



TÜRKISCH-DEUTSCHES
BIOGAS PROJEKT

2. Biogas-Training

Biomass Potential Assessment

Jaqueline Daniel-Gromke, Nadja Rensberg; Deutsches
BiomasseForschungsZentrum (DBFZ)

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Bundesministerium
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giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

This project is part of the International Climate Initiative. The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety supports this initiative on the basis of a decision adopted by the German Bundestag.

Biomass potential

Definitions

Theoretical potential

Technical potential

Economic potential

Realisable potential

Biomass Potential

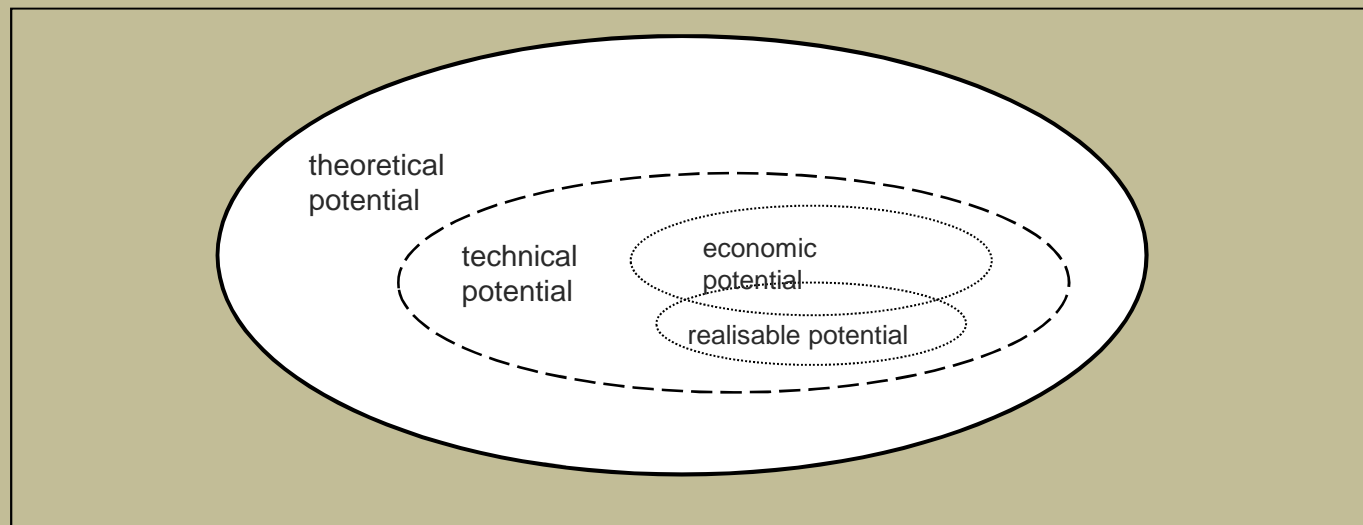
- Definitions -

The **theoretical potential** refers to a theoretical limit of the available energy supply from biomass meaning all phytomass and zoomass in a defined area

The **technical potential** means the part of the present biomass (theoretical potential) that can be used given current technical possibilities as well as structural and ecological restrictions

The **economic potential** refers to the fraction of the technical potential that can be used economically in the context of the economic framework (development of conventional energy systems, prices of energy sources)

The **realisable potential** depicts the expected current use of bioenergy



Biomass potential

Definitions

Different biomass origin:

- Forest biomass
- Agricultural biomass
- Residues
- Land potentials (degraded lands)



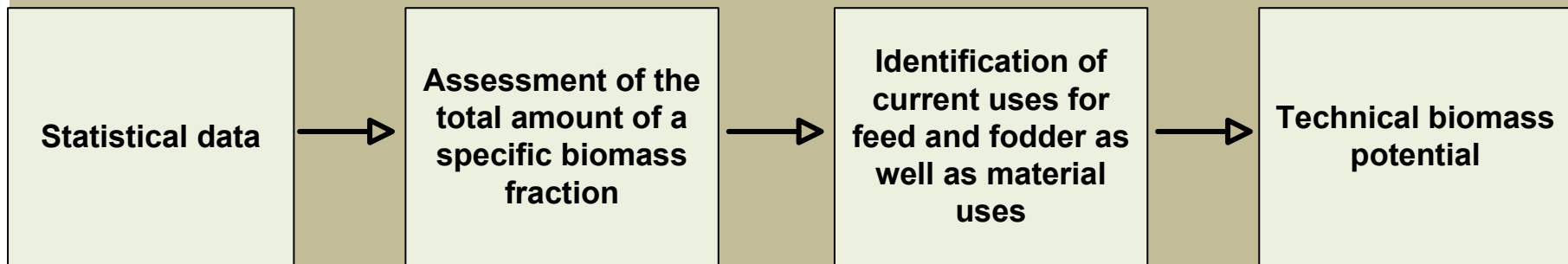
Different methodological approaches:

- Mass Flow Analysis
- Market Models
- Land Use Models
(including Remote Sensing and GIS)

Biomass potential

Mass Flow Analysis

- Analysis of statistical data
- Systematic identification of mass flows in a defined region
- The investigation compares resources and the current or expected demand for specific biomass fractions
- Scenarios can show prospective biomass potentials using different framework conditions



Biomass potential

Market and Land use Models

- Variety of national and international economic, geographic or integrated models (CLUE, AgLU, FASOM, IMAGE, FAPRI, GTAP...)
- Market Models consider interactions between supply and demand, prices and trade and quantify spatial impacts on demand trends
(iLUC, GHG emissions)
- Market Models study impacts of (trade) policies, technical change and global change on agricultural and/or forestry sector
- Individual strengths, but still limited to simulate all the complexities involved in the functioning of landscapes

Biomass potential

Market and Land use Models

Uncertainties:

- Spatial and temporal resolution
- Input parameter (raw material mix; which price leads to intensification of agricultural production; trend of yield increase) more important than model
- Great variation of results

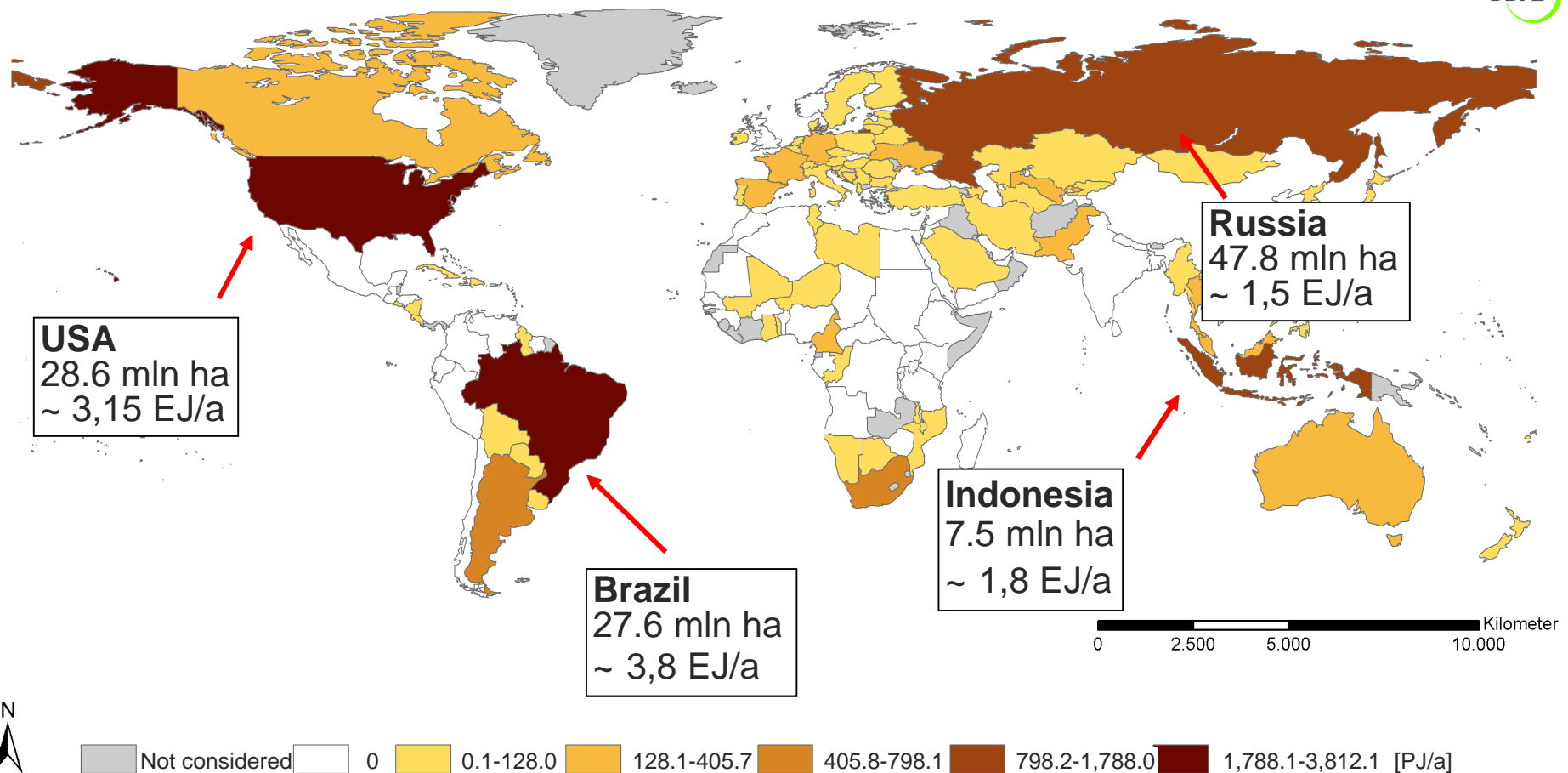
No own calculation of Market Models at DBFZ/UFZ

BUT

Biomass and available land potentials from land use models

Energy Crops

Technical biomass potentials from energy crops - scenario „bioenergy“ in 2020



(“Global and regional spatial distribution of biomass potentials“, a project financed by the German Federal Government, 2008-2009
Publication in Preparation)



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Residues, waste Drivers

POPULATION



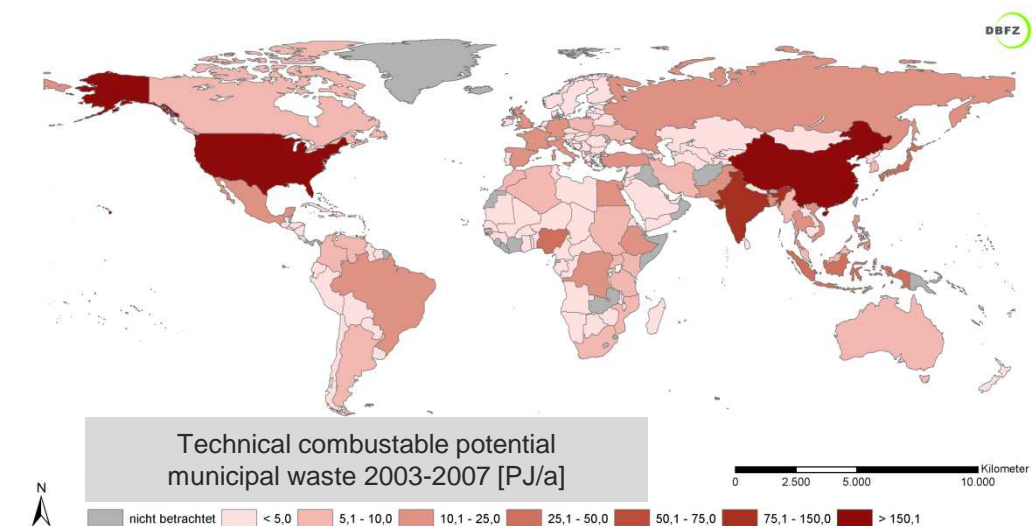
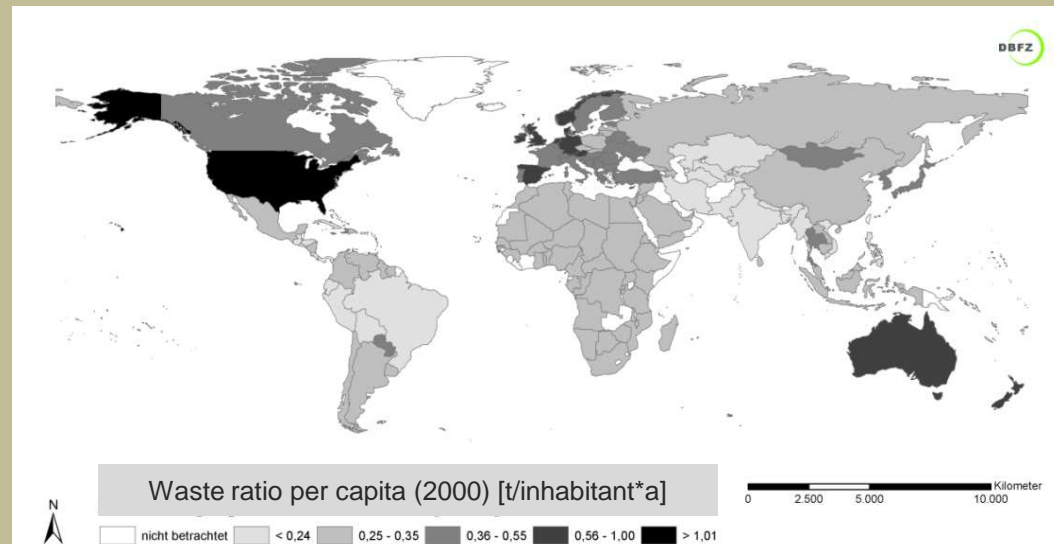
Municipal waste

Animal residues

Straw

Landscape related residues

Forest residues



Biomass Potential

Uncertainties

- Local conditions are not included in the analysis

→ these can be important especially regarding the amounts of residues resulting from production processes

→ Locally differing manufacturing processes

e. g. collection systems for wastes

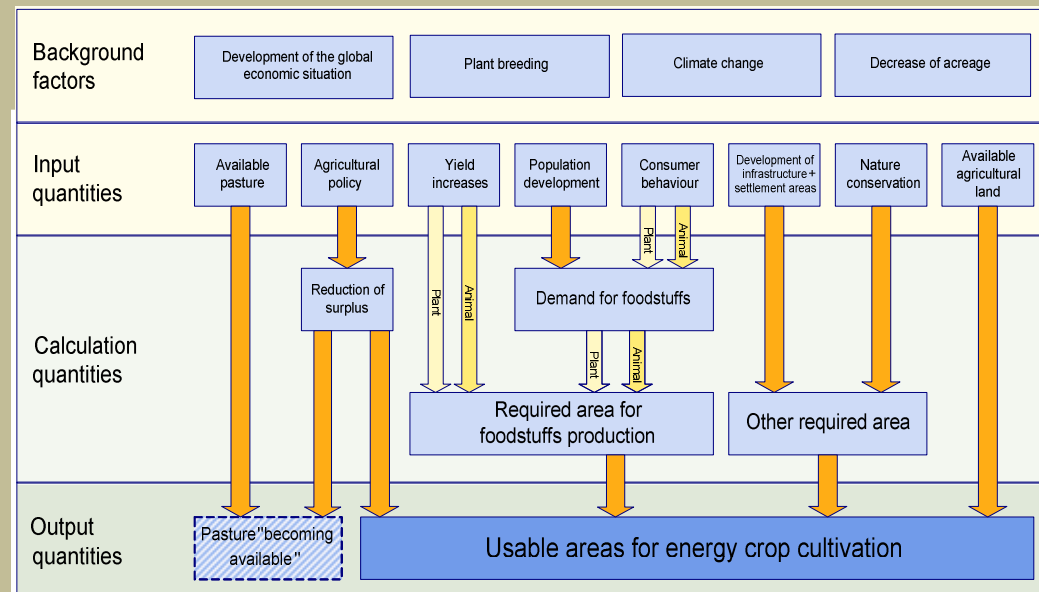
handling of wood for industrial uses (decortication in the forest or in the sawmill)

→ data quality and lack of data

→ Interactions between bioenergy and nature/environment

☞ Risk and opportunity

e. g. biodiversity,
riparian zones,
degraded lands...



Results

Conclusions

- Available potential assessments differ in several aspects like the evaluation period, the framework conditions and the bioenergy sources
- Unclear political developments and insufficient data availability (developing countries)
- Main factors influencing food and feedstock demand: global population growth, future per-capita consumption, development of the specific yields for food, fodder and biomass production, climate change
- Lack of consistent definitions for specific biomass fractions such as logging residues
- Scenario approach can be regarded as the most appropriate means in order to handle the existing uncertainties
- Assessment of future biomass potentials depends mainly on global political agreements concerning food security and sustainability, as well as consumer behaviour in rich countries

Biomass Mobilisation

Key Actions

- Energy saving
- Increase energy efficiency
- Manage the high demand for wood
 - plantation wood from extensive systems, increase research regarding SRC
 - forest management
- Improvement of political, technical and economic framework
- Development of technologies for non-food crops (straw, perennial grasses)
- Improvement of cultivation systems and techniques (food & non-food)
- International, sustainable agreement on securing of resources (food & bioenergy)

Conclusion

AB1

- **Available potential assessments**
 - Differ in methods, time horizons, the frame-work conditions
 - Differ in the bioenergy sources
 - Come up with different figures
- **Biomass potential depends on future food and feedstock demand**
 - Driven by population growth, per-capita consumption, development of yields for food, fodder and biomass production, climate change
- **Input data problem**
 - Unclear political developments
 - Insufficient data availability (developing countries)
 - Lack of consistent definitions for specific biomass fractions (such as logging residues)
 - Interpretation of degraded lands

Slide 13

AB1

Hier eine der zwei Versionen für die Conclusion wählen

André Brosowski, 09/05/2011

Conclusion

- **Scenario approach**
 - Can be regarded as the most appropriate means in order to handle the existing uncertainties
- **Sustainability of future biomass potentials depends mainly on**
 - Global political agreements concerning food security and sustainability
 - Consumer behaviour in developed countries
- **Additional impact assessment on regional level** is a precondition for the mobilisation of the potential (i.e. biodiversity, water management, social aspects) > options for synergies!

Thank you for your attention!



Turkish-German Biogas Project

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH
And Sokak No: 8/11
06680 Cankaya/Ankara, TURKEY



T +90 312 466 7056
T +49 6196 79830 007
E biogas-tr@giz.de
I www.giz.de
I www.biyogaz.web.tr

Author:

Jaqueline Daniel-Gromke, Nadja Rensberg
Deutsches BiomasseForschungsZentrum (DBFZ)