management. Building in developing countries a network of reference wood-framed constructions is likely to awake investors' interest for wood. Enabling conditions such as pro-wood policies and regulations are necessary. Three priority first steps are : partnership building, increasing construction sector demand for wood products and increasing wood products availability on the markets.

Discussion highlighted the strategic importance of investments in Wood training centres in Gabon, Kenya and Rwanda, to be designed in relation with Wood promotion centres such as in Cameroon.

- **Engineered wood products adoption for a sustainable world : Egide Karuranga (University of Kibungo, Rwanda)**

Egide Karuranga made a very dynamic presentation on the necessary investments in training and research to develop wood value chains in Africa. He focused on the case of Kibungo University in East-Rwanda, of which he is Rector. Kibungo University was created in 2003 and prides trainings in Education, Economics, Agriculture, Forestry and rural development. International partnerships have been developed with universities in Belgium, USA and with a German tractor manufacturer, for agricultural and forestry works. At national level, strong ties have been established with Rwanda Ministry of agriculture.

The importance of contextual factors to successfully develop wood value chains in Africa was highlighted. Modelling works underlining the critical role of training among other variables was introduced.

Professor Karuranga recalled the huge worldwide importance of Congo basin forest (242 million ha) and regretted weak scientific, technical and training investments. Congo Basin urgently needs strengthened knowledge, training capacities, preservation and sustainable use of these forests. He argued for an ambitious international project based on strengthened scientific knowledge of Congo basin forests (including creation of a gene bank) and massive training programmes (forest workers, technicians and engineers) for sustainable harvesting and processing of Congo basin wood, for sustainable cities.

He proposed the creation of a multi-donor trust fund.

- **Non-wood forest products in the bioeconomy : Sven Walter (FAO “Forest products and statistics” Team Leader)**

Sven Walter introduced another compound of forest-based bioeconomy, made of non-wood forest products (NWFP). He stressed that nowhere on Earth can be seen a pure wood-based forest bioeconomy without non-wood forest products. They are closely associated in people’s minds and in their relation to forests. Of course, relative importance of wood and non-wood forest products differ from place to place. NWFP have to be taken into account as important additional benefits and in many cases as main benefits brought by forests to local populations.

Through mankind’s history, NWFP fulfilled many needs such as food and animal feeding, clothing, healing, sheltering, etc. Most important NWFP finally became agricultural practices (agricultural crops and livestock).

FAO estimated that in 2011 NWFP generated US\$88 billion turnover, that 76 million tonnes of food from forest were consumed, that 1 billion people were depending on wild food and 80% of population from developing countries relied on traditional medicines, mostly plant drugs, for primary health care. These value chains in the bioeconomy are contributing to livelihoods, as long as they are sustainably managed. Transitioning to sustainable management of these resources (and of forests hosting them) directly contributes to expanding sustainable bioeconomy.

Today’s diversity and importance of NWFP is still a small part of their full potential. Indeed, many NWFP remain to be discovered for first or new uses (for example insects as new protein-rich foods), in both developed and developing countries. NWFP can bring significant contributions to bioeconomy all along these specific value chains, including through quality, certification and transparent statistical data policies.

FAO’s NWFP programme is supporting biodiversity-friendly and nutrition-sensitive NWFP-based value chains for improved food security, nutrition and livelihoods. This work is achieved in relation with the IUFRO NWFP bioeconomy task force.

At the end of presentation, Anoop underlined the need for clearer definitions between wood and non-wood products, “wood-based”, “lignocellulosic-based”, “fibre-based”. He also highlighted that it is important in a bioeconomy approach to keep in mind a holistic approach considering all possible uses of a resource. In the case of coconut trees, it goes from food to textiles and construction. Holger Weimar suggested to have further work on this issue and in particular to inventory good practices for non-wood forest production.

- **Leveraging forest finance for wood-based bioeconomy : Marco Boscolo (FAO)**

Marco Boscolo addressed the forest finance topic, a key-issue whose resolution is likely to unlock forest investment and deploy nature-based solutions for climate change mitigation and wood-based



bioeconomy expansion. Less than 3% of climate and conservation finance is directed towards AFOLU sector (Climate focus 2019), while forest sector yearly needs around US\$350-640 billion. Forest finance only collects US\$2-3 billion annually. In public international and domestic finance as well as in private finance, the forest investment part remains marginal (less than 1%).

De-risking forest investment can be achieved through renewed communication from the forest sector, explaining that, though initial stages may generate negative cash-flows, first harvesting stage and industrial expansion generate important positive cash-flows. But several enabling conditions have to be met (tenure, governance, access to wood markets, infrastructure, ...) prior to proposing bankable projects. Catalysing forest investment requires capacity building and mentoring, availability and transparency of information on forest value chains, dialogues and partnerships. At last, a new narrative is needed around forest investment and wood products, in order to better promote benefits to be generated by a sustainable wood-based bioeconomy.

During discussion following the presentation, Mike May recommended to distinguish and develop separate approaches for small-scale investments on the one hand, and for big investors (more than 20 M€ investment) for the other hand. For these latter, it is necessary to change the mind-set and to talk about new value chains in order to reach new audiences. Suzana Kahn recommended to focus the discourse on carbon markets, as the solution for climate and wood, in particular through article 6 of Paris Agreement on climate. Geoffrey Wanyama stressed that without improved country data on forest private sector, investors will not invest. Strengthening capacity building on wood statistics is needed. WWF highlighted that huge degraded land surfaces are available and sufficient for all investors. But in densely populated areas, priority should be given to smallholders and wood construction for poverty reduction.

Mike May thanked Marco Boscolo for his very useful presentation. He mentioned that there is a point to be addressed on investment size. At global level, there is low interest for small-scale investments. And big potential for investments from 20 M€ and above. It is difficult to attract investors below this amount. To take out of its low-funding problems, forest sector should work more on building bigger size investment projects. Otherwise it will remain for a long time very difficult to attract investors. He highlighted the importance of small holders to address the supply-gap, as the industry won't invest in acquiring land, but on building a network of reliable suppliers. He also recommended to attract "impact investors", likely to convince other investors to follow them. He proposed to improve communication towards investors, explaining that there are new wood value chains to build for sustainable development. Time for game change has come, it's now possible to change mindset and to find new audiences among finance sector.

- **Forest products and efficient resource use as climate mitigation and adaptation strategies : Suzana Kahn (Federal University of Rio de Janeiro and President of the Scientific Committee of the Brazilian Climate Change Panel)**

Suzana Kahn made a presentation on the possible major contributions that forest investment and forest products can provide for achieving goals of national strategies for climate change mitigation and adaptation. She explained that biosphere carbon sinks are nearly reaching their maximum sequestration potential and that this potential will regularly decline from 2025 (due to ocean's acidification and heating and due to increasing terrestrial impacts from climate change on fragile land ecosystems where adaptation capacity, resilience, will get slower than the pace of climate change with stronger heats, droughts, storms and hurricanes). The solution will come from anthropogenic CO2 removals (decreasing fossil fuel consumption) and from human carbon sinks. These carbon sinks will be made of tailored engineered CO2 sinks and of optimum management of land-use and land-use change. Suzana Kahn stressed that carbon pricing has to be considered as a "logical foundation for any

police regime for low carbon development” (World Economic Forum). World bank recorded in 2019 carbon pricing initiatives amounting 11 GtCO<sub>2</sub>e., representing 19.6% of global GHG emissions. She also quoted other economic tools for mitigating climate change effects, such as subsidies, standards and certifications, taxations, emissions trading and regulations.

Carbon pricing still depends on heterogeneous methodologies and prices throughout countries and subnational territories. But it is expanding, what may lead to more harmonized practices and prices.

An example of relevant investment with huge carbon sequestration potential is bamboo, whose carbon sink can be several times superior to fast growing trees : a giant bamboo plantation can thus capture 78 tonnes CO<sub>2</sub>/year, to compare with 13 tonnes CO<sub>2</sub>/year for fast growing trees. Planting bamboos on all degraded land could generate huge benefits for climate change mitigation globally. Bamboos can also be planted in areas where farming is not feasible, by rehabilitating degraded land including eroded slopes. Bamboos can re-establish functioning and productive ecosystems by improving soil quality and restoring the water table. At US\$7 the value of a captured CO<sub>2</sub> tonne, bamboo capture of 78 tonnes CO<sub>2</sub>/year could generate an income of US\$550/ha/year. While contributing to achieve the Bonn challenges through restoration of degraded land, bamboo can become a more and more interesting investment for family farming, providing increasing incomes while offering a new raw material to wood industries. Indeed, bamboo as a material for wood products offers high life expectancy and interesting mechanical properties (many uses from paper to construction, furniture, lamination and charcoal production).

Further discussions considered carbon sinks beyond 15 years of effective storage in plantations, to compare with carbon storage life expectancy through different categories of wood products.

- **Forest-based sector and bioeconomy in the EU : Andrea Camia (European Commission / Joint Research Centre (JRC) / Italy)**

Andrea Camia made a presentation on the description of the forest-based sector in the EU bioeconomy. He introduced the new policy context with a new European Commission and a new President from 1 December 2019, whose lead policy message is “A European green deal, a Union that strives for more”, including “Going climate-neutral by 2050”, while implementing a sustainable and circular bioeconomy strategy and its action plan. Other key commitments are “Ensuring there is enough food for a growing population”, “Mitigating and adapting to climate change”, “Reducing our dependence on non-renewable resources”, “Strengthening European competitiveness and creating jobs”, “Managing our natural resources in a sustainable way”.

For EU bioeconomy monitoring, the European Commission (EC) created within JRC a “Knowledge Centre for Bioeconomy (KCB)”. It is an association of internal EC competences and external expertise, for knowledge-based assessment and progress monitoring of EU bioeconomy. The KCB works according to a cross-sectoral approach, so that he can analyse and report on trade-offs between sectors, identify trends of relevant interest for policy monitoring and update at EU level.

Assessment of the whole biomass used in the EU (produced and imported) requires deep statistical and flow analysis work. For the forest sector, this concerns in particular gross annual increment, fellings, removals and logging residues. Assessing discrepancies between national forest inventories, national wood growing stock and biomass available for wood supply is another challenge. Major trends : EU forest surface is expanding - only 63% of the annual increment is harvested - forests are ageing.

Other approaches record forests with difficult topographic conditions (slopes and soils with erosion risk). Consequently : technically difficult harvesting and expensive exploitation costs lead to rare wood removals. These assessments can be refined with other parameters such as forest accessibility, age distribution, growing stock by age class, species distribution, forest workers average wages, etc. Sectoral characteristics by country can be detailed (employment, turnover, value-added, relative importance of primary production, first and second processing, material use efficiency, labour productivity, etc.). The connection between forest sector and supporting near sectors (silviculture and industrial machinery, construction, furniture and energy sectors) can also be explored. The final goal is to monitor the whole value chain from natural resource management to biomass production, transformation, use by consumers, possible recycling until end of life.

EU monitoring indicators will be developed at local, regional and national level, on regular timescales according to environmental, social and economic sustainability criteria.

Andrea Camia welcomed the idea of developing a community of practice between FAO and JRC.

Many questions were raised, in particular on forest sector job accounting and job distribution along the value-chain, on the wood supply-chain analysis, on the assessment of the natural capital and on the impact of final consumption on natural capital (several possible methodologies). Sheam Satkuru raised a question on the funding of this particular JRC activity. Andrea Camia answered that it is funded on the core budget of JRC, not through specific projects. He recalled that circular bioeconomy is an EU priority and more than ever through the “EU-carbon neutral” policy of the new European Commission (EU to be carbon neutral by 2050).

#### **Item 4 – Conclusion and next steps**

##### **○ Thais LinharesJuvenal (FAO)**

Thais Linhares-Juvenal delivered concluding remarks, highlighting that after a broad overview of wood products contributions to the global sustainable bioeconomy, including the additional contribution from non-wood forest products, this workshop has set the scene with a great diversity of highly interesting presentations.

Among the many inputs introduced and discussed, the following major points arose :

- importance of governance for building and implementing sustainable bioeconomy strategies;
- importance of participatory process when defining sustainability indicators;
- need for combining sustainable production and consumption of wood products, keeping in mind possible cross-sectoral interrelations an the food security nexus;
- necessary investments in R&D to continuously increase material efficiency and by-products optimum uses when processing wood;
- importance of training to build new skills in developing countries;
- interest of public/private partnerships to accelerate the rise of wood-based bioeconomy, to generate new incomes and to reduce poverty;
- need for strengthened statistical quality to facilitate investment decisions and sustainable bioeconomy monitoring;
- needed investments in sustainable plantations (for example as recommended by New Generation Plantations platform), to supply new wood value chains while reducing pressure on natural forests and mitigating climate change;
- need for forest finance information in order to reach new forest investors.

FAO is determined to increase its activities related to sustainable bioeconomy and in particular in the forest and wood sector. This workshop contributed to complement the discussions held in the three FAO SW4SW regional dialogues organized in 2019: in Douala, Cameroon (for francophone African countries); in Johannesburg, South-Africa (for other African countries); and in Nanning City, China (with focus on trade). A summary of the discussions held during these dialogues can be found in the meeting reports available in SW4SW webportal (see weblinks mentioned in Annex 3).

As follow up to this workshop, a community of practice on wood in the bioeconomy will be launched within the Sustainable Wood for a Sustainable World (SW4SW) initiative. The possibility of creating a working group to contribute to the formulation of indicators on sustainable wood-based bioeconomy in coordination with the broader bioeconomy work in FAO will be assessed as well.

Last words were added by Suzana Kahn on climate change mitigation and adaptation. She reported that substitution effects, in particular through wood use, received very positive interest from COP25 participating delegations. Sheam Satkuru underlined that campaigning for sustainable wood consumption may have strong impact in favour of sustainable production. Tax incentives are legitimate tools to promote sustainable bioeconomy and should be more frequently used by governments. As a conclusion, Mike May added that global community is increasingly aware of the need for better access to finance to unlock forest investment and help tackling together climate change mitigation and poverty alleviation. At the same time, wood supply gap is increasing. China needs 200 million m<sup>3</sup> more each year. 10 billion m<sup>3</sup> could be easily used in a new world of low-fossil carbon economies. 100 million ha of degraded land are waiting for restoration investments, in order to become productive again. It is urgent to invest now, to improve the forest sector “narrative”, to make these arguments understandable and to enhance bioeconomy as a new path for the future.



## ANNEX 1 : Agenda

### 10 December morning session (10:00 to 13:00)

#### Opening

- **Thais Linhares Juvenal** (FAO, Team Leader “Forest Governance and Economics”)
- **Anne Bogdanski** (FAO, Natural Resources Officer / Bioeconomy) : Mainstreaming sustainability into the global bioeconomy

#### Item 1 – Innovative wood-based sectors throughout the world

- Europe
  - The European wood waste platform : wood waste recycling for circular bioeconomy : **Magdalena Borzęcka** (Institute of Soil Science and Plant Cultivation · Department of Bioeconomy and Systems Analysis – Pulawy, Poland)
- Asia
  - Coconut Palm Wood - a goldmine waiting to boost the parallel coastal economy of coconut growing countries : **Dr Elaveetil Vasu ANOOP** (Professor and Head of wood science department, Kerala Agricultural University, India)
- Oceania
  - Innovations with engineered wood products in New Zealand : **Andrea Stocchero** (Scion Forest Research Institute, New-Zealand)

#### *Coffee pause at 11:30*

- North America
  - Innovation and development of forest products industries in Québec : **Vincent Rochette** (Formabois, Québec, Canada)
- South America
  - The rise of sustainable wood-based industries in Brazil : **Mike May** (Futuragene, Brazil)
- Africa
  - Developing sustainable wood value chains among smallholder forest producers in Kenya : **Geoffrey Wanyama** (Farm Forestry Smallholder Producers Association of Kenya)

### 10 December afternoon session (14:30 to 18:00)

#### Item 2 - Opportunities and challenges for wood in bioeconomy

- Monitoring the use of wood in the German bioeconomy and its global footprint : **Stefan Bringezu** (UNEP/ International Resource Panel – Kassel University/ Germany)
- Wood as Low-Carbon Material for housing needs : **Christina Cheong** (Global Green Growth Institute/ South-Korea)
- Current contribution of forest management to climate-change mitigation and REDD+ : **Marieke Sandker** (FAO)
- Discussion

#### *Coffee pause at 16:00*

- Land use competition in Central Africa and bioeconomy development : **Jean Bakouma** (WWF-France)
- Developing wood-based biorefineries : **Nikolaus Schwaiger** (SAPPI, South-Africa/Austria)
- Which methodology for sustainability indicators and monitoring of forest-based bioeconomy ? **Holger Weimar** (Thünen Institute for International Forestry and Forest Economics, Germany)
- Discussion

## 11 December morning session (9:00 to 13:00)

### Item 3 – Policies and measures to enable forest-based bioeconomy

- From bioeconomy definitions to bioeconomy strategies targeted on promoting forest-based bioeconomy : **Pierre Bouillon** (FAO)
- Favoriser l'émergence de chaînes de valeurs liées à l'utilisation du matériau bois dans le bâtiment. Par où commencer ? **Nicolas Biron** (Institut Francophone du Développement Durable, Québec, Canada) and
- Engineered wood products adoption for a sustainable world : **Egide Karuranga** (University of Kibungo, Rwanda)
- Non-wood forest products in the bioeconomy : **Sven Walter and Giulia Muir** (FAO "Forest products and statistics" Team ), **James Chamberlain** (USDA, USA & IUFRO taskforce on non-wood forest products in the bioeconomy)
- Discussion

### *Coffee pause at 10:30*

- Leveraging forest finance for wood-based bioeconomy : **Marco Boscolo** (FAO)
- Forest products and efficient resource use as climate mitigation and adaptation strategies : **Suzana Kahn** (Federal University of Rio de Janeiro and President of the Scientific Committee of the Brazilian Climate Change Panel)
- Forest-based sector and bioeconomy in the EU : **Andrea Camia** (European Commission / Joint Research Centre/ Italy)
- Discussion

### Item 4 – Conclusion and next steps

**Thais Linhares Juvenal (FAO)**

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## ANNEX 3 : “Sustainable wood for a sustainable world” (SW4SW)

“Sustainable wood for a sustainable world” initiative portal :

<http://www.fao.org/forestry/sustainable-wood/en/>

Latest SW4SW meetings :

- **SW4SW Sub-regional dialogue for Francophone countries in Africa**, Douala, Cameroon, 28-30 May, 2019 :  
<http://www.fao.org/forestry/sustainable-wood/93842/en/>
- **SW4SW Sub-regional dialogue for Anglophone and Lusophone countries in Africa**, Johannesburg, South-Africa, 29-31 October 2019 :  
<http://www.fao.org/forestry/49096-0f8ca8b5f372a2ade5f92642109929d88.pdf>
- **SW4SW Regional dialogue in China**, Nanning, China, 23-25 November 2019 :  
<http://www.fao.org/forestry/sustainable-wood/en/>