



Biomass potentials and the SDGs: Adding a food security and equity perspective

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- Planetary boundaries limit biomass supply
- Varying estimates for globally and locally available non-food biomass in 2050
- Unclear how models address food security, sustainability and equity

Research on global and local (not national) level...

1. to evaluate how food security is included in non-food biomass estimates
2. to identify how much of the global non-food energy uses can be filled by non-food biomass
3. to discuss results from an equity and SDG perspective
4. to differentiate regionally / nationally
5. to protect food security and the human right to adequate food in local (certified) biomass production sites: Project *Food Security Standard (FSS)*



The inclusion of food security in the non-food biomass estimates **ZEF**

- Approach: food and feed requirements assumed, converted to land requirements, remaining available land for non-food biomass production
- Studies often do not provide estimates on assumed food needs (in kcal) in 2050 nor details on assumed diets
- Modeled food needs ranges from 2414 to 3629 kcal cap⁻¹ d⁻¹ (OECD countries consumes 3500 kcal cap⁻¹ d⁻¹, FAO recommendation: 3070 kcal cap⁻¹ d⁻¹ for balanced diets and low levels of undernourishment)
- Food security = caloric requirements → outdated concept since 20 years
- Current food security concept based on World Food Summit (1996)

Four pillars of food security:

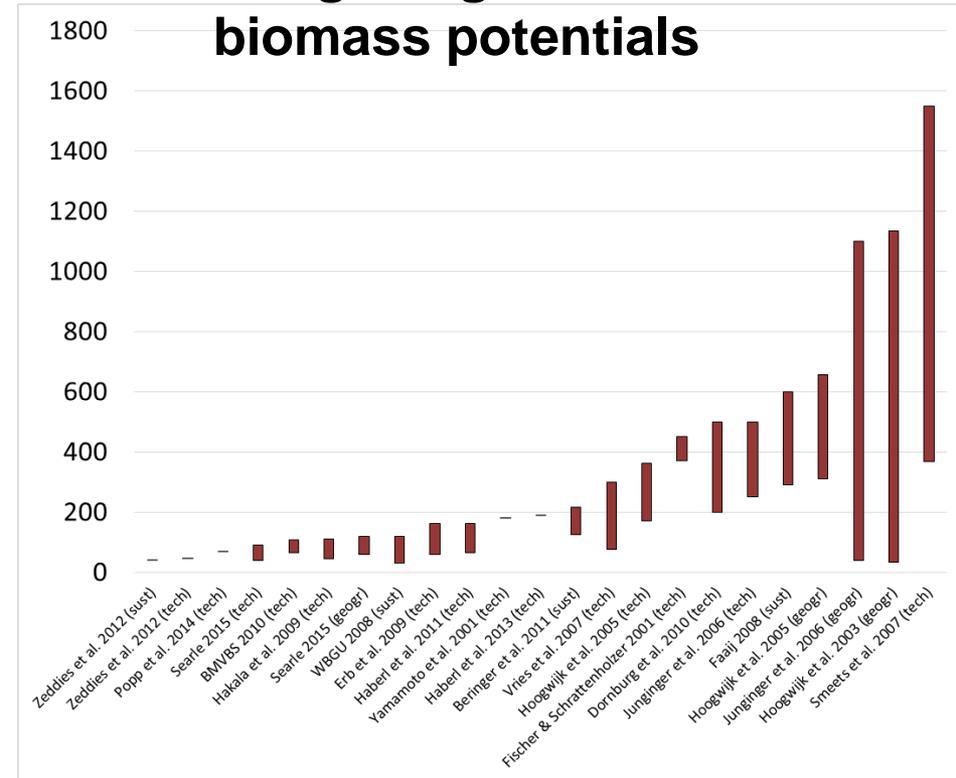
1. Availability
2. Access (e.g. physical/economic)
3. Utilization (e.g. nutritious diets)
4. Stability



Food security and global non-food biomass potentials

- Balanced nutrition including vitamins, minerals, micronutrients, phytochemicals not considered
- Highest non-food biomass potentials based on food caloric requirements below FAO recommendation
- Most biomass estimates require a cut of food consumption; the extreme ones of 30% in developed and 20% in developing countries.
- Regional /national differences: Africa projected to need all biomass for food needs in 2050; Brazil already food surplus

Range of global non-food biomass potentials



Non-food biomass potentials in 2050
Minimum 111EJ - maximal 231 EJ

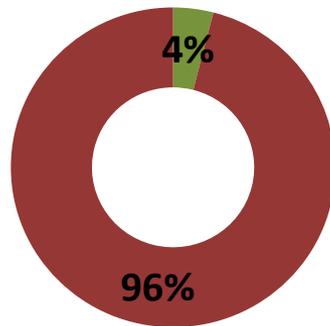


- Prioritization of material/chemical uses (currently 9% of all fossil fuels)
- Fossil fuels for chemical/material uses can be replaced by biomass (estimates range from 146% up to 300%)
 - ➔ Little remains for bioenergy in conservative scenarios

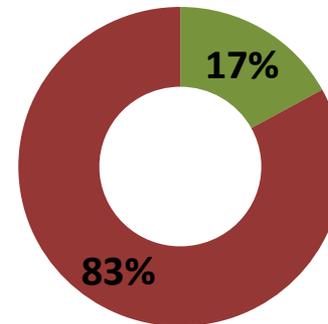
Share of global energy needs covered by non-food biomass scenarios, after accounting for material use (%)

■ Energy covered by biomass

■ Energy needs to be filled by non-biomass



Conservative scenarios



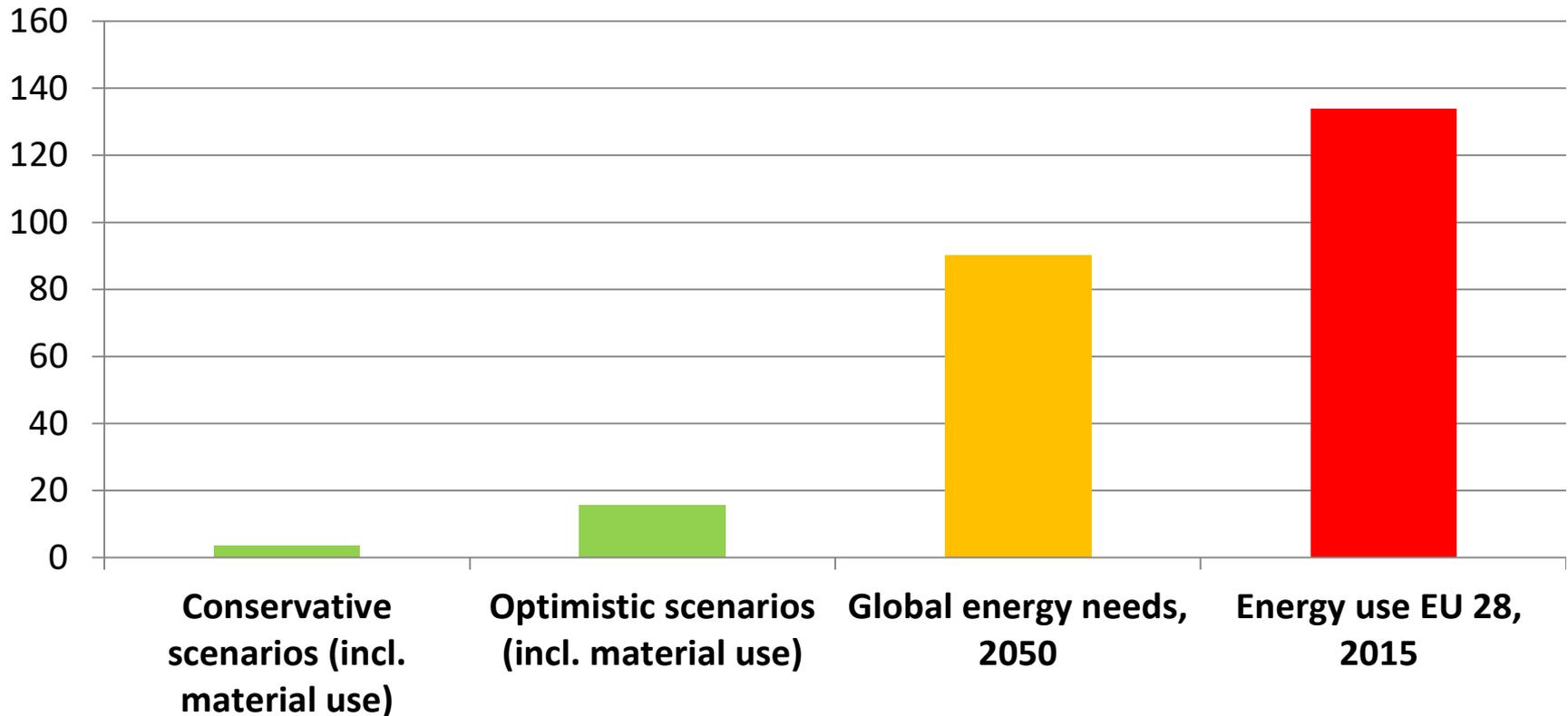
Optimistic scenarios



An **egalitarian distribution** of biomass as a global norm would imply that countries have to rethink their biomass-related policies, tailoring investments towards their available per capita biomass share and in favour of the poor.

Per capita biomass potentials in 2050 and energy needs (global, EU)

(GJ cap⁻¹)





- Discussions around non-food biomass potentials **need to**
 - include four pillars of food security (**SDG 2 No hunger**)
 - increase the complexity to reflect reality: governance systems, development status (**SDG 1 Poverty**), global inequities (**SDG 10 Equity**), sustainability (environmental) concerns esp. regarding forests and biodiversity (**SDG 15 Life on land**).
 - Have reality check e.g. assumptions on yield increases, LCAs (**SDG 2, 15**) and practical implications in DCs (aim to close yield gaps since 50 years)?
 - Be combined **with ex- ante impact assessments (e.g.)**:
 - SDG 2 (No Hunger), SDG 6 (Water), SDG 15 (Life on land), SDG 1 (Poverty) and SDG 10 (Equity)
 - How can (the poor in) developing countries benefit (SDG 10)?



- **Need for a normative guiding framework:**
 - What to use of the SDGs, the “**goal, target or indicator**”???
 - **Human rights** and other international agreements as guiding framework

**Who is to use how much of the global biomass resources,
for how long and for what?**

- **Consumption levels** in industrialized countries need to become more sustainable (reduced consumption)
- **Policies** (bioeconomy, energy, industrial, environmental,...) need further prioritization and coherence which biomass-based investments are best
- **Global bioeconomy (2050 vision):** focus on replacing fossil fuels for chemical & material uses, increasing efficiencies, producing bioenergy primarily from waste and residues and as by-product (local exceptions – context specificity)



Thank you!

Questions welcome!

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