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)
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Food security = caloric requirements ➔ outdated concept since 20 years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
- 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
Global non-food energy use and biomass potentials

- 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 (%)

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<tr>
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<th>Conservative scenarios</th>
<th>Optimistic scenarios</th>
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<tbody>
<tr>
<td>Energy covered by biomass</td>
<td>4%</td>
<td>17%</td>
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<tr>
<td>Energy needs to be filled by non-biomass</td>
<td>96%</td>
<td>83%</td>
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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)**

- **Conservative scenarios (incl. material use)**
- **Optimistic scenarios (incl. material use)**
- **Global energy needs, 2050**
- **Energy use EU 28, 2015**

(GJ cap⁻¹)
Conclusions and recommendations

• 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**)?
Conclusions and recommendations

• 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!

FSS │ Project
www.biomassweb.org