

Innovative Technologies for Sustainable Forestry and Forest Management

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Innovative Technologies for Sustainable Forestry and Forest Management in Asia and the Pacific

Online workshop – 30 November, 1 December, & 3 December 2020

Day 1 – 30 November

Session 1.

Typology of Innovative Technologies

Objective

The purpose of the *innovative technology roadmap study*

- **Evaluate how the application of innovative technologies in the forest sector can contribute to sustainable forestry and forest management in the Asia-Pacific region.**
 - Improve productivity and efficient production of forest products and services
 - Contribute to the conservation of the ecosystem and its natural resources
 - Enhance/protect social-economic-political conditions and livelihoods of employees, local communities, etc

What are ‘innovative’ technologies?

‘Innovative’ – featuring *new, advanced and original methods*; introducing *new ideas; or original and creative thinking*.

For the roadmap study, innovative technologies are:

- those recent deployed or in the proof-of-concept to pilot phases, that could become mainstream or mature in the next 10 years;
- those emerging for new purposes or in new contexts; ... *can*
- include those either developed outside or within the forestry sector.

Key Idea: *The ‘innovations’ have the potential to out-perform the currently utilized technologies, or provide new functions/applications*

Categories of Innovative Technologies

For the purpose of the Roadmap Study *innovative technologies* are categorized into four clusters:

- i) Digital technologies
- ii) Biological technologies
- iii) Product and process innovations (forest industry)
- iv) Innovative finance and social innovations

Digital Technologies

- Big data analysis and storage, cloud computing, shared user platforms
- Timber tracking, certification, monitoring
- Artificial intelligence, machine learning, digital twin replica
- Social media, video-conferencing
- Crowd sourcing and Citizen Science
- Drones and UAVs
- Satellite-based observations
- GPS, GIS, mobile phone apps
- Optical data and storage
- Acoustic and camera monitoring
- Monitoring & early warning systems



Biological Technologies

- Genetic selection
- Tree breeding
- Mass and rapid production of improved clonal material
- Access to superior genetic material
- Innovative and effective germplasm dissemination
- Genetic (germplasm) business plans
- *DNA identification and tracking*
- Other biotechnologies??



Process & Products Innovations (Forest Industry)

- Refined site preparation, planting and management
- Improved harvesting and transportation (RIL)
- Improved industrial processing
(more efficient, improved recovery rate)
- Engineered wood products (CLT)
- Bioplastics, biochemicals, pharmaceuticals
- Bioenergy products (resources, species)
- Bamboo products (repl. wood & plastics)
- Nanotechnology
- *Other products & processes*



Innovative Finance & Social Innovations

- Blockchain
- Blended finance
- Green bonds
- Responsible investments
- Crowdfunding
- E-commerce - online trading for community/farmer producers
- PES & RES mechanisms
- Social innovation for community forest management; forest monitoring, etc
- Others



Session 1 ... next steps

- ***Presentations from experts on the specific technologies and uses (4 presentations)***
- ***Breakout groups to discussion innovative technology clusters (4 groups, 1 per technology cluster)***

Session 1

- ***Presentations on specific technologies or uses***
 - **Dr Junqi Wu, International Bamboo and Rattan Organization (INBAR)**, Harmonized System code for monitoring international trade of bamboo and rattan.
 - **Dr Tony Page, University of the Sunshine Coast**, Selection, breeding and dissemination of improved teak germplasm in Papua New Guinea.
 - **Dr Jalaluddin Harun, former Director General of Malaysian Timber Industry Board (MTIB) and Fellow of the Academy of Sciences Malaysia (ASM)**, Overview of rubber wood related technology impacts (economic, social, environmental) on Malaysia
 - **Dr Bas Louman, Tropenbos**, Innovative finance for forestry and sustainable investment

Breakout Groups for Session 1

Break groups on ‘Typologies of Innovative Technology’

- Group 1 - Digital Technologies
- Group 2 - Biological Technologies
- Group 3 - Process & Products Innovations (Forest Industry)
- Group 4 - Innovative Finance and Social Innovations

Breakout Groups for Session 1

Guiding Questions:

What are the 3-5 most ***promising innovative technologies*** for sustainable forestry and forest management in the next ten years - globally? Specific for the ***Asia-Pacific region?***

Expected Output

Highlight the 3-5 most promising technologies and their potential contribution to sustainable forestry and sustainable forest management in the region in the next ten years.

- **Identify a group chairperson (a rapporteur will be assigned to each group)**
- **300-word summary to be presented during the first session on Day 2**
- **1-2 page summary report addressing the ‘expected output’**



Thank you !!

Session 2.

What Technologies for What Functions?

Session 2

- ***Presentations on ‘What technologies for what functions?’***
 - **Dr Vu Tan Phuong, Deputy Director in Charge of international cooperation, Vietnam Academy of Forest Sciences,** The use of innovative technologies for forest management and on the integration of innovative technologies in forest policies
 - **Dr. Wu Shengfu, China National Forest Products Industry,** The impacts of innovative technologies in the wood panel industry
 - **Dr. Oliver Coroza, Center for Conservation Innovations,** Geospatial technologies for conservation

What technologies for what functions?

- *Functions*, uses, applications* of the technologies
- *What functions do the ITs serve in sustainable forestry and forest management along the entire value chain (forest-to-consumer)?*
- Technology can serve (be used for) various functions

***Functions - examples, not exhaustive (social, economic, environmental)**

Tree improvement; forest management (tree planting, tree growing, forest protection); forest monitoring; wood harvesting; wood processing (first and second transformation); quality control; traceability; transport; distribution; final use of wood-based or non-wood forest products (for e.g. medicine, energy, packaging, construction material, ...); reuse and recycling; waste management; marketing; community empowerment; etc.

Functions	Category	Innovative Technologies / Examples	Pros & Cons (*) In different contexts
1) Forest management / pre-harvest			
1.1 Forest monitoring			
Forest and biodiversity protection, Monitoring illegal activities (logging / poaching), community involvement	Digital technologies	GIS, mobile phone apps, GPS for illegal logging / poaching early warning systems	
		Cameras and acoustic systems	
		Drones equipped with LIDAR sensors	
Fire prevention, community empowerment	Digital technologies	Drones, satellites for monitoring and warning of amount of dead biomass	
Monitoring of biomass growth and carbon stocks	Digital technologies	Drones and satellites for remote sensing technologies	
Monitoring of pests and diseases	Digital technologies	Drones and satellites for remote sensing technologies	

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Functions	Category	Innovative Technologies / Examples	Pros & Cons (*) In different contexts
Drought-tolerant varieties for better climate change adaptation	Biological technologies	Genetic selection and tree breeding	
Low-lignin varieties to improve pulp yield	”	“	
High-lignin varieties to produce cellulosic derived sugars for bio-plastics or bio-fuels	“	“	
Landscape restoration, sustainable timber supply, empowering communities (levelling the playing field)	Biological technologies	Mass production of improved clones; effective germplasm dissemination	
Traceability, tracking illegal harvesting	Biological technologies	DNA identification and tracking	

Functions	Category of Innovative Technologies	Innovative Technologies / Examples	Pros & Cons / Strengths and Weaknesses(*) In different contexts
2.2 Wood processing			
1 st transformation	Resource saving technologies	Spindle-less lathe technology for veneer peeling	Reduces waste, allows the use of smaller diameter timber
2 nd transformation	??	??	??
2.3 Traceability and quality control			
Traceability	Biological technologies	DNA identification to track illegal wood	Prevent illegal logging
	Digital technologies	Smart chips and barcodes	Contribute to facilitate and secure transactions, improve transparency.
Quality control	??	??	??

Breakout Groups for Session 2

Break groups on ‘What technologies for what function/application?’

(Same groups from Session 1)

- **Group 1 - Digital Technologies**
- **Group 2 - Biological Technologies**
- **Group 3 - Process & Products Innovations (Forest Industry)**
- **Group 4 - Innovative Finance and Social Innovations**

Breakout Groups for Session 2

Guiding Questions:

What are the contributions* of IT to sustainable development (social, economic, environmental) in different context? How does the application of innovative technologies affect different functions* throughout the value chain and to what extent does this contribute to sustainable development in the forest sector?

* Contributions – see *next slide*

* Functions – see *next slide*

Breakout Groups for Session 2

***Contributions – examples, not exhaustive**

Reduced costs; improved productivity; reduced ecological footprint; reduced waste; improved resource efficiency; low-carbon technologies; job creation; improved governance; community empowerment & decision making; improved transparency & accountability; real time monitoring & reporting; improved access to natural resources; improved access to information; improved access to credit and markets; etc

***Functions - examples, not exhaustive (social, economic, environmental)** *(repeated earlier slides)*

Tree improvement; forest management (tree planting, tree growing, forest protection); forest monitoring; wood harvesting; wood processing (first and second transformation); quality control; traceability; transport; distribution; final use of wood-based or non-wood forest products (for e.g. medicine, energy, packaging, construction material, ...); reuse and recycling; waste management; marketing; community empowerment; etc.

Breakout Groups for Session 2

Expected Output

Identify the main contributions of IT to sustainable development (social, economic, environmental) in different contexts. Focus on the *3-5 most promising technologies from Session 1, with illustrative examples of other technologies possible*. The objective is to identify parameters/criteria that influence positive outcomes.

- Identify a group chairperson (a rapporteur has been assigned)
- 300-word summary to be presented during the 1st session on Day 2
- 1-2 page summary report addressing the 'expected output'

Thank you !!



Thank you!

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