Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)

WOOD RESIDUES IN THE TRANSITION TO SUSTAINABLE BIOENERGY

Good practices and recommendations for developing countries

Ms Évelyne Thiffault - Professor, ing.f., Laval University

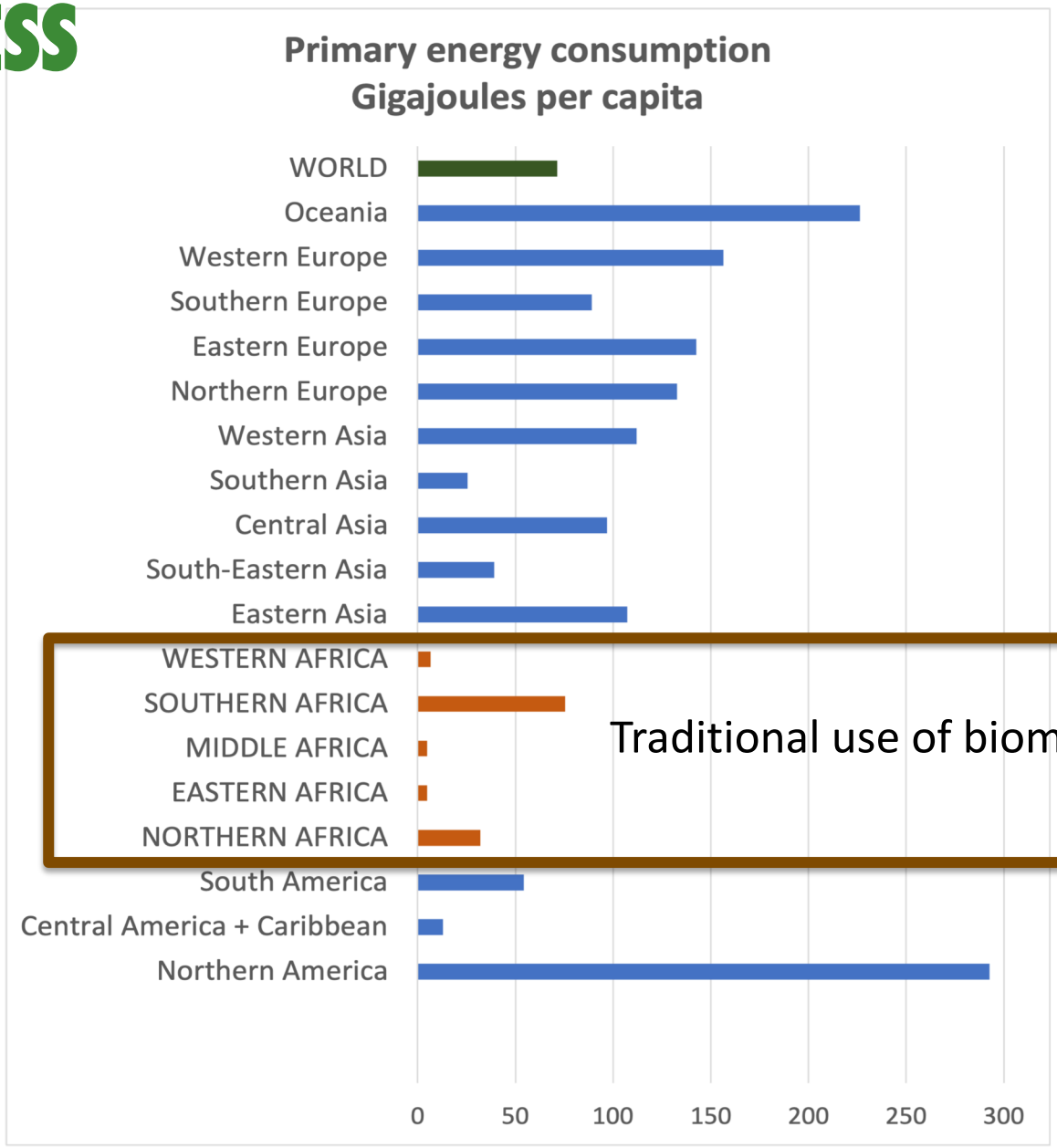
Mr Arturo Gianvenuti - Forestry and Energy Specialist, FAO

Sessions Agora, Forum ATIBT – 2 June 2022

ENERGY ACCESS

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)



Source of data: BP (2021); FAOSTAT, 2020

WOODY BIOMASS STREAMS

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)

Forest lands, other wooded lands and trees outside of forests

Wood product value chain

Harvesting of industrial roundwood

Primary residues

Processing of industrial roundwood

Wood product manufacturing

Secondary residues

Wood product material use

Wood product end-of-life

Tertiary residues

Material use

Wood fuel

Harvesting/collection of wood fuel

Recycling & cascading

Energy use

CHALLENGES, OPPORTUNITIES AND LESSONS LEARNED

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)

- Land tenure and use rights of forest resources
- Consumer preferences
- Economic impact of bioenergy
- Economic role of traditional bioenergy
- Valuation of industrial roundwood and residues
- Cascading use of wood
- Logistics of wood residue supply chains
- International trade of modern bioenergy from wood residues
- Impact of bioenergy development on land use change
- Mitigation of GHG emissions
- Soil, water and air quality

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)

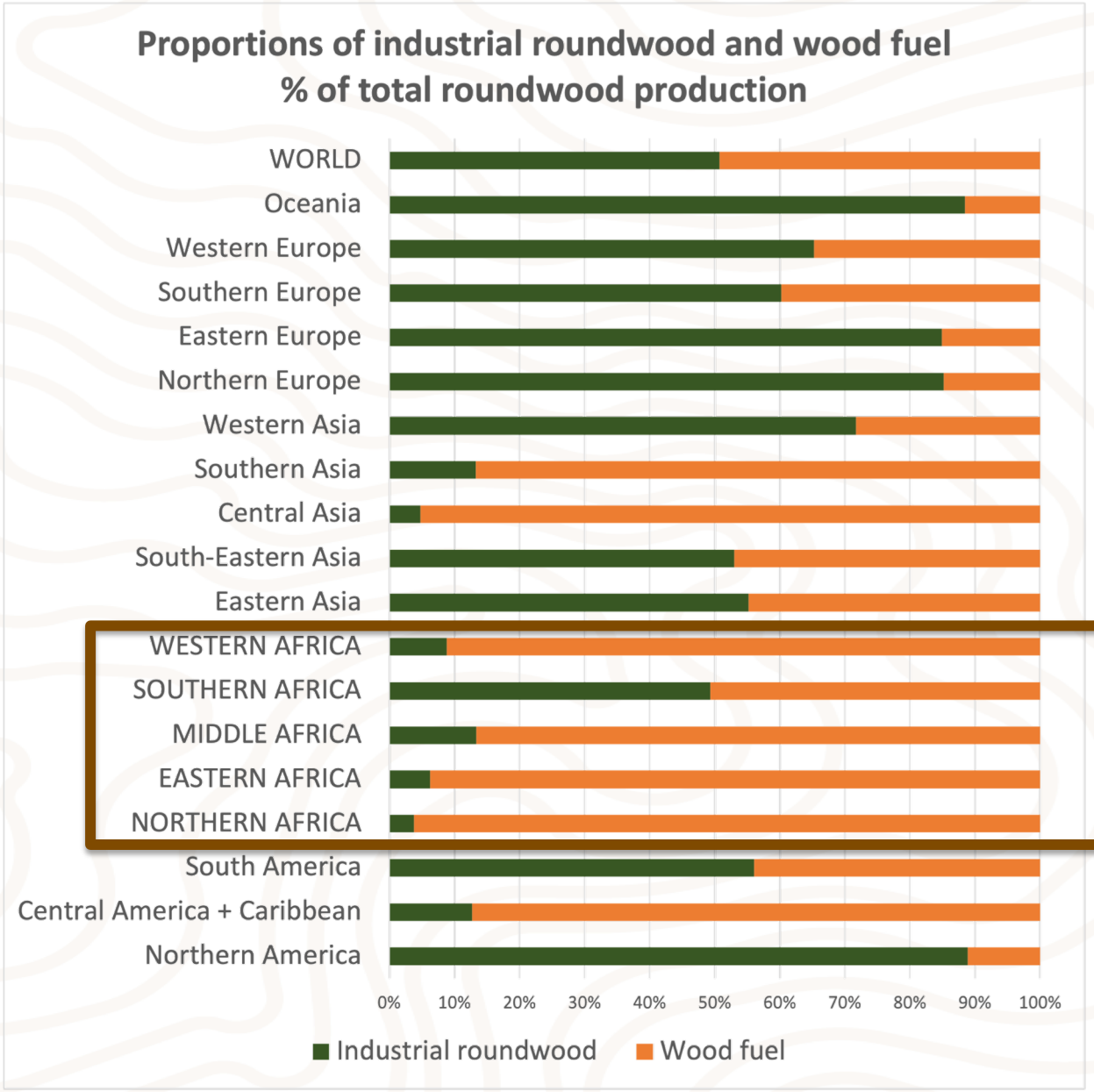
MESSAGE # 1

Encourage systematic changes in land and forest governance to enable the modernization of wood energy value chain

ROUNDWOOD PRODUCTION

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)



Mobilize wood resources towards the bioeconomy

Source of data: FAOSTAT, 2020.

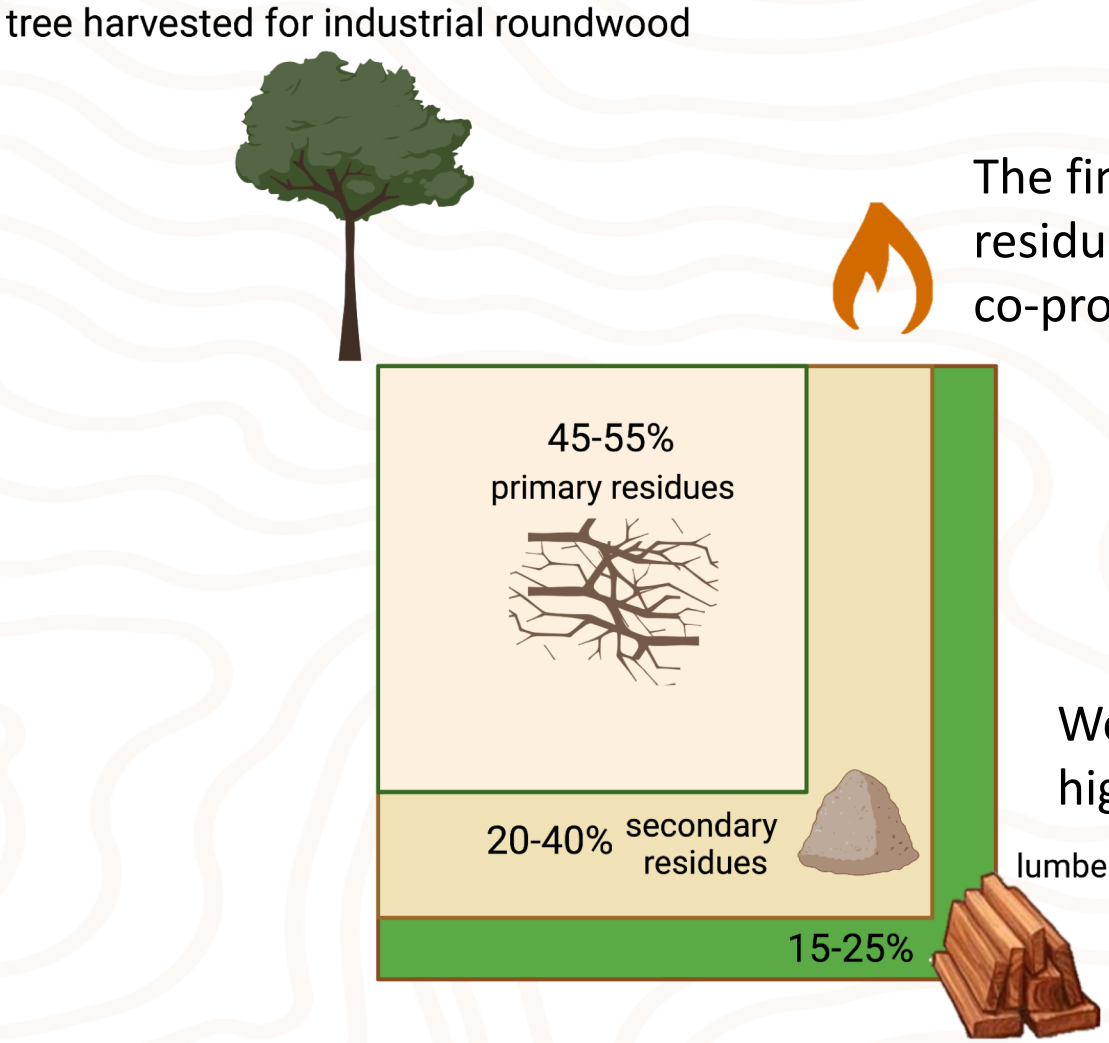
MESSAGE # 2

Stimulate increased efficiency and added value in the industrial roundwood network

OUTPUTS FROM A TREE HARVESTED FOR INDUSTRIAL ROUNDWOOD IN DEVELOPING COUNTRIES

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)



The financial profitability of energy from wood residues depends on the optimal and efficient co-production of material products.

We need processes that optimize high-value material products.

Adapted from data in GIZ and GBEP (2015)

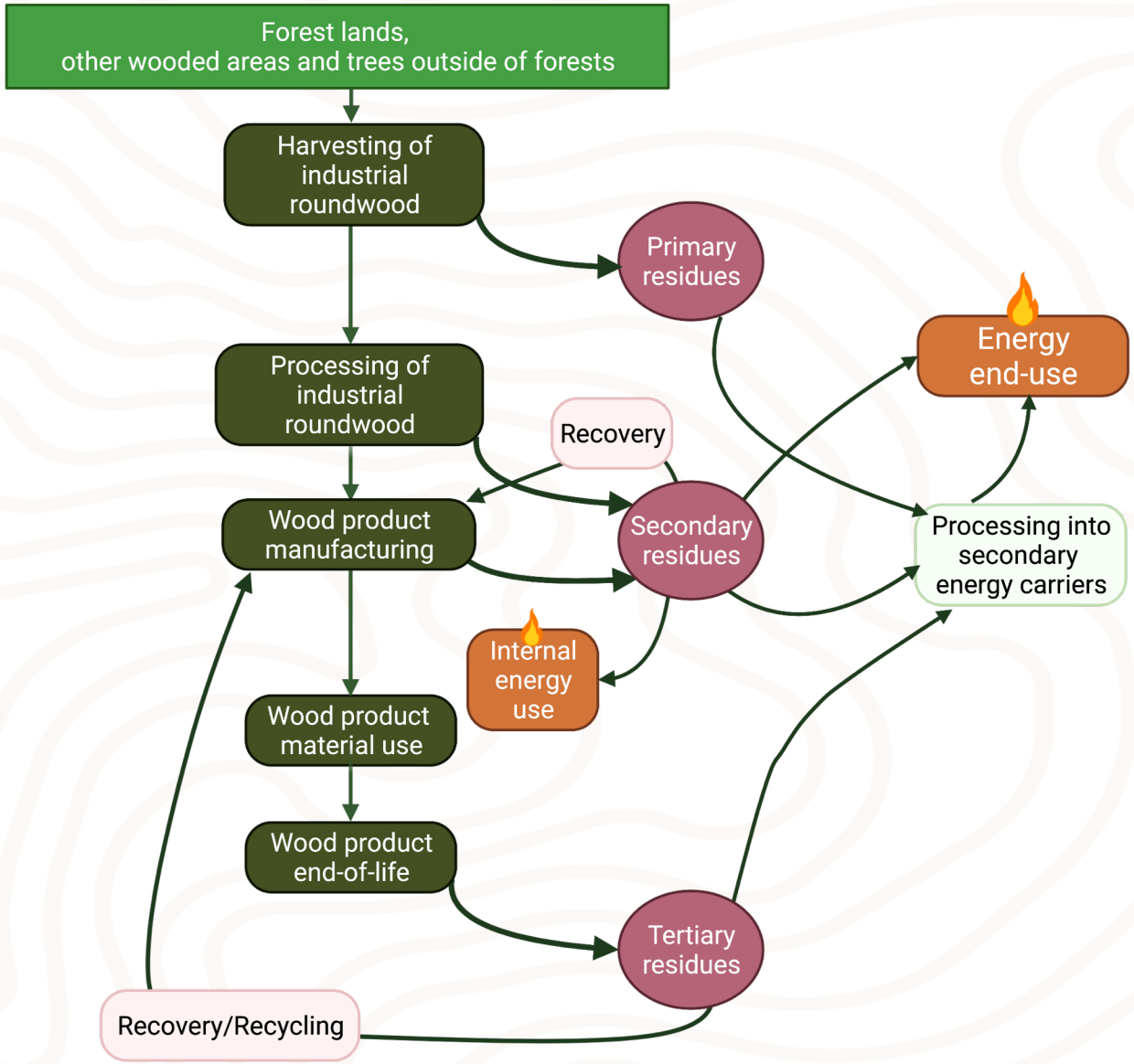
MESSAGE # 3

Stimulate the cascading use of wood resources

CASCADING USE

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)



CASCADING USE

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)

	Can serve as feedstock for the production of:		Can further be recovered for the production of:
Secondary residues, recovered paper	→	Paper	→ Recycled paper and energy after several cycles
Recovered sawn wood, recovered particleboard and oriented-strand board (OSB)	→	Particleboard	→ Energy and fraction for reuse in particleboard
Industrial roundwood, secondary residues	→	Medium-density fibreboard (MDF) and OSB	→ Energy and fraction of OSB for reuse in particleboard
Industrial roundwood	→	Plywood	→ Energy
Industrial roundwood	→	Sawn wood for construction	→ Particleboard
Industrial roundwood, secondary residues	→	Wood plastic composites	→ Still in development
Industrial roundwood, secondary residues	→	Biobased chemicals from biochemical conversion	→ Still in development
Industrial roundwood, secondary residues, recovered (clean) wood	→	Biobased chemicals from thermochemical conversion	→ Still in development

Adapted from Vis, Mantau and Allen (2016)

RECOMMENDATIONS

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)

	Key categories of stakeholders	Recommendations
1	○ Governments ○ International organizations and NGOs	→ Encourage systematic changes in governance to enable the modernization of wood energy value chains → Raise awareness of the benefits of modern bioenergy
2	○ Governments ○ Cooperative unions ○ Operators within the value chain	→ Develop cooperative solutions that encompass the whole wood energy value chain
3	○ International organizations ○ National/regional forest services and agencies ○ Operators within the value chain	→ Improve the tracking and reporting of wood flows from the land base to the end-users to quantify and characterize wood residue potentials
4	○ Governments ○ Operators within the value chain and within mills	→ Stimulate a cascading use of wood resources and increased efficiency in the industrial roundwood network
5	○ Policymakers ○ Producer associations ○ Cooperatives	→ Develop classification and standardization systems and practices for wood residues and wood residue-based energy carriers

FINAL CONSIDERATIONS

Food and Agriculture Organization of the United Nations

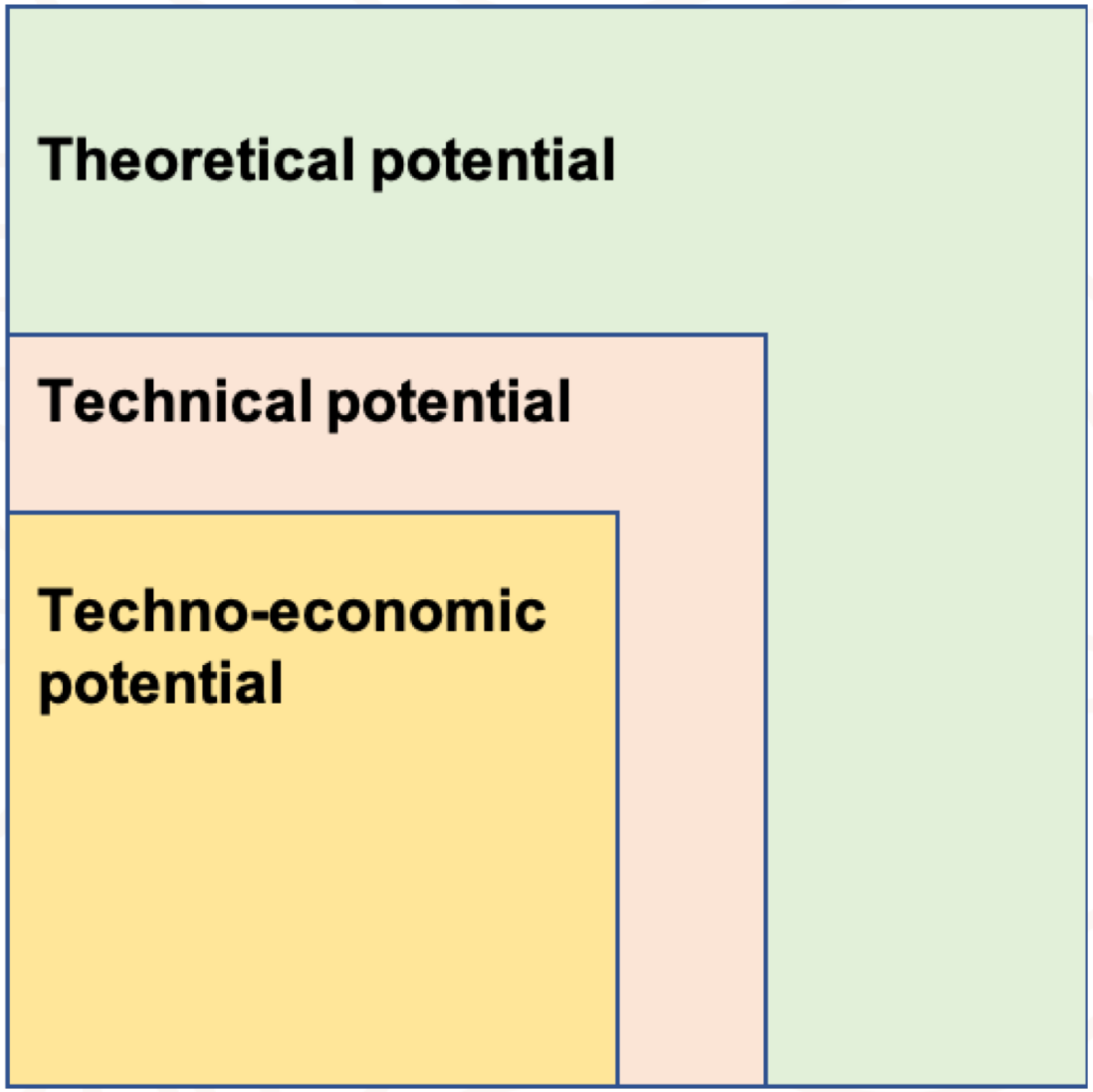
ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)

- Achieving access to affordable, reliable, sustainable and modern energy for everyone (SDG7) will require a transition from traditional uses of wood fuel to modern systems of wood fuel production and use.
- In several developing countries, wood residues generated by industrial roundwood production are often considered waste to be eliminated through open air combustion or simply abandoned.
- The use of wood residues plays an important role for sustainable energy access, notably for cooking, heating and power generation.
- The combination of sustainable forest management and the efficient use of harvested roundwood, including the valorization of wood residues, represents an opportunity to develop a modern bioenergy value chain as part of a sustainable bioeconomy which includes substitution of non-renewable materials and energy.
- There is a need to collect site-specific evidence on wood residue availability and to analyze appropriate technologies in order to inform investors, support the development of policies and ensure best practices are implemented.

THANK YOU FOR YOUR ATTENTION

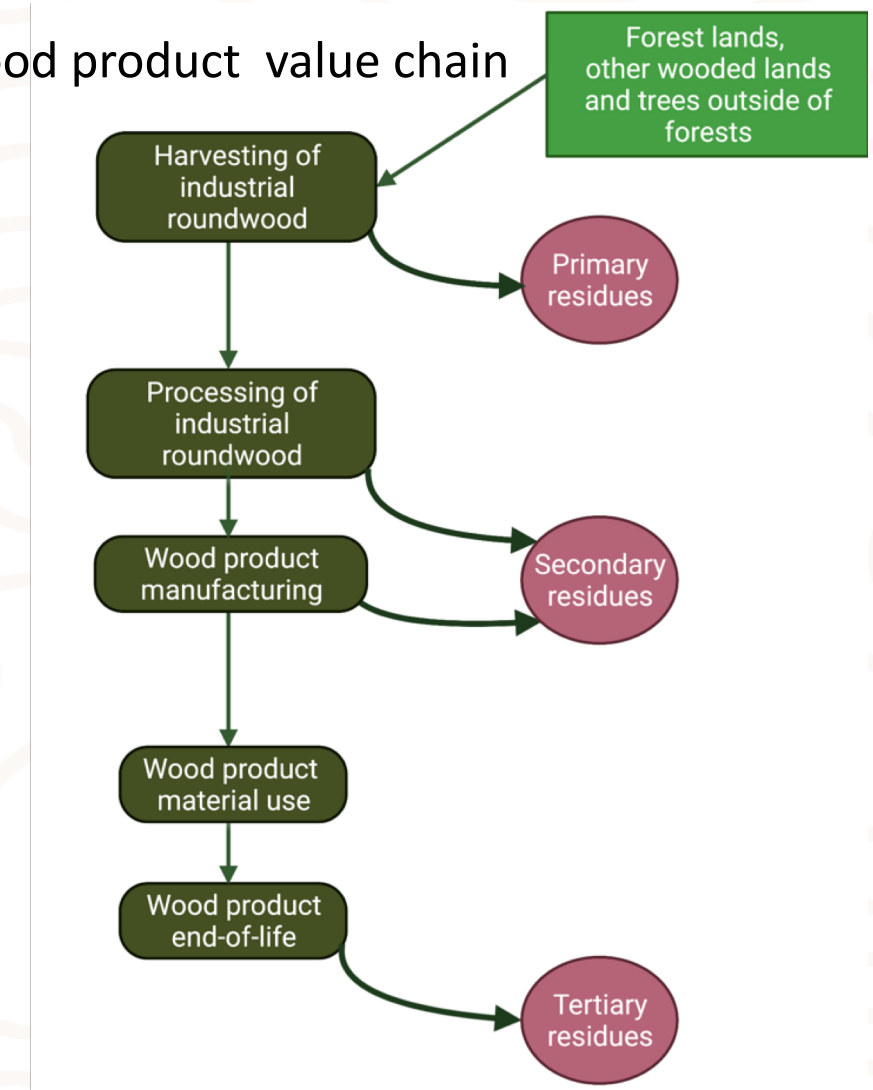
EXTRA SLIDES

Concepts of biomass potential



Theoretical potential availability of wood residues associated with industrial roundwood value chains

Wood product value chain



Theoretical potential availability of wood residues associated with industrial roundwood value chains

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)

World regions	Total theoretical availability or wood residues	Potential energy generation from residues	Total theoretical availability of residues as a proportion of wood fuel production
	Millions m^3 $year^{-1}$	Exajoules $year^{-1}$	%
Northern America	460.65	2.56	739
Central America+ Caribbean	13.51	0.08	15
South America	126.52	0.7	70
Northern Africa	**10.5**	**0.06**	**20**
Eastern Africa	**5.32**	**0.03**	**2**
Middle Africa	**3.17**	**0.02**	**3**
Southern Africa	**11.59**	**0.06**	**64**
Western Africa	**7.27**	**0.04**	**3**
Eastern Asia	504.88	2.8	295
South-Eastern Asia	92.18	0.51	65
Central Asia	4.65	0.03	116
Southern Asia	42.21	0.23	11
Western Asia	30.59	0.17	329
Northern Europe	158.94	0.88	539
Eastern Europe	149.58	0.83	251
Southern Europe	59.45	0.33	204
Western Europe	141.33	0.79	251
Oceania	43.47	0.24	435

Theoretical potential availability of wood residues associated with industrial roundwood value chains

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)

World regions	Total theoretical availability or wood residues	Potential energy generation from residues	Total theoretical availability of residues as a proportion of wood fuel production
	Millions m^3 $year^{-1}$	Exajoules $year^{-1}$	%
Northern America	460.65	2.56	739
Central America+ Caribbean	13.51	0.08	15
South America	126.52	0.7	70
Northern Africa	**10.5**	**0.06**	**20**
Eastern Africa	**5.32**	**0.03**	**2**
Middle Africa	**3.17**	**0.02**	**3**
Southern Africa	**11.59**	**0.06**	**64**
Western Africa	**7.27**	**0.04**	**3**
Eastern Asia	504.88	2.8	295
South-Eastern Asia	92.18	0.51	65
Central Asia	4.65	0.03	116
Southern Asia	42.21	0.23	11
Western Asia	30.59	0.17	329
Northern Europe	158.94	0.88	539
Eastern Europe	149.58	0.83	251
Southern Europe	59.45	0.33	204
Western Europe	141.33	0.79	251
Oceania	43.47	0.24	435

Food and Agriculture Organization of the United Nations

ADVISORY COMMITTEE ON SUSTAINABLE FOREST-BASED INDUSTRIES (ACSFI)