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Houtgebruik als onderdeel van duurzaam beheer van bossen

The use of wood, a factor in developing sustainability

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SAR Minaraad - PWC Bosbeleid
Academische zitting:
35 jaar inspraak voor bos in Vlaanderen
Brussel, 06 maart 2015

INNOVAWOOD

UGent WOODLAB

Wood as a renewable resource

Wood formation in trees… **maximum** potential?

Available from:

- (Semi-)natural forest: multifunctional management
- Planted forest (plantations): poplar,…
- Arable land: timber farming, agroforestry, SRC ….

Trends:

- Ecosystem services
- More hardwoods
- More forests excluded from wood production

Wood as a renewable resource

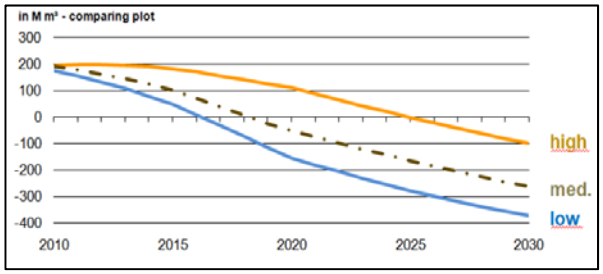
Natural forest			Planted forest			Non-forest
Primary	Modified natural forests	Semi-natural forests	Plantations			Trees outside forest (TOF)
		Assisted natural regeneration	Planted component	Productive	Protective	
						
Forest of native species, where there are no clearly visible indications of human activity and ecological processes are not significantly disturbed	Forest of naturally regenerated native species, where there are clearly visible indications of human activity	Intensive silvicultural management, e.g. weeding, fertilizing, thinning, selective logging	Forest of native species, established through planting, seeding, coppice	Forest of primarily introduced and native species, established through planting or seeding mainly for production of wood or non-wood products	Forest of native or introduced species, established through planting or seeding mainly for provision of environmental services	Smaller than 0.5 ha; tree cover in agricultural land (e.g. agroforestry), trees in urban environments, and scattered along roads and in landscapes

Source: Carle and Holmgren, 2008, modified and illustrated.

Wood availability

Deficit before 2030?

Perfect storm?



Mantau, EUWood 2010

Sustainability of the forestry-wood industry chain

Link with (eco)systemic forestry management… good governance

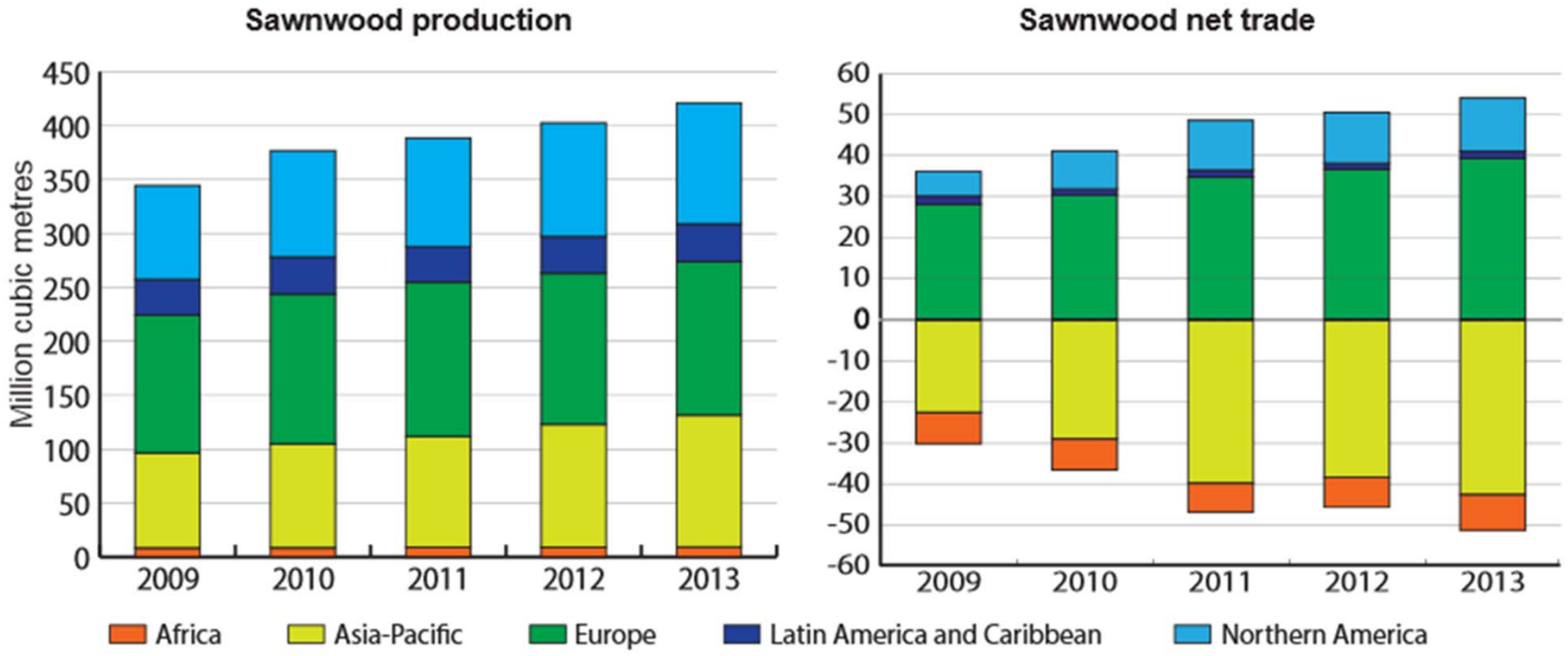
Lost interaction forestry – wood industry (COST Action E44)

Forest as part of nature – **ecological** approach

Biodiversity increased by open systems (shrub land…)

“close-to-nature” forestry versus intensive even-aged forestry

Wood availability



Wood and an eco-techno approach

A: Balance between **material and energy use**

B: Vertical integration and **cascade use**

C: Tree quality and wood **quality**

D: Service life **impact**

Balance between material and energy use

Energy from woody **biomass** both for residential and industrial use…

Combustion:

firewood, pellets,…

Thermochemical conversion:

charcoal, pyrolysis, gasification,…

Biorefineries and biochemical processes:

liquid biofuels, white chemistry,…

Impact of international trade and subsidies

→ replacing/substituting fossil fuels… (import of biomass, e.g. Canada)

→ spoil quality wood - use as firewood…(also tropics, e.g. DRCongo)

Balance between material and energy use (2)

Forest products use as a material is **low in embodied energy,** energy required for processing – but has a **high embedded renewable energy**

Material use is an excellent **alternative /substitute** for man-made materials requiring a lot more energy to be produced

Wood is also very positive for **energy efficient housing**, e.g. passive houses

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Materials versus Bioenergy
case poplar/willow

Poplars and willows for bioenergy – specific clones and cultivation/harvesting

Multipurpose applications? Integrated wood transformation or specific production for bioenergy

Vertical integration and cascade use

A tree is traditionally subdivided for different transformations: slicing/peeling, sawing, chipping, … **integration**

Waste is not really generated: **residuals** are used

Recycling and reuse are key elements in the traditional **cascade** approach allowing the production of different wood based panels, eminent example of particleboard (chipboard).

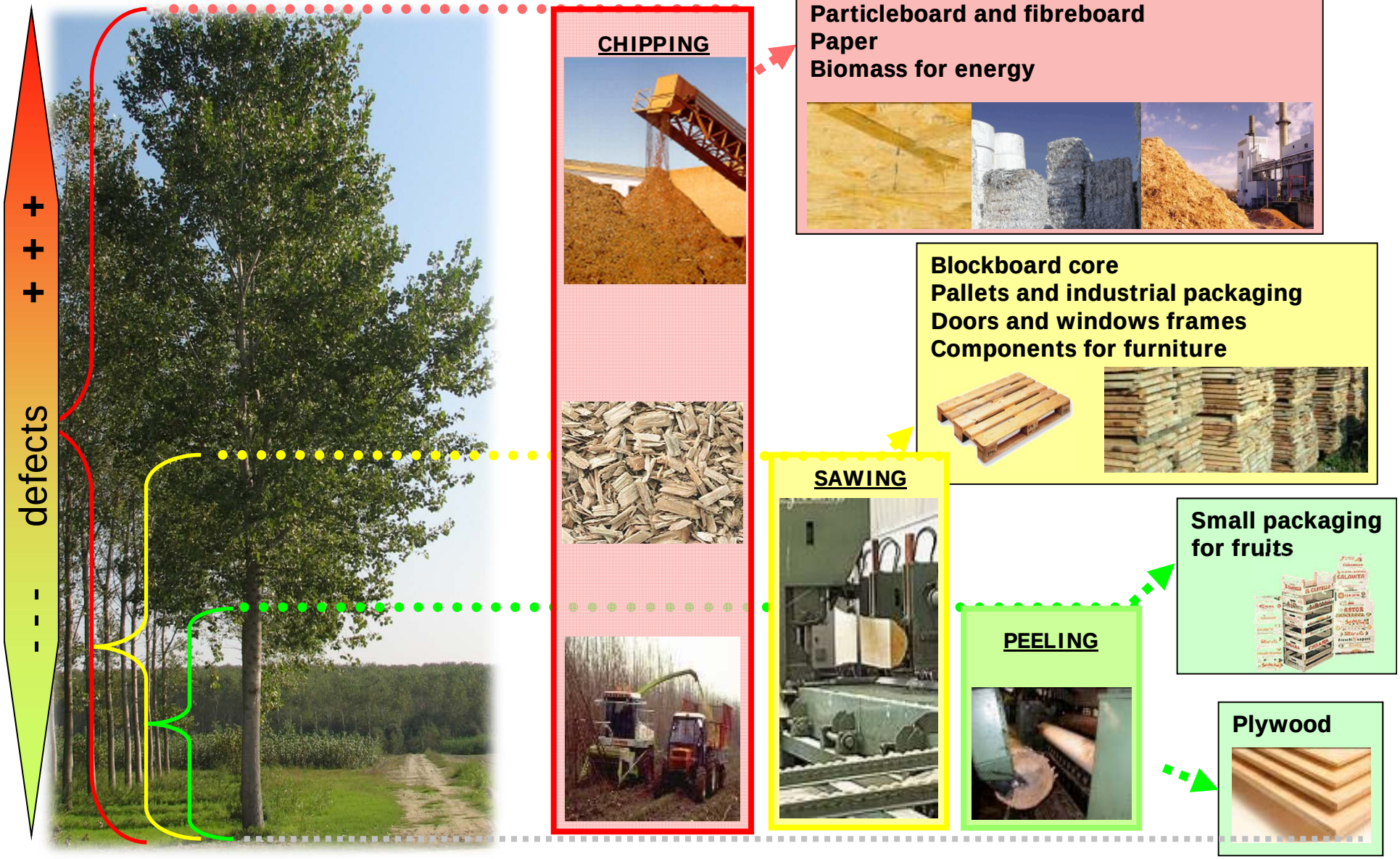
EU Strategic Implementation Plan - EIP on Raw Materials: ECAMOB

End of life allows for generation of energy or composting…

Integrated processing

Lower part of the tree, logs for: *veneer, plywood, timber,...*

Top and residues from sawmills / veneer peeling : bulk products...
panels, paper, energy,...



Adapted from Fioravanti (2007)

Tree quality and wood quality

Trees **suitable for materials**:

- Aesthetics … sliced veneer, parquet, music instruments
- Mechanics… timber, engineered wood products
- Durability… exterior use, wood protection
- Surface… panels, paper, packaging
- Chemicals… biopolymers, white chemistry building blocks

Tree quality and wood quality (2)

Wood has technological assets:

- Beauty… furniture
- Multi-level natural composite… construction, load bearing
- Interesting and abundant chemistry
- Specific strength/stiffness
- Fire resistance
- Renewable…

Michael Green Tall Wood skyscraper

Tree- and wood quality
case poplar

Considered critical for many poplar/willow wood products:

- veneer – plywood
- engineered wood products, glulam
- timber constructions ?
- packaging (food, transport,…)

Service life impact

Wood and moisture… dimensional changes, fungal decay

"**Durability**" also means "sustainability" in many languages

Energy efficient housing – **green** building

Link to LCA approach

Impact on CO_2 sequestration

Build with wood - reduce CO_2 emissions

CEI Bois

Positive aspects of **fit for purpose** approach in relation to long lasting products

Need for technology to **enhance service life**

Forestry – Wood research

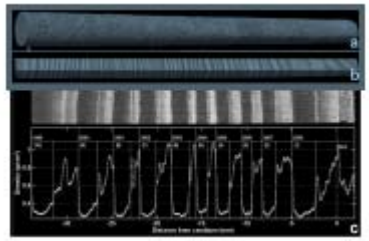
Bringing research together: InnovaWood

Cross national interactions…projects, priorities

Project linking forestry and wood technology: e.g. Trees4Future

Innovation and cutting edge research techniques

e.g. microdensitometric profiling of growth rings on wood cores



NanoWood CT scanner at UGent

More wood in the EU ?

Forestry requires eco-economical investments, technology, know-how beyond nature conservation…**foresters**…

We should not forget that **sylviculture** (the practice of controlling the establishment, growth, composition, health, and quality of forests to meet diverse needs and values) is critical for the link forest – society.

The fact that **forest certification systems** like FSC and also PEFC were established underpins the need for forest management.

More wood in the EU ?

Wood **production** outside the forests is viable, more than just energy crops: tree farming, agroforestry, polycyclic plantations… even with focus on precious wood species & greening of agricultural area

Stimulate **SME's** and craftsmanship… to enhance potential of quality wood products – resource of woody biomass is not necessarily fully suited within economics of scale…

Grown in Britain

More wood products in the EU ?

Quality: **green** building – fit for purpose

Quantity with technology **upgrade**:

Pulp & paper / Wood based panels & EWP / Modification

SME based **innovation** related to quality

Chemical building blocks: bio-refineries & new materials

2nd generation bio**fuels** and thermochemical conversion

Selection – breeding – **forestry** – agriculture – ecosystem service

e.g. hardwood seedlings for high quality timber production

Sustainability – biodiversity – nature: eco-economic **strategy?**

Role of **planted forest/plantations** see examples China, Brazil

Climate perspective & sustainability?

Deal with climate change **mitigation** and remain sustainable at **higher production** levels?

Combine **cascade use** and **service life** approach

Forestry-wood industry chain victim of **renewable energy** boost in search for replacing fossil fuels…?

Focus on **low energy transformation** processes and substituting man-made materials… stimulate timber construction

Stimulate growing **more trees**, producing more long-lasting high quality **forest products**… woody biomass and timber…model forestry units linked to local wood industry

SWOT analysis

STRENGHT: **Sustainability**

Comparison with man-made materials and fossil fuels

WEAKNESS: **Production capacity**

We need 2 to 3 times earth…

OPPORTUNITY or THREAT: **Bioeconomy**

Creative destruction… (revolutionizing the economic structure from within)

Creative innovation: (nano-)fibres, 2nd generation biofuels, EWP (e.g. CLT)

Decline of some wood products?

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During the presentation of
the Woodworking Industries' Manifesto
at the Wood Action Days on 23/09/14 to the EU Parliament
presented in part as :

Advantages of using
more wood products for the EU
from a climate perspective

DANK - THANK YOU FOR YOUR ATTENTION

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