

Reflection on current data modelling and DBFZ approach to regional datasets

BioMob#4 design workshop on how to look at biomass availability data



DBFZ in short



The DBFZ is a federal research institute which focusses on the **integrated energetic and material use of biomass**. Sole shareholder is the Federal Republic of Germany, represented by the Federal Ministry of Agriculture, Food and Regional Identity (BMLEH).



applied
research &
development
on **biomass**



55
memberships in
(scientific) advisory
boards & working
groups

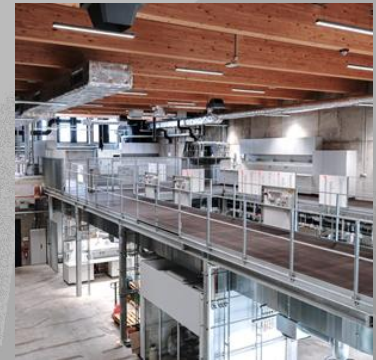
275
employees

33 M EUR
financial volume
in **2024**



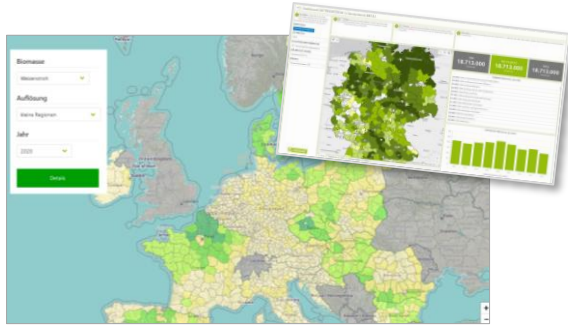
~120
research projects (per year)

~130
industrial cooperation
partners



Biomass mapping & mobilisation

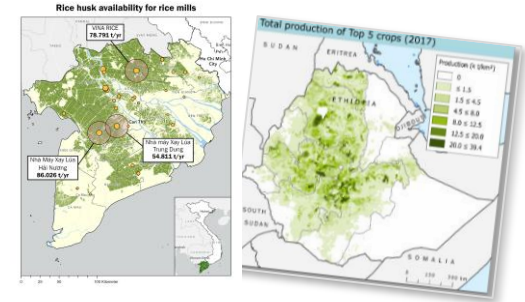
R&D methods and tools



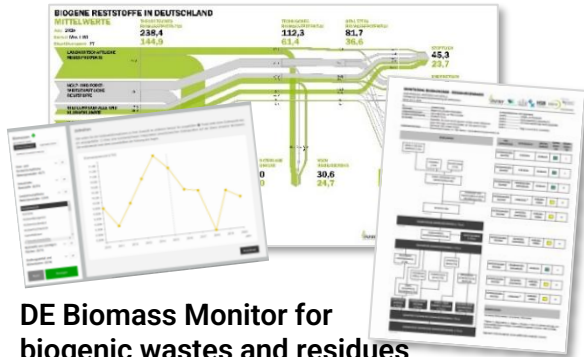
Regional biomass potentials & online atlas
(EU Biomass potential atlas)



Automatised (spatial) data analysis

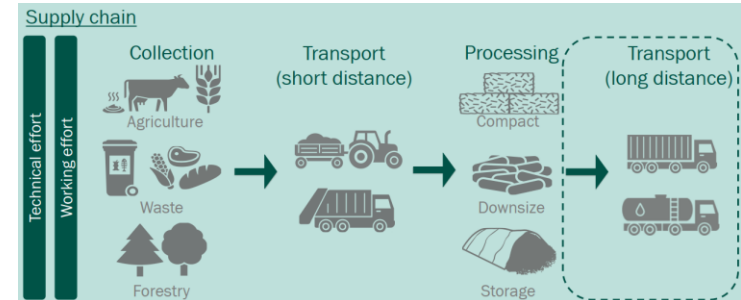


Spatial analyses with GIS and remote sensing technologies



DE Biomass Monitor for
biogenic wastes and residues

Find out more:



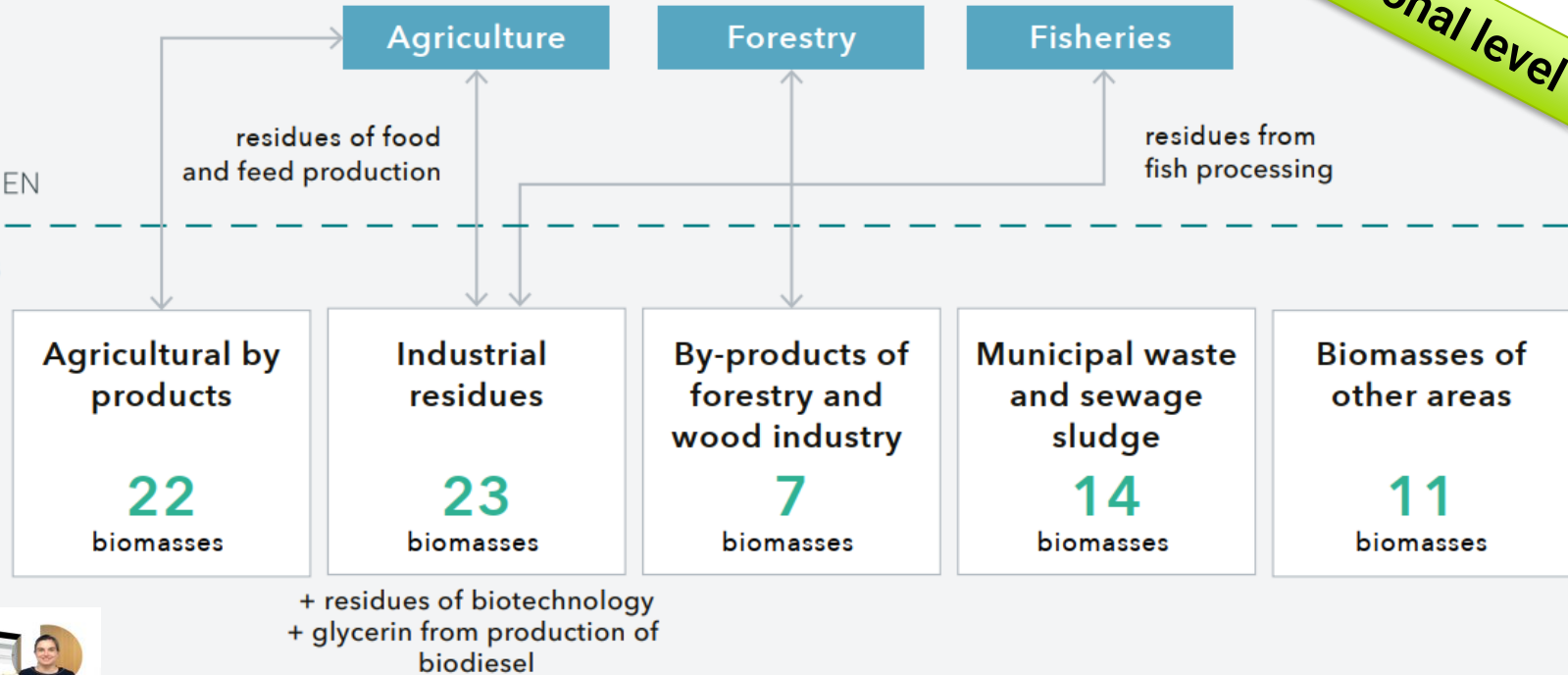
Supply chain analysis

DE Biomass Monitor

Biogenic Wastes and Residues



National level



Data and methodology are published as Open Data in [DBFZ Resource Database](#)

DE Biomass Monitor

Biogenic Wastes and Residues, Supply & Use in 2020 (Mio. tDM)



National level

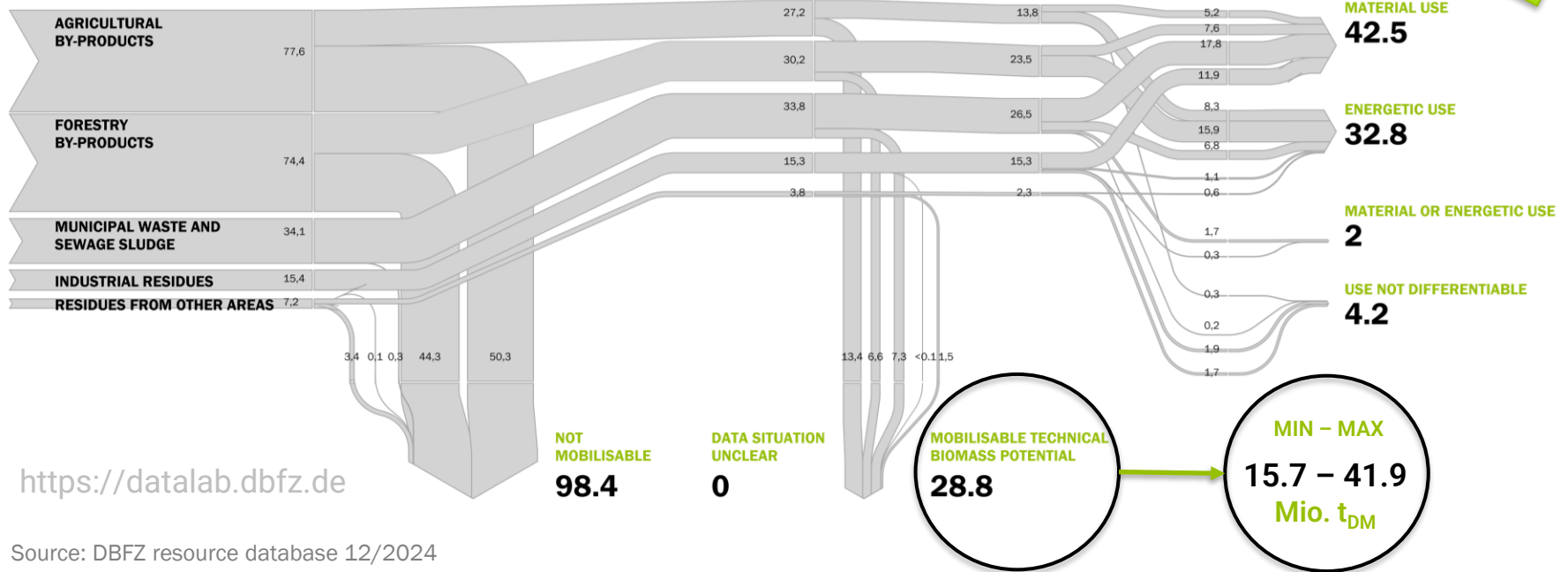
AVERAGE VALUES

Year 2020
Unit Million t dm
Individual biomasses 77

THEORETICAL
BIOMASS POTENTIAL
208.7

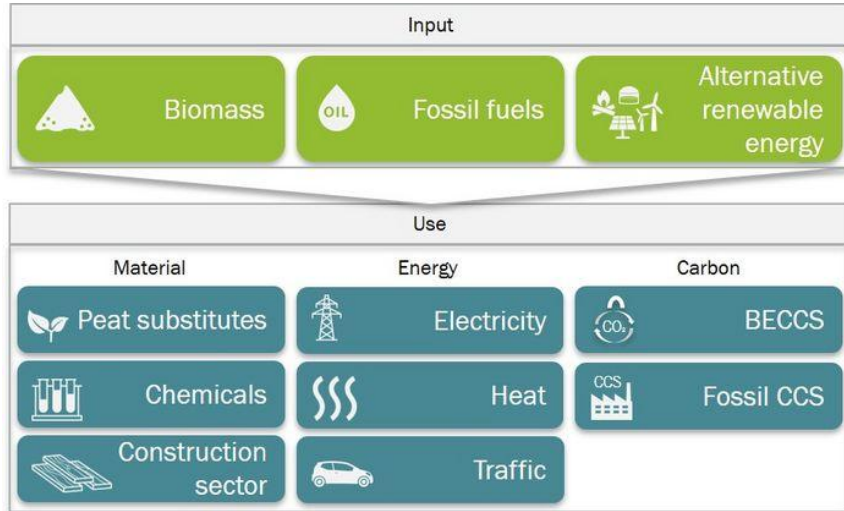
TECHNICAL
BIOMASS POTENTIAL
110.3

TECHNICAL BIOMASS
POTENTIAL USED
81.5



<https://datalab.dbfz.de>

Source: DBFZ resource database 12/2024

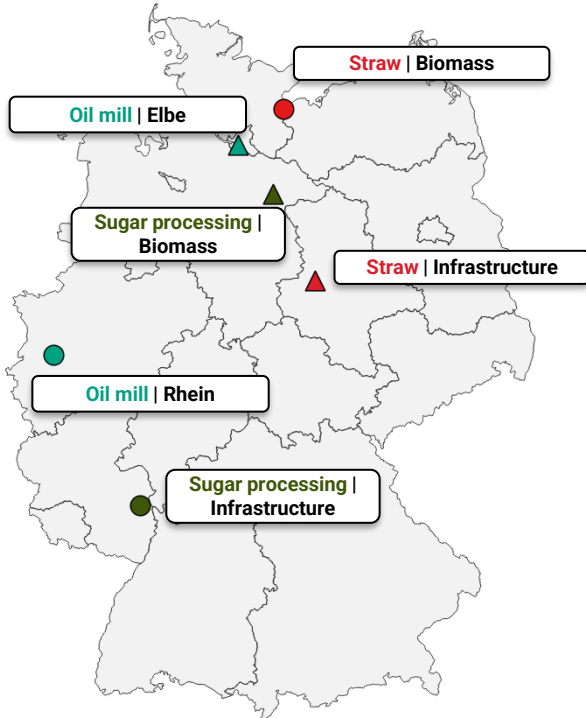


- Bioeconomy modeling using the BenOpt model, a linear energy system (cost) optimisation model taking into account defined climate targets
- Biomass data based on DE Biomass Monitor/Magnet (residues/wastes), GFPM & FABio-Forest model (wood supply), scenario-based land use assumption (crops) and further sources (e.g. scenarios for rewetting of lands for paludiculture)
- Knowing status quo uses highly important for start of modeling

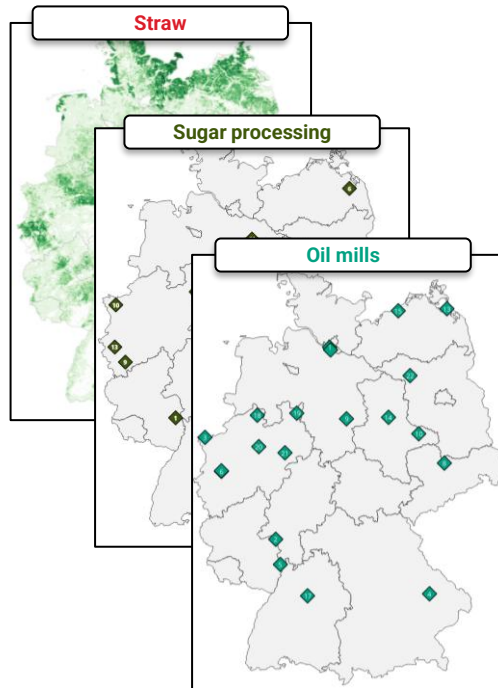
Missing aspects?

- Connection to LULUCF sector within model
- Cascading (temporal biomass use) effects relating to supply of residues and waste
- Regionalization for supply costs and improved regional supply-demand allocation
- Actual markets not perfectly described in the model

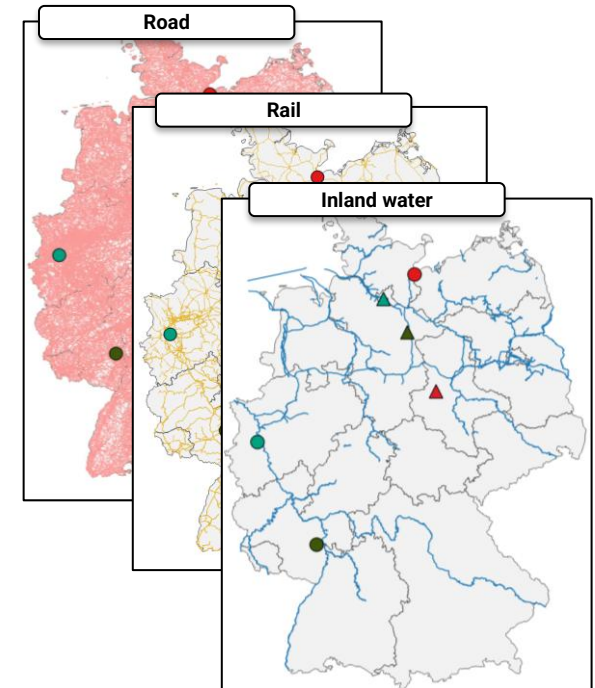
Potential processing facilities



Sources



Transport options



Supply cost for straw from field to plant

Optimisation model

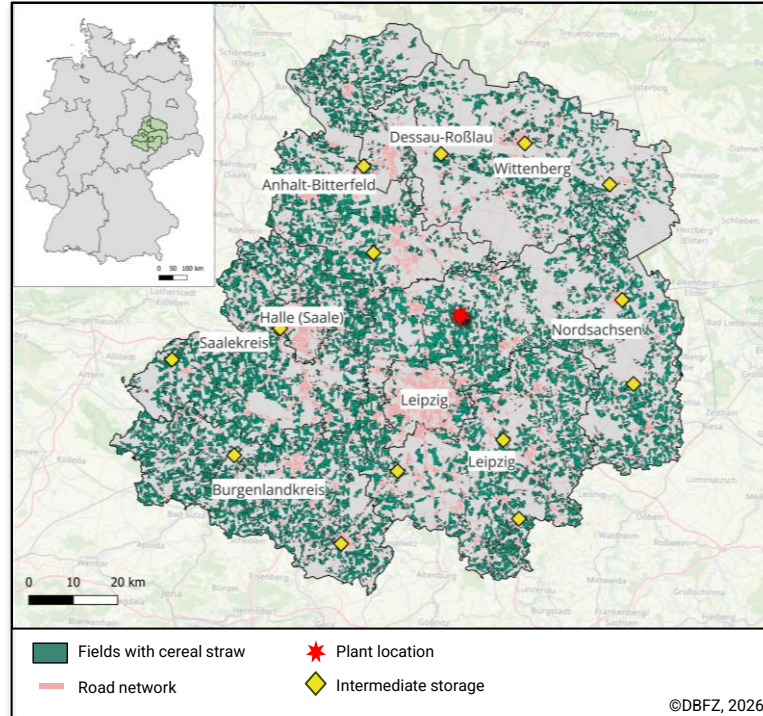
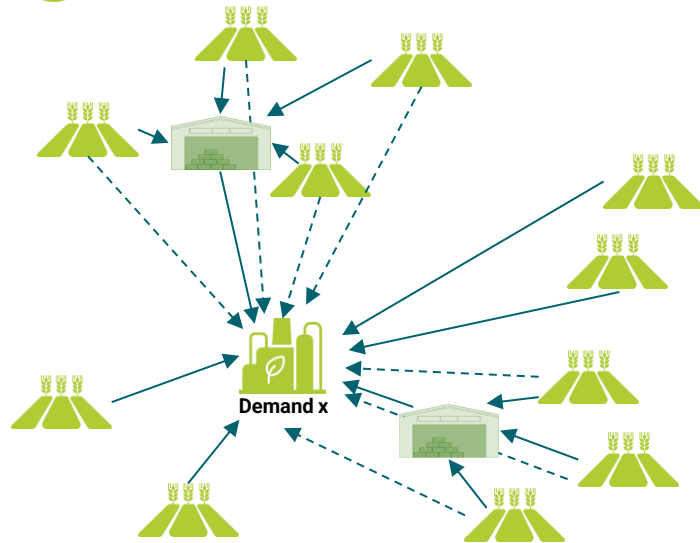


Case Study



Objective:

Minimise the total supply cost for demand x



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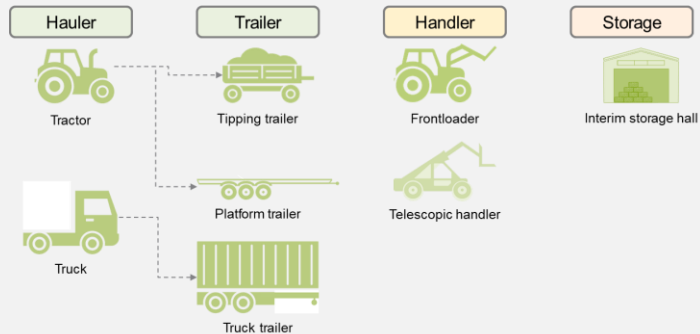
<https://www.dbfz.de/forschung/projektverzeichnis/projektdetailseite/page/detail/project/bk-bit>

DOI: [10.1007/s12649-024-02528-x](https://doi.org/10.1007/s12649-024-02528-x)

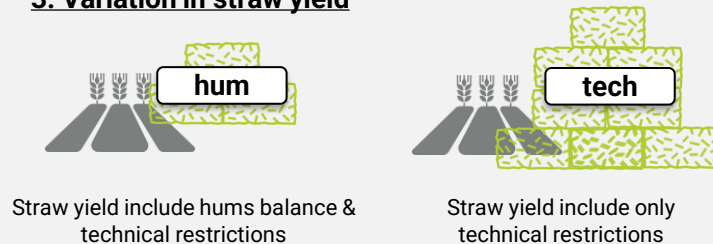
Scenarios for supply costs

Optimisation model

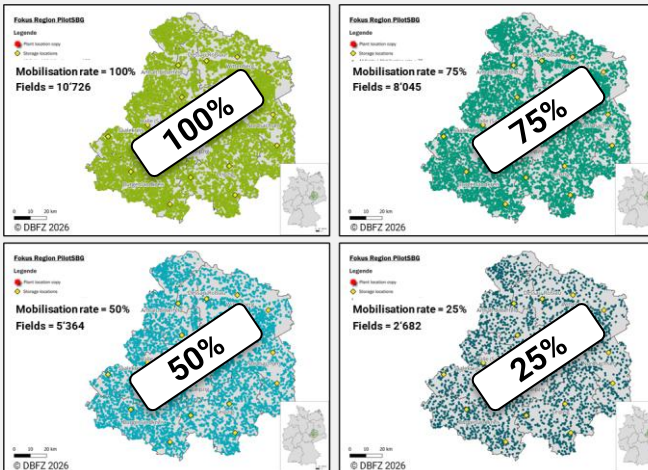
1. Variation in machinery & vehicles



3. Variation in straw yield



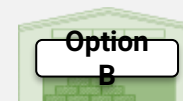
2. Variations in mobilisation rate:



4. Variation in usage of intermediate storage



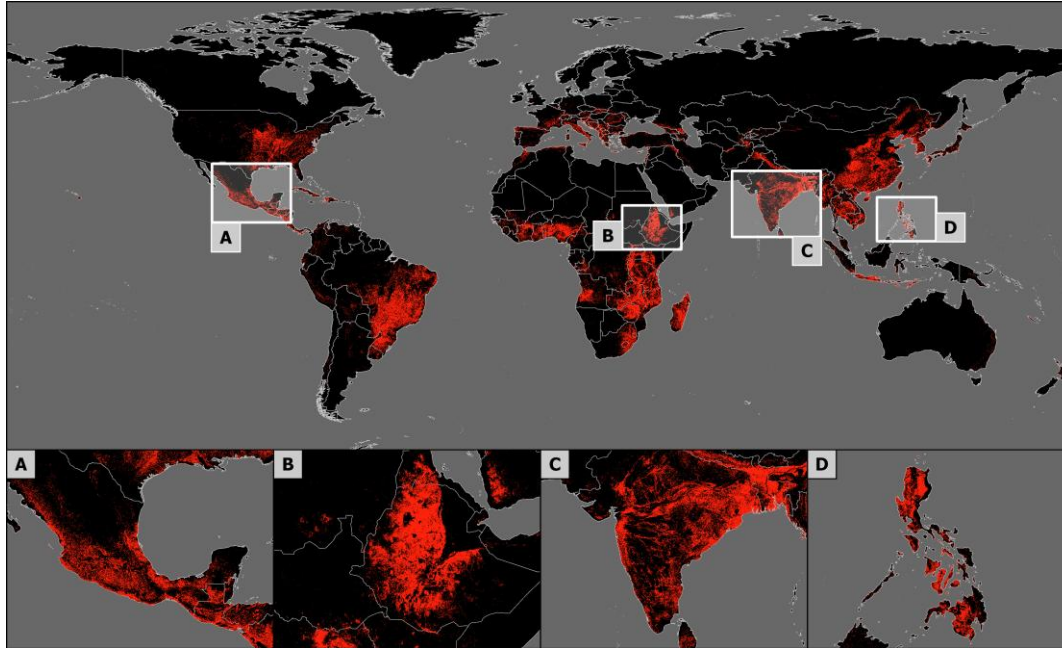
No intermediate storage allowed



Intermediate storage allowed

“Novel biomasses”

High-resolution global data product prototype assessing land degradation



 **Severely degraded lands** (under erosion with poor soil organic matter content or with high salinity, Buffi et al. 2026)

- Regionalised data for biogenic wastes and residues
- Data base for novel biomasses & (novel) technologies (e.g. higher residue usability in case of digestate return to fields for humus balance*, alternative feed use/circularity approaches)
- Cost data and modeling for residues and wastes
- Approaches for comparative market analysis (e.g. feedstock revenue/compensation in GHG quota (transport) vs. Renewable Energy Law (electricity))
- Analysis for efficient cascading concepts within the bioeconomy**
- Ownership/stakeholder/regional use data, e.g. Regional Bioeconomy Atlas***, Biogas plant questionnaire****, CHP plant questionnaire, industry monitoring
- Future research for regionalised value-added and resilience questions (e.g. due to shocks)

* SOMenergy (2020): Maintaining soil organic matter levels in arable farming with straw removal for bioenergy production. <https://www.fnr.de/ftp/pdf/berichte/22402914.pdf>; Witing et al. (2018): Biogas production and changes in soil carbon input - A regional analysis. <https://www.sciencedirect.com/science/article/pii/S0016706117311758>

** Schindler (2026): Holzkaskaden in der ErneuerbareEnergien-Richtlinie: Gestaltung effizienter Ausnahmen für Bioenergie.

https://www.dbfz.de/fileadmin/user_upload/Referenzen/Statements/DBFZ_LUKE_Policy_brief_-_Kaskadenregel_in_der_EU.pdf

*** <https://www.dbfz.de/bioeconomieatlas/start>

**** Daniel-Gromke et al. (2023): Biogasferzeugung und -nutzung in Deutschland. <https://www.dbfz.de/pressemediathek/publikationsreihen-des-dbfz/dbfz-reports/dbfz-report-nr-50>

Smart Bioenergy – Innovations for a sustainable future

Contact:

Prof. Dr. mont. Michael Nelles

Dr. Christoph Krukenkamp

Dr. rer. nat. René Backes

Dr. agr. Peter Kornatz

Prof. Dr.-Ing. Volker Lenz

Dr.-Ing. Franziska Müller-Langer

Prof. Dr. rer. nat. Ingo Hartmann

**DBFZ Deutsches
Biomasseforschungszentrum
gemeinnützige GmbH**

Torgauer Straße 116

D-04347 Leipzig

Phone: +49 (0)341 2434-112

E-Mail: info@dbfz.de

www.dbfz.de/en