

Plantations development and sustainability

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RESEARCH
PROGRAM ON
Forests, Trees and
Agroforestry



“Plantation forest” (FRA) 2020

Plantation forest

Planted forests that are intensively managed and meet **all** the following criteria *at planting and stand maturity*:

- **one or two species;**
- **even age class;** and
- **regular spacing.**

Specifically excludes:

- forest planted for protection or ecosystem restoration;
- non forests (palm oil, agricultural trees)

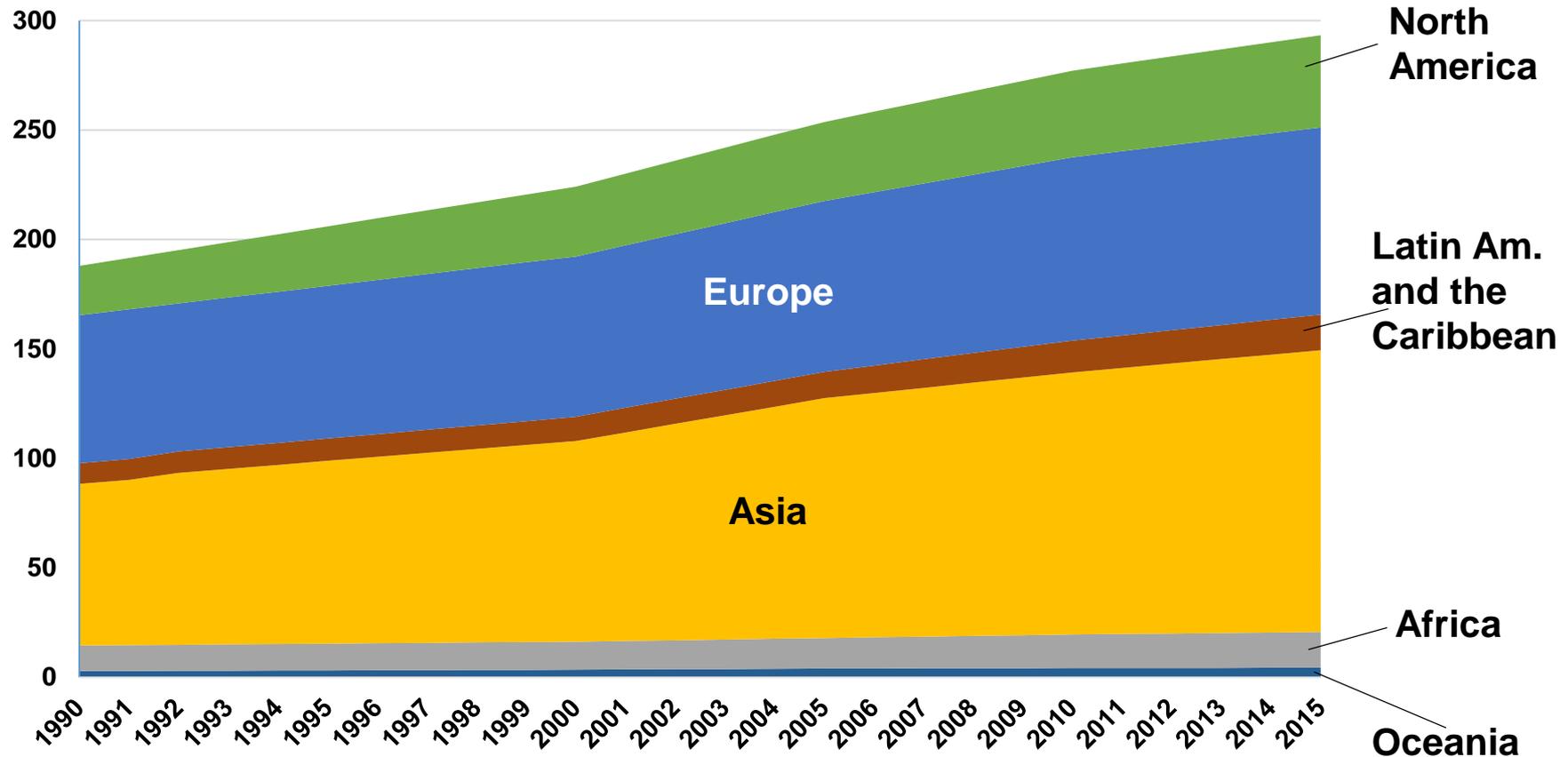
Outline

Introduction

- 1) The development of plantations**
- 2) Drivers of plantations development**
- 3) Sustainability hotspots**
- 4) Pathways to improve sustainability of plantations**

Expansion of planted forests

Planted forests - Area (million ha)



Source FAOstat

Planted Forest

Forest predominantly composed at maturity of trees established through planting and/or deliberate seeding. Planted forest includes plantation forest (*not yet separated in the statistics*) and other planted forest

Planted forests

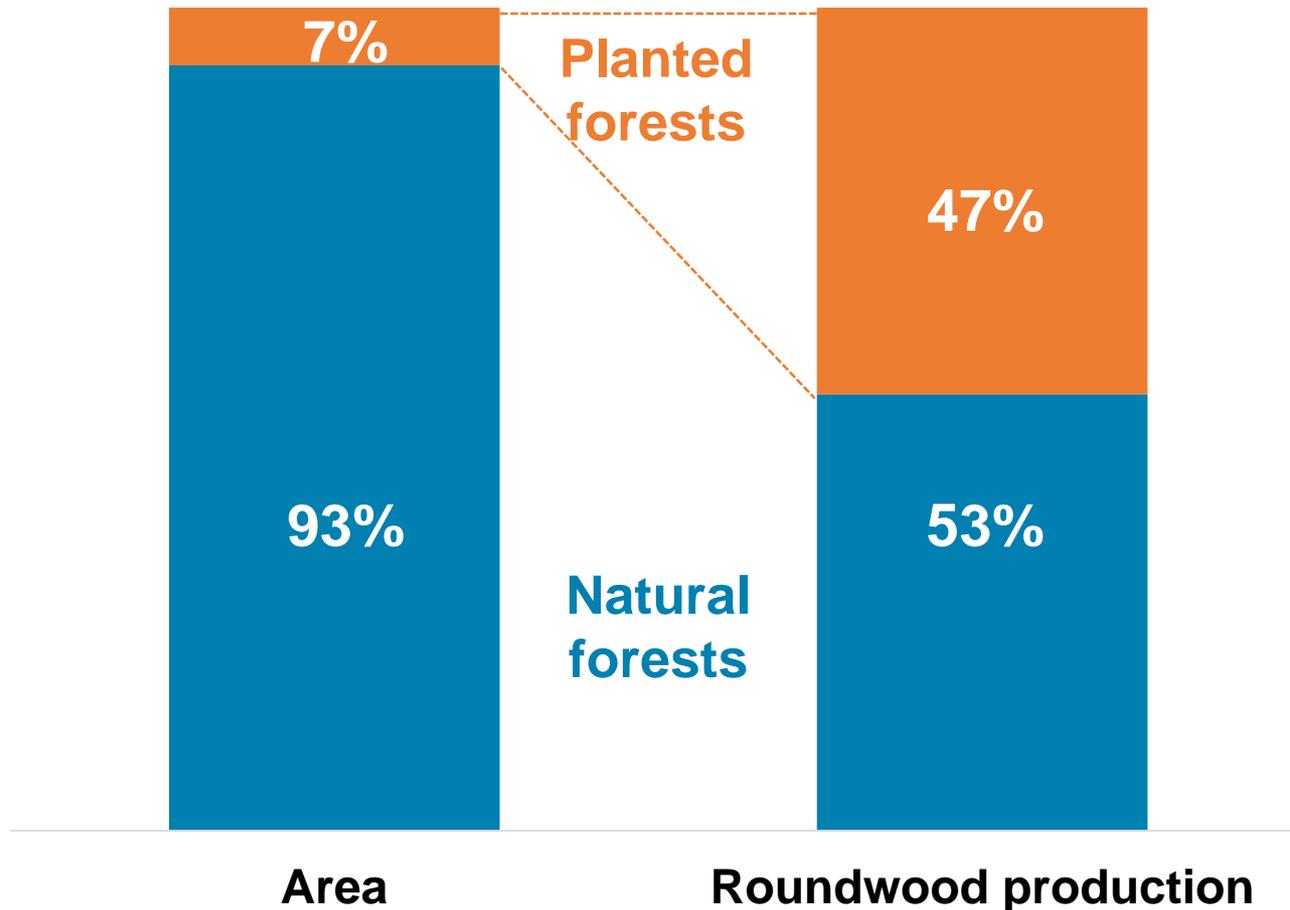
Million ha	Planted forests		
	1990	2015	Change (%)
World	182	287	57.9
Asia	75	129	71.0
Europe	61	80	31.7
North and Central America	23	43	85.7
Africa	12	16	39.5
South America	8	14	80.1
Oceania	3	4	56.9

Source FAO

Drivers of plantations' expansion

- 1. Increased demand for wood**, driven by population and economic growth, that will continue;
- 2. Political commitments**, pressure, and incentives for:
 - using wood as a substitute to more polluting, non-renewable, energy intensive materials (also as mitigation of climate change);
 - restoration of degraded land;
 - afforestation to mitigate climate change and/or adapt to climate change.
- 3. Economic actors** seeking to benefit from the above, and to **diversify financial investments**.

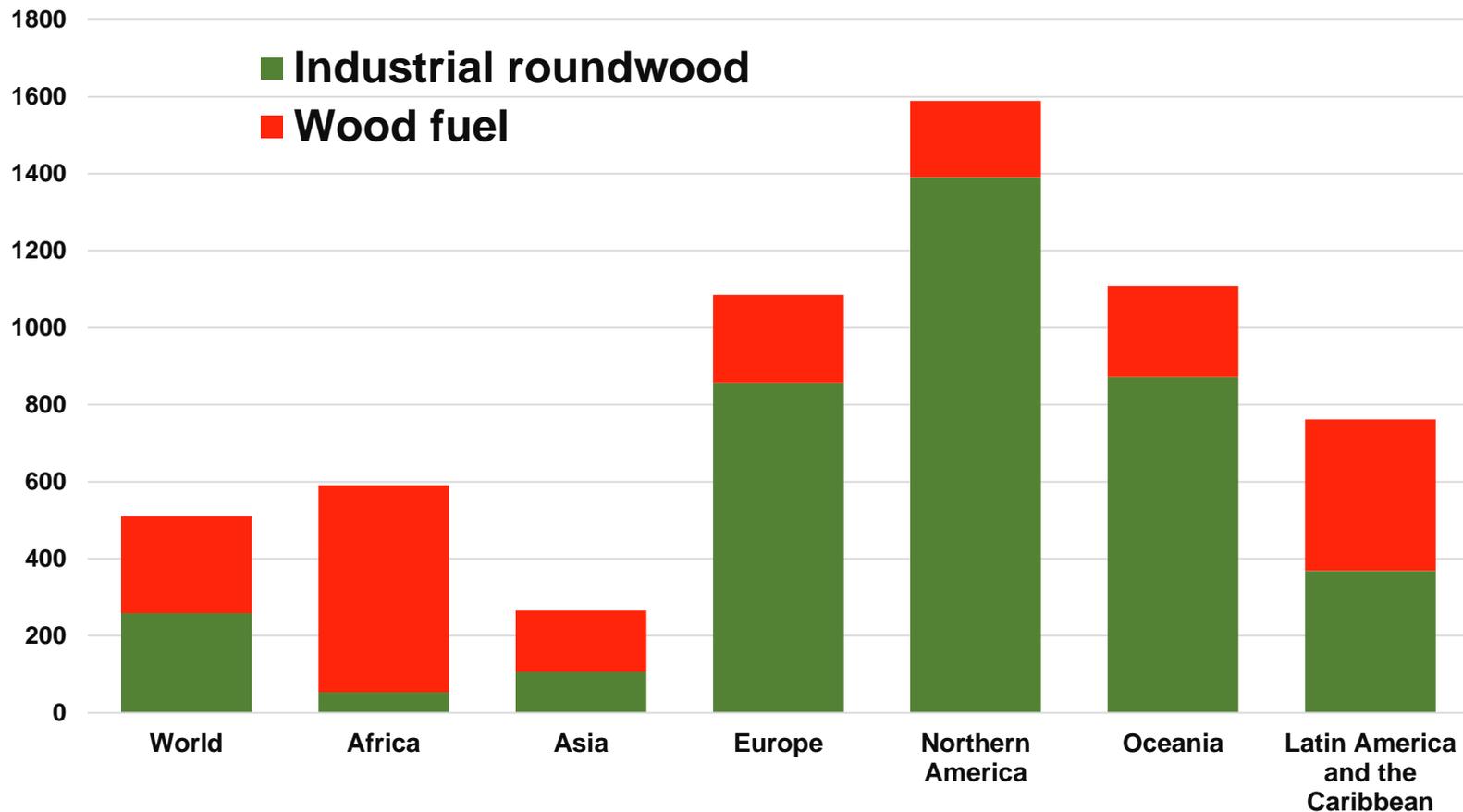
Planted forests and roundwood production



Source FAOstat

Wood consumption per capita: *considerable differences*

Consumption per capita (m³/1000 persons) 2018



Source FAOstat

Sustainability hotspots	Potential negative impacts of large scale intensive monoculture plantations	Bibliographical references
Biodiversity	<p>Monoculture and pesticide application</p> <p>Use of exotic species can cause invasions and imbalances in natural biological processes</p> <p>Fragmentation of natural forest stands</p> <p>Deforestation of natural forests</p>	<p>IIED, 1996, Cossalter & Pye-Smith, 2003; Michon, 2003; Brockerhoff <i>et al.</i>, 2008; Van Bodegom <i>et al.</i>, 2008; Barua <i>et al.</i>, 2014; Duponnois <i>et al.</i>, 2014; Abood <i>et al.</i>, 2015; Andersson <i>et al.</i>, 2015; Cateau <i>et al.</i>, 2018; Liu <i>et al.</i></p>
Soil quality	<p>Chemical pollution, soil compaction and erosion</p>	<p>Van Bodegom <i>et al.</i>, 2008; Barua <i>et al.</i>, 2014; Andersson <i>et al.</i>, 2015; Cateau <i>et al.</i>, 2018; Liu <i>et al.</i>, 2018; Malkamäki <i>et al.</i>, 2018</p>
Water resources	<p>The use of pesticides causes chemical pollution of the water resource</p> <p>Water resources overexploited</p>	<p>Cossalter & Pye-Smith, 2003; Van Bodegom <i>et al.</i>, 2008; Andersson <i>et al.</i>, 2015; Cateau <i>et al.</i>, 2018; Liu <i>et al.</i>, 2018; Malkamäki <i>et al.</i>, 2018</p>
Social and economic development	<p>Low job creation per hectare</p> <p>Frequent social conflicts, particularly around land issues</p> <p>Fosters rural exodus</p>	<p>Cossalter & Pye-Smith, 2003; Enters <i>et al.</i>, 2004; Van Bodegom <i>et al.</i>, 2008; Barua <i>et al.</i>, 2014; Andersson <i>et al.</i>, 2015; Cateau <i>et al.</i>, 2018; Liu <i>et al.</i>, 2018; Malkamäki <i>et al.</i></p>
Resilience and long term production	<p>Monospecific plantations are the most susceptible to diseases and pests</p> <p>Monospecific plantations seem to be the least resilient to climatic phenomena and therefore to future climate change</p>	<p>Cossalter & Pye-Smith, 2003; Barua <i>et al.</i>, 2014; Cateau <i>et al.</i>, 2018; Liu <i>et al.</i>, 2018</p>

What makes the difference?

Potential **impacts of plantations expansion** and contribution to the SDGs and to the Paris agreement finally depend on three factors:

1. Where this expansion is going to take place, what are plantations going to replace;
2. The type of production/management system, yield, overall efficiency, including impacts on water and biodiversity;
3. The way it benefits to smallholders and local populations.

Sustainable plantations development

- **Limit negative impacts** of land use change
- **Regulate** land concessions
- **Support** smallholders and farmer groups
- **Facilitate** the development of adapted diversified systems
- *Requires:*
 - A combination of measures;
 - Coordinated action between different categories of actors.

Limit negative impacts of land use change

- **Limit land needs:**
 - Improve yield
 - Facilitate multiple uses
- **Limit land use change impacts** through zoning and landscape approaches:
 - Preserve important areas for biodiversity conservation and sustainable management
 - Ensure biodiversity corridors
 - Land use zoning and planning to prevent the conversion of forest
 - Planning mixed landscapes
- **Ensure the protection** of existing tenure and use rights
- **Beware of the situation** of all users (including marginalized)

Control land concessions

Regulation and implementation of land concessions can limit negative social and environmental impacts, and support positive ones:

- **Land zoning planification**
- **Right of communities to decide to concede lands by FPIC**
- **Fair compensation** for lost assets and use rights
- **Adequate and fair wages** and working conditions
- **Promote** management practices that are more favorable to **biodiversity** and that provide **more diverse livelihood opportunities**
- **Encourage private companies to share technology and genetic material** with small holders and facilitate access to markets

Improve contributions of large-scale plantations to economic and social sustainability

- Recruitment, training, wages and working conditions
- Laws and regulations, monitored and enforced.
- Social protection schemes.
- Recruitment policies and types of contracts
- Participation of local communities and technology transfer.

Support smallholders and farmer groups

- Access to **high quality genetic material** and associated technologies
- Access to **techniques and training** to ensure successful growth and quality of material
- Access to **credit**
- Access to **markets**
- Promote **diversified systems** providing diverse livelihood opportunities

Rubber diversified systems



Teak plantation, Jepara, Indonesia



(photos Murdani Usman/CIFOR)

Conclusions

- 1) Expansion of plantations will continue
- 2) Sustainable development of plantations will require:
 - The consideration of specific national and local situations
 - The identification of priority issues locally and the combination of appropriate means and measures to address them. This process requires the involvement and coordination of all concerned actors (public, private, public private partnerships),
 - Adequate incentives and support to actors for the implementation of solutions that are more adapted to the pursuit of multiple objectives.

<http://foreststreesagroforestry.org/>



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The CGIAR Research Program on Forests, Trees and Agroforestry (FTA) is the world's largest research for development program to enhance the role of forests, trees and agroforestry in sustainable development and food security and to address climate change. CIFOR leads FTA in partnership with Bioversity International, CATIE, CIRAD, ICRAF, INBAR and TBI.



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