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The role of the forest sector in a transition to a bio-based, circular economy

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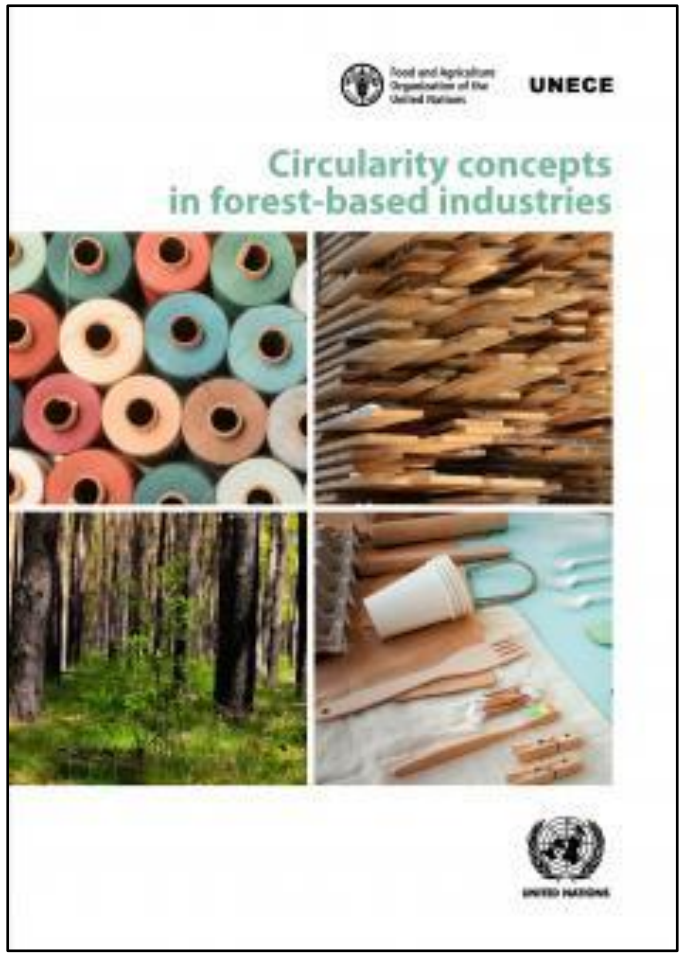
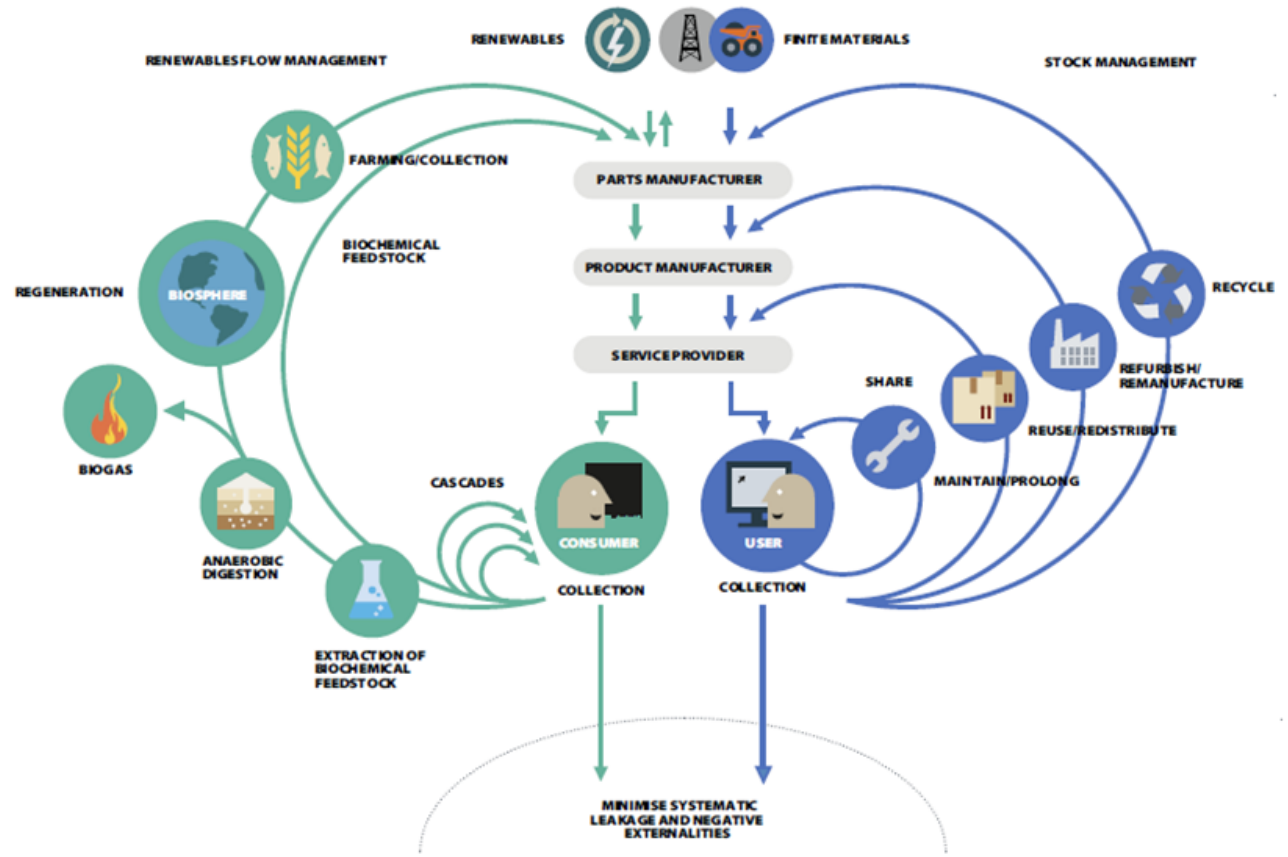


Forest-based industries

- Sawn wood
- Wood in construction
- Bioenergy
- Wood in furniture sector
- Pulp, paper and paperboard manufacturing
- Cellulose-based fibers
- Cellulose-based plastics

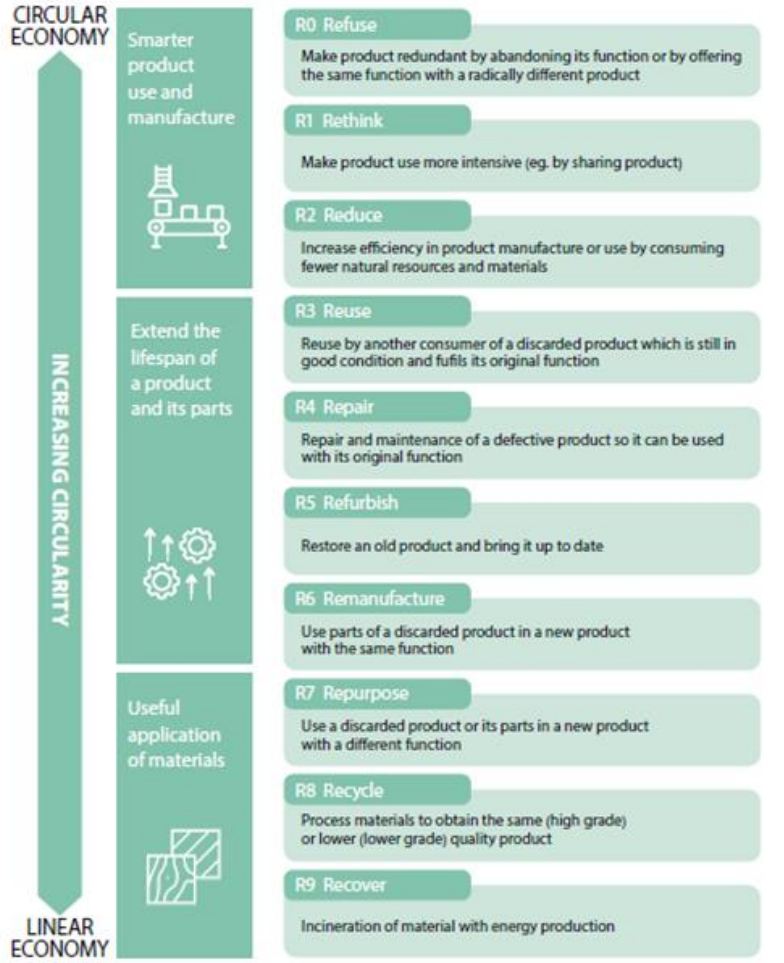
Bio-based circular economy

Biological and technical cycle in a circular economy model by the Ellen McArthur Foundation.



Source: https://www.ellenmacarthurfoundation.org/circular-economy/concept/infographic. Copyright © Ellen MacArthur Foundation (2017).

Circularity and the 9Rs.



Source: UNECE/FAO, adapted from Ellen MacArthur Foundation (https://www.ellenmacarthurfoundation.org)

Increasing interest in a bio-based circular economy

Urgent needs to address

- Growing demand for raw materials
- Pressure on ecosystems
- Climate change
- Pollution
- Waste

Transition to a bio-based circular economy

Opportunity for forest-based industries…

1. Source of renewable, bio-degradable materials

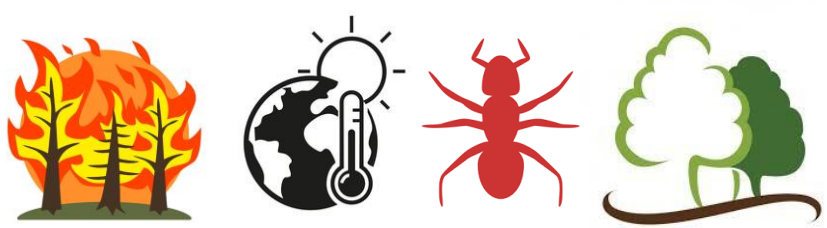
2. Low carbon impact

3. Can prompt transition in strategic sectors

Transition to a bio-based circular economy
…but also a challenge

Sourcing → **Production** → **Consumption**

1. Regeneration of resource vis-a-vis pressures on ecosystems



2. Sustainability of supply amid increased demand

3. Economic viability of post-consumer wood waste management

Universal preconditions for circularity in forest-based industries

- **Protect forests** - Stop deforestation
- **Restore ecosystem** – plant trees, restore landscapes
- **Use wood** from sustainably managed forests
- **Use wood-based materials** which are renewable and biodegradable

Characteristics of circularity in forest-based industries

- Wood - biodegradable resource – circulates in biological and technical cycles - nutrients return to the biosphere
- Cascading use of wood rather than circular use
- Circular value chains – material flow but also carbon and energy cycles
- No circularity without SFM
- Effective resource management in manufacturing, closing the loop with post-consumer waste still a challenge

Increased circularity
What to consider

- Sustainable forest management is key for sustainability and circularity in all value chains
- Eco - design needs to be promoted to ensure effective circularity in particular at the end-of life valorization in all value chains

- Economic viability of circular approaches is often low
  - Construction and furniture waste – low value, you pay for removal service.
  - Cellulose-based fibers and plastics - biodegradable, cannot be recycled infinitely
  - Repair, collection and redistribution services are labor intensive and can be expensive
  - Waste collection infrastructure is underdeveloped and requires substantive investment
  - Transport cost in a fragmented collection infrastructure is expensive
- Environmental externalities
  - Extraction of wood from forests to produce more bio-based products vs. leaving logging residues to support ecosystem functions
  - Geographically extended value chains contribute to a negative environmental impact of transport
  - Recovering, reusing and recycling imply energy consumption

Closing the loop : post consumer wood
Challenges

- No international wood waste classification
- New outlets for upper quality residues - supply tension for panel industry and wood energy facilities, already competing for raw material
- Non-existent collection and sorting infrastructure
- No automatized sorting techniques – labor costs and hazards
- Heterogenous, low value feedstock
- Highly fragmented markets
- Externalities: e.g., impact of transport
- No “extended producer’s responsibility”

Tools for policymaking

Recommendations

A definition of a circular economy in the forest sector (developed by the UN)

Circularity ≠ sustainability further analysis of environmental and social impacts case by case

A good practice guide on cooperation in industrial ecosystems to promote sustainable use of wood

A good practice guide on how to sustain healthy links between forests and forest-based industries

An assessment of national priorities and needs in transitioning to a circular economy

A strategy for the implementation of circular economy principles in forest-based industries

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Thank you!

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