

Mobilisation of non - food biomass in a sustainable way; Criteria & Indicators

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Various approaches to sustainability



- **RED (and beyond) sustainability requirements for biofuels and bioliquids.**
- **Non-legally binding requirements for solid and gaseous bioenergy at the EU level (but some MS binding requirements e.g. UK and NL) - Communication from the EC (2014).**
- **Non-legally binding requirements for biomaterials at the EU level.**

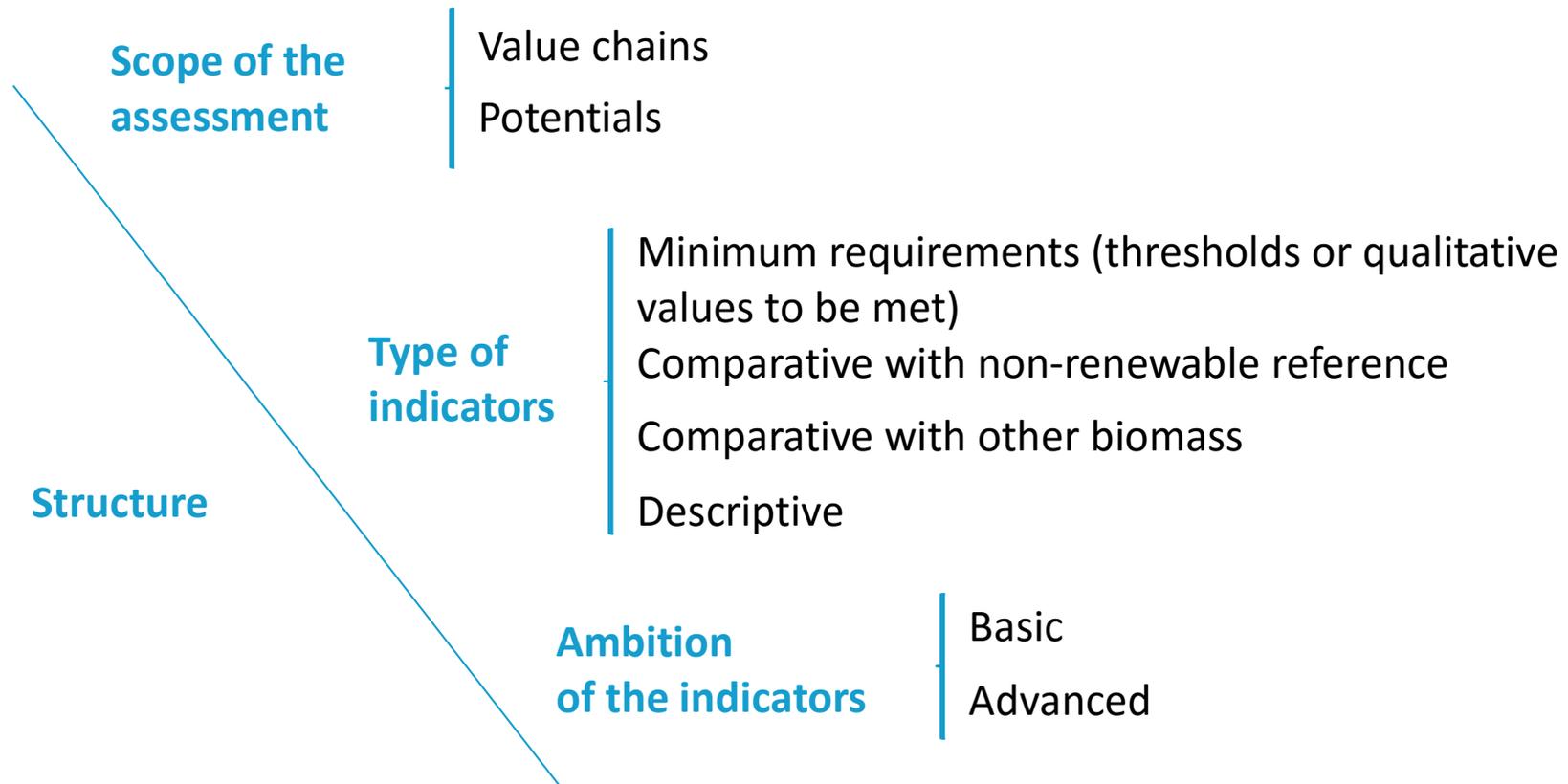
→ Urgent need of harmonised sustainability C&I across value chains

Umbrella approach for sustainability in the bioeconomy

Rationale:

- **Target: non-food biomass for the bioeconomy (biobased economy)**
- **Holistic view of sustainability: economic, social and environmental criteria**
- **International view: to be applied in the EU and in third countries**
- **Integrated approach: beyond forestry, agriculture or waste sectors**

Assessing Sustainability



Scope of the assessment



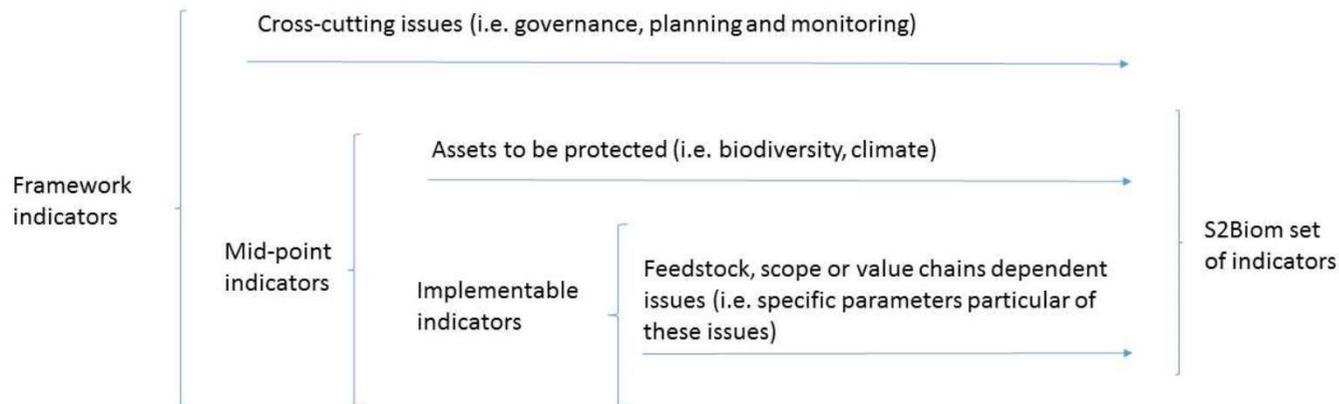
Geographical scope:

- **spatially explicit** (e.g. for biodiversity, soil, etc.) when they depend on the location.
- **partially** attributable to spatial distribution (e.g. GHG, land use efficiency) when a part of the indicator is associated to the location (i.e. production) and another part depends on the value chain.
- **non-spatial** but circumstantial (e.g. labor conditions, employment) when their performance depend on the context and not specifically on the location.

Types of Indicators (I)



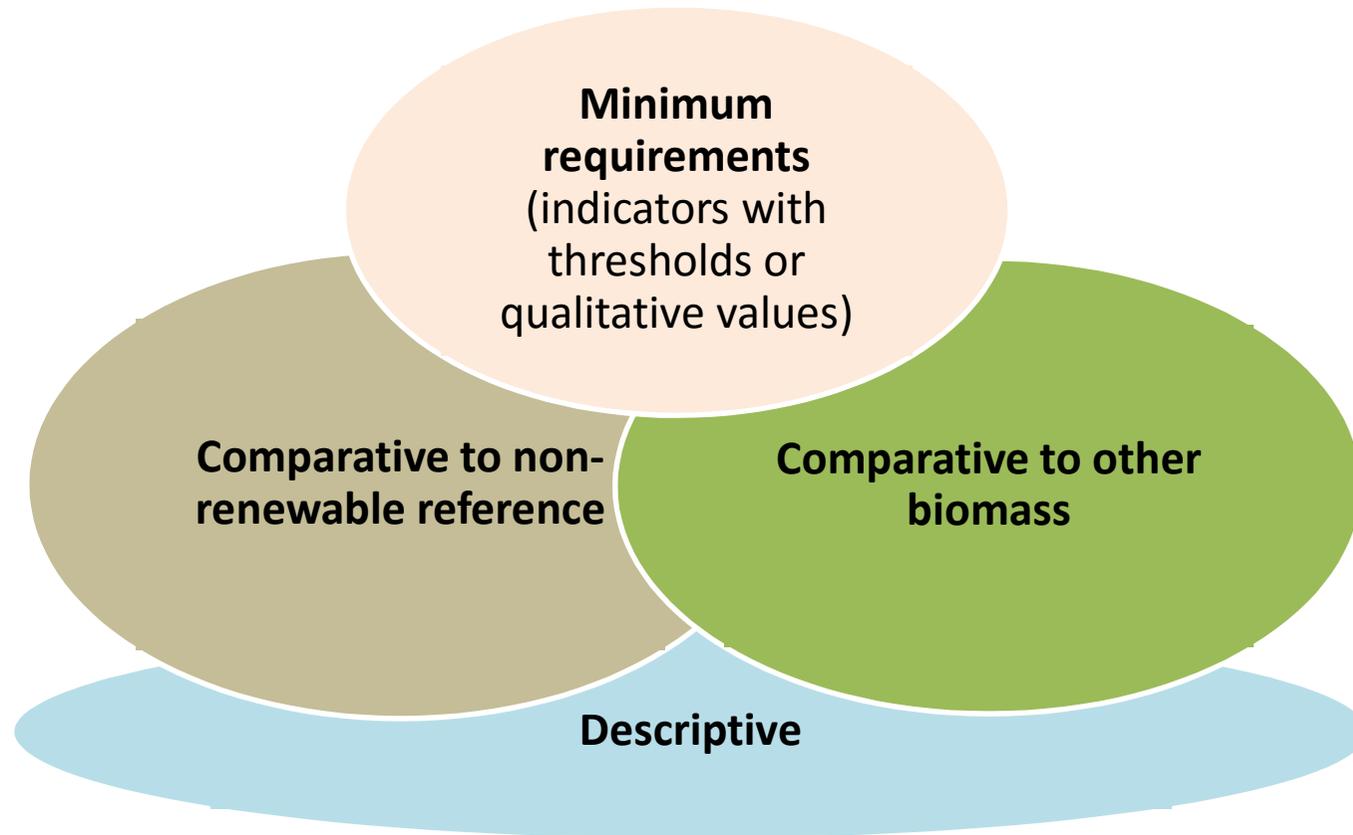
Conceptualization of the types of indicators



Overview of the relation between “mid-point” indicators and “implementable” indicators.

S2Biom Criteria	S2Biom Mid-point Indicators		S2Biom Implementable Indicators
3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	Amount of residues to be left on the ground in every location
	3.2	Biodiversity conservation and management	
4. Soil	4.1	Erosion	
	4.2	Soil Organic Carbon	
	4.3	Soil nutrient balance	

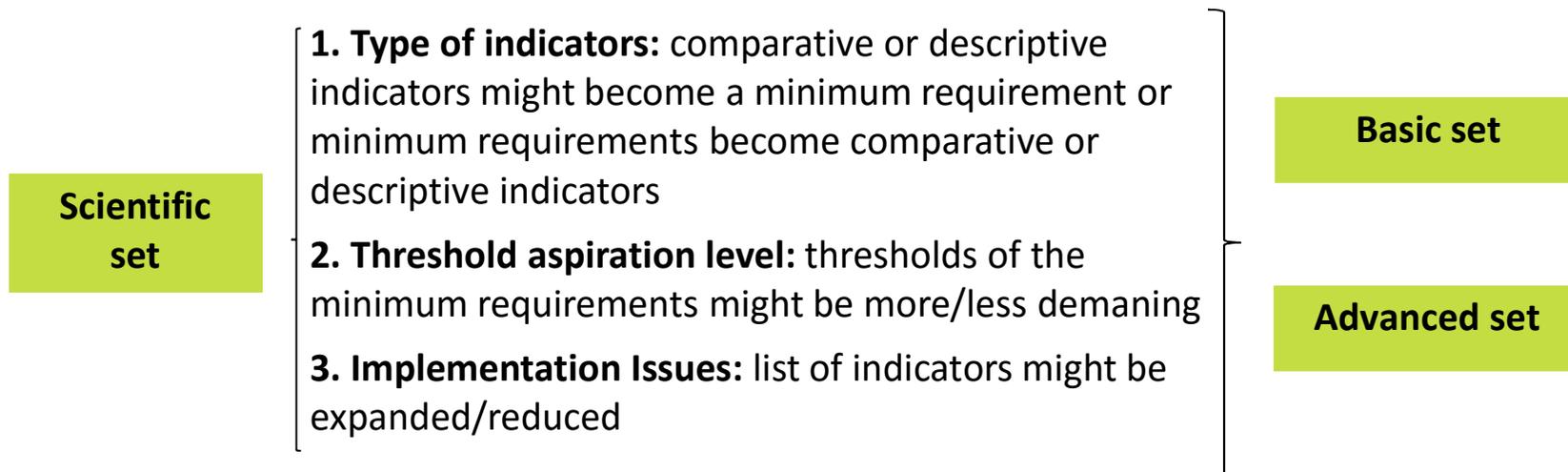
Types of Indicators (II)



Ambition Level



The definition of the basic and advanced sets will depend on policy decisions (stakeholder views). Different considerations might be applied to translate scientific set into the basic or advanced sets



Data background:

- The methodology for life-cycle based environmental sustainability assessment of non-food biomass value chains, (JRC 2014)
- Current criteria and indicators developed for bioenergy at the international, EU and country level, including voluntary private sector schemes.
- Other sectoral policies with sustainability requirements (i.e. EU Forest Strategy).
- Proposals from other research projects focused (mainly) on biomass for bioenergy such as Biomass Energy Europe, Biomass Futures, Biomass Policies, Global Bio-Pact and BioTrade2020plus.
- Efforts from other projects that focuses on biorefineries such as BIOCORE, EuroBioRef, and SUPRABIO.

Sustainability C&I (II)



(Draft) List of Sustainability C&I → Umbrella approach (12 criteria; 27 indicators)

Environmental	1. Resource Efficiency	Land Use Efficiency
		Secondary Resource Efficiency
		Energy Efficiency
		Functionality (Output service quality)
	2. Mitigate Climate Change	GHG(CO ₂ eq) LCA, including LUC
		Other GHG emissions
	3. Biodiversity	Protected areas and land with significant biodiversity values
		Biodiversity conservation and management
	4. Soil	Erosion
		Soil Organic C
		Soil Nutrient Balance
	5. Water	Water availability and regional water stress
		Water use efficiency
		Water quality
	6. Air	SO ₂ equivalents
		PM ₁₀

Social	7. Participation and transparency	Effective participatory processes
		Information transparency
	8. Secure tenure of land	Land tenure assurance
	9. Employment and labor conditions	Full direct jobs equivalents along the full value chain
		Full direct jobs equivalent in the biomass consuming region (or country)
		Human and Labor Rights
	Occupational safety and health for workers	
10. Health risks	Risks to public health	
11. Food, fuelwood and other products	Food, fuelwood and other products supply security	
Economic	12. Production costs	Current levelized life-cycle cost
		Future levelized life-cycle cost

Environmental C&I



Criterion	Indicator		Level of ambition							
	#	Indicator	Basic				Advanced			
			Minimum requirement	Comparative (non-renewable reference)	Comparative (biomass reference)	Descriptive	Minimum requirement	Comparative (non-renewable reference)	Comparative (biomass reference)	Descriptive
1. Resource use	1.1	Land use efficiency			✓		✓			
	1.2	Secondary resource efficiency			✓		✓			
	1.3	Energy efficiency		✓			✓			
	1.4	Functionality (Output service quality)						✓	✓	
2. Climate Change	2.1	Life cycle-based CO ₂ eq including direct land use change	✓				✓			
	2.2	Other GHG emissions		✓	✓		✓			
3. Biodiversity	3.1	Protected areas and land with significant biodiversity values	✓				✓			
	3.2	Biodiversity conservation and management			✓		✓			
4. Soil	4.1	Erosion			✓		✓			
	4.2	Soil Organic Carbon			✓		✓			
	4.3	Soil nutrient balance			✓		✓			
5. Water	5.1	Water availability and regional water stress		✓			✓		✓	
	5.2	Water use efficiency						✓	✓	
	5.3	Water quality		✓				✓	✓	
6. Air	6.1	SO ₂ equivalents		✓	✓		✓			
	6.2	PM ₁₀		✓	✓		✓			

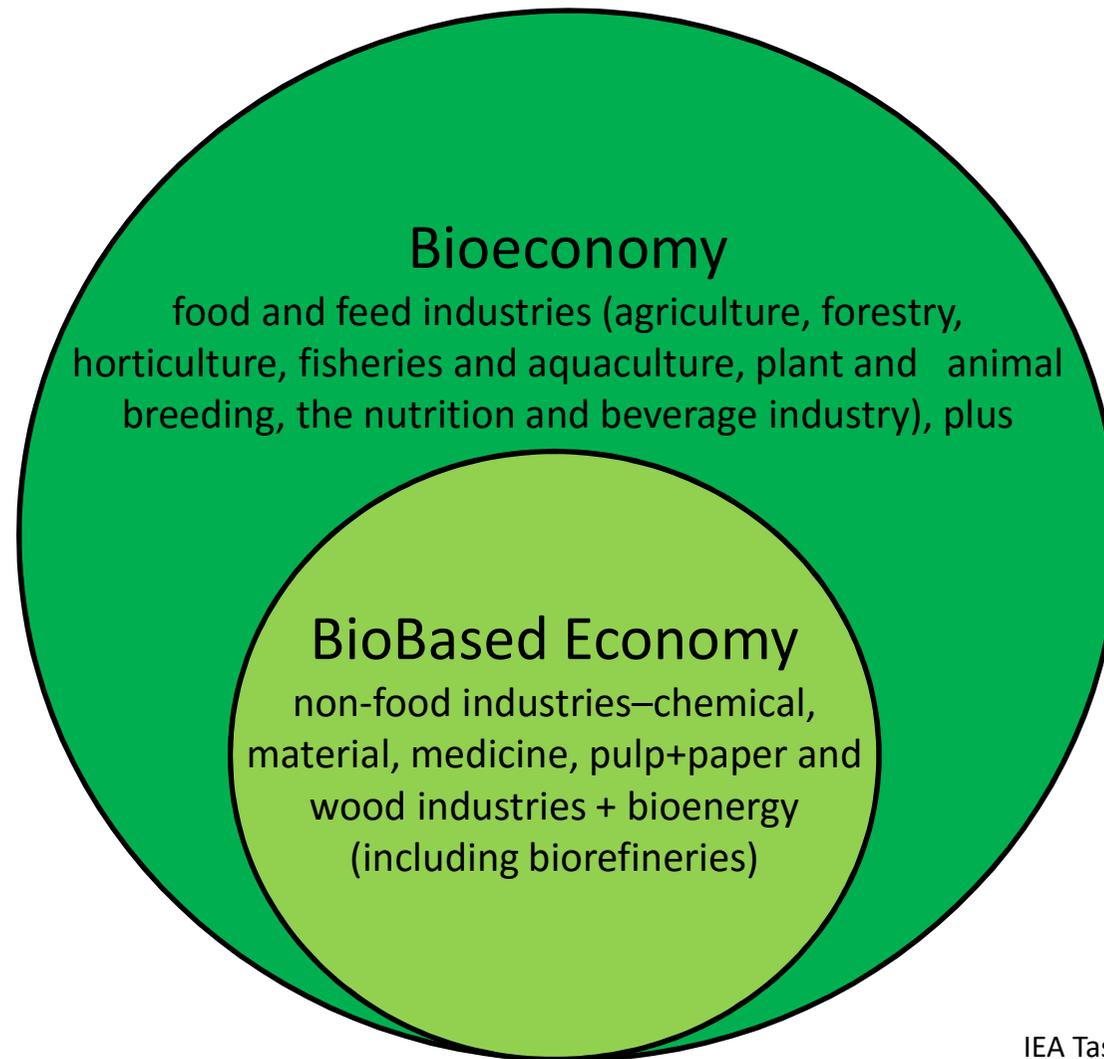
Social & Economic C&I

Theme	Criterion	Indicator		Level of ambition									
		#	Indicator	Basic				Advanced					
				Minimum requirement	Comparative (non-renewable reference)	Comparative (biomass reference)	Descriptive	Minimum requirement	Comparative (non-renewable reference)	Comparative (biomass reference)	Descriptive		
Social	7. Participation and transparency	7.1	Effective participatory processes									✓	
		7.2	Information transparency										✓
	8. Land tenure	8.1	Land Tenure assurance			✓		✓					
		9. Employment and labor rights	9.1	Full direct jobs equivalents along the full value chain		✓	✓			✓		✓	
	9.2		Full direct jobs equivalent in the biomass consuming region (or country)		✓	✓			✓		✓		
	9.3		Human and Labor Rights	✓				✓					
	9.4		Occupational safety and health for workers	✓				✓					
	10. Health risks	10.1	Risks to public health										✓
	11. Food, fuelwood and other products	11.1	Food, fuelwood and other products supply security			✓		✓					
Economic	12. Production costs	12.1	Current levelized life-cycle cost		✓	✓			✓		✓		
		12.2	Future levelized life-cycle costs						✓		✓		

Thank you for your attention !!

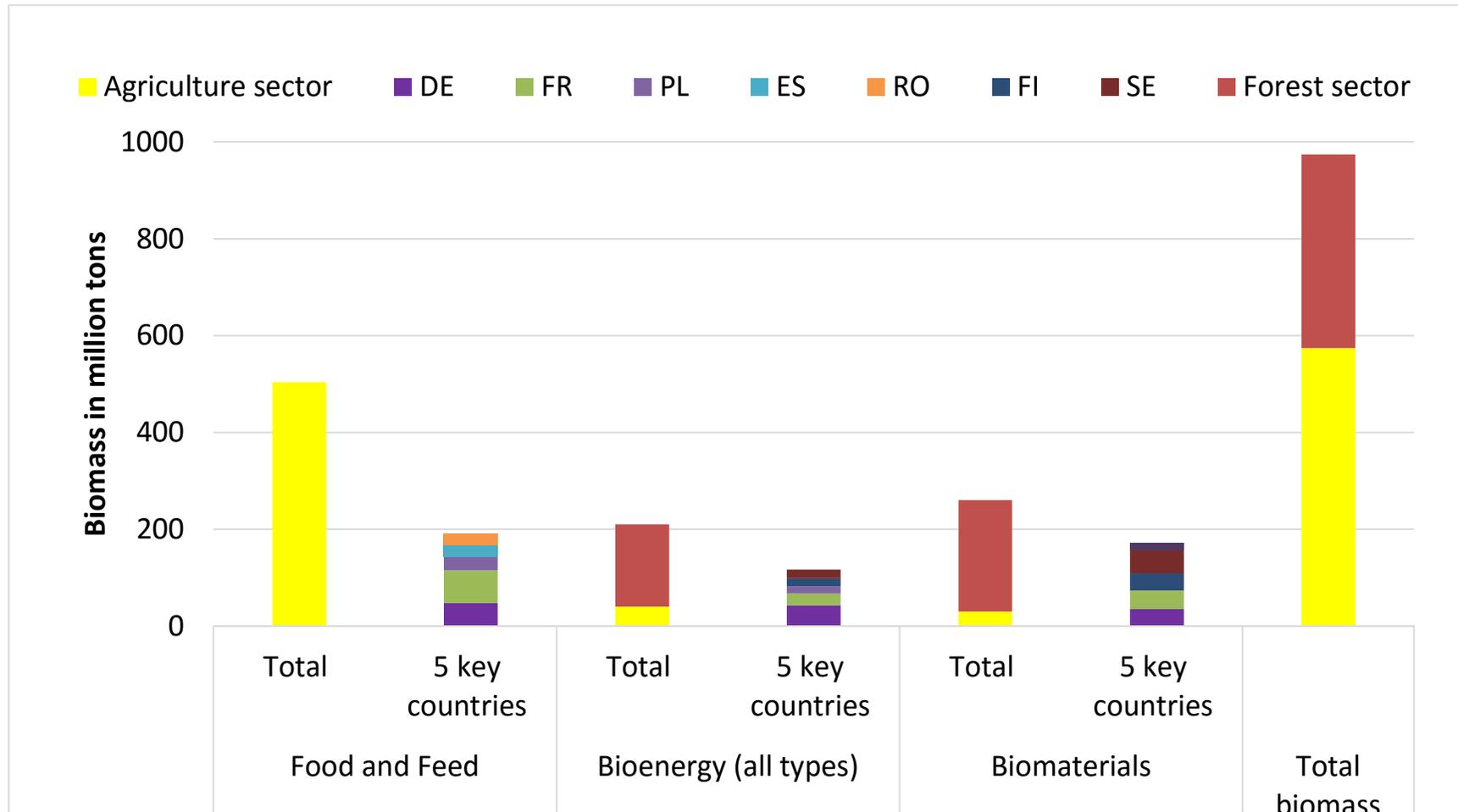
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IEA Task 42 (2014)

Agriculture and Forest Biomass Produced in EU Biobased Value Chains in 2010



IINAS (forthcoming)