The role of quality, innovation and technology in strengthening the wood sector of Gabon

RACEWOOD. Libreville (Gabon) 20-22 June 2018
Gabon wood sector – Main figures

- 80% of forest surface (13.5 million ha of logging potential)
- Export-oriented (internal market demand low)
- Contribution 2.5-3% GPD // Employing 25-28% workers
- LEB since 2010 and updating Forest Code
- Government and private actors investment (i.e. GSEZ)

Source: FAO (2016) Forestry policy working paper (Data: ITTO Annual statistics on-line)
Factors influencing the competitiveness and development of the timber sector

Drivers
- Forestry Policies and Codes

Blockage
- Physical and Soft Infrastructure
- Labor (Skills, Wages)

Complementary Industry

EU Market

Asian Market
Role of quality, innovation and technology
• A proofed driver of economic development
• Innovation is not just about high-technology
• Innovation and technological strategic plan (public-private)
• Building up a reliable and competent quality infrastructure
“To increase growth and profitability rates of the industry by contributing in increasing sales or reducing productive costs”

WOOD TECHNOLOGY LABORATORY

- Providing testing, certification and inspection services to the local industry (under accreditation i.e. ISO 17025)
- Remove trading barriers associated with meeting local and international standards
- Contribution in building local high-skilled labor (training services)
- Representing the industry in local technical regulations and standardization
- To be the technological and innovation partner for the timber sector
- Evolve to a research center for local industry (applied research)
Research and Technology challenges for the timber sector

- Traditional Uses of Timber
- Wood Energy and Biofuels
- Chemical & Pharma Feedstocks
- Wood-Based Nanomaterials
- Biotechnology
- Wood Modification
WOOD-BASED NANOMATERIALS

- Lightweight material, builds network structures
- Renewable resource, biodegradable
- High strength and stiffness
- Transparent, translucent, water storage capacity, rheology modifier
- High Surface area & aspect ratio
- High reactivity, barrier properties
• Nanomaterials and nano-enabled products will grow to exceed a trillion dollars per year as technology is further developed during the 21st Century.
POTENTIAL APPLICATIONS OF WOOD-BASED NANOTECH

- Membrane
- Energy storage
- Biomedical applications
- Safety equipment
- Ultralight materials
- Textiles
- Packaging
- Paints
- MultiFuncional Materials
- Biodegradable medical applications
- Flexible packaging
- Water separation technologies
- Substrate for electronics
- Construction
- Concrete additives
- Food additives
- Bioinks
- Paper & paperboard
- Wood-based nanotechnology potential applications
THERMOCHEMICAL PROCESSES
- Gasification (oxid 800-1500°C)
- Pyrolysis (no O2 at 300-600°C)

BIOCHEMICAL PROCESSES
- Fermentation
- Anaerobic digestion

MECHANICAL PROCESSES
- Compression and extrusion

CHEMICAL PROCESSES
- Hydrolysis
- Transesterification
W O O D M O D I F I C A T I O N

ALTERNATIVE TO TRADITIONAL PRESERVATIVE TREATMENTS (biocide free)

CHEMICAL, BIOLOGICAL OR PHYSICAL TREATMENTS

NON-TOXIC // NO LEACHING OF TOXIC SUBSTANCES

IMPROVED PROPERTIES (DURABILITY, STABILITY,...)

Wood

\[
\text{Wood} \xrightarrow{\text{Heating } > 180^\circ C} \text{Wood}
\]

Wood - OH + \( \text{CH}_3\text{CO}_2\text{CH}_3 \) → Wood - O - CH\(_3\) + CH\(_3\)COOH

acetic anhydride

acetic acid

Wood

\[
\text{OH OH OH OH OH}
\]

\[
\text{OH OH}
\]
Equilibrium moisture content and dimensional stability of THERMOTREATED wood
Examples of **CHEMICAL MODIFIED wood**

**Acetylated wood (Accoya)** - (~ 50 000 m³/year)

\[ \text{Wood} - \text{OH} + \text{acetic anhydride} \rightarrow \text{Wood} - \text{O} - \text{CH}_3 + \text{CH}_3\text{COOH} \]

**Furfurylated wood (Kebony)** - (~ 10 000 m³/year)

\[ \text{Wood} + \text{furfuryl alcohol} + \text{catalyst} \rightarrow \text{Wood} + \text{H}_2\text{O} \]
Examples of modified wood applications
Characterization of unfamiliar Wood Species of Gabon’s forests

RESEARCH & TECH CHALLENGES IN GABON

TOPIC PRIORITIES
- Local potentialities
- Aligned to industry needs

MORE THAN 400 SPECIES
- Around 60 traded species
- Okumé, Sapelly (60%)

POTENTIAL USES
- Characterization of anatomy, chemical, physical and mechanical properties

MARKETING MARKET LAUNCH
MERCI BEAUCOUP

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