



IFEU work related to land use change and bioenergy

Dr rer nat Guido Reinhardt

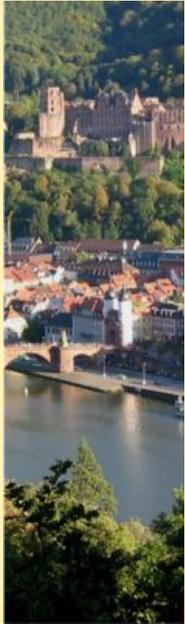
Workshop

“Land Use Change and Bioenergy”

May 12 – 14, 2009, Vonore, Tennessee, USA

IFEU - Institute for Energy and Environmental Research Heidelberg, since 1978

- **Independent scientific research institute**
- **organised as a private non profit company with currently about 40 employees**
- **Research / consulting on environmental aspects of**
 - **Energy (including Renewable Energy)**
 - **Transport**
 - **Waste Management**
 - **Life Cycle Analyses**
 - **Environmental Impact Assessment**
 - **Renewable Resources**
 - **Environmental Education**



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- **Our clients (on biofuel studies)**

- World Bank
- UNEP, FAO, UNFCCC, UNIDO, GTZ etc.
- European Commission
- National and regional Ministries
- Associations (national and international)
- Local authorities
- WWF, Greenpeace etc.
- Companies (Daimler, Shell, German Telekom, etc.)
- Foundations (German Foundation on Environment, British Foundation on Transport etc.)



→ **dLUC for biofuel GHG balances was considered as early as 1991**

Endbericht

Energie- und CO₂-Bilanz von Rapsöl und Rapsölester im Vergleich zu Dieselkraftstoff

ifeu - Institut für Energie- und Umweltforschung Heidelberg
Fachbereich "Verkehr und Umwelt"

Dezember 1991



ifeu –
Institut für Energie-
und Umweltforschung
Heidelberg GmbH

**Agricultural reference systems in environmental Assessments:
A basic analysis**

→ **iLUC for LCA of biofuels is considered since 2000**

Heidelberg, 2000

IFEU's activities on iLUC



- **Member of German GBEP delegation: leading a number of task groups**
- **Member of CEN TC 383 WG 6 „Indirect Effects“: leading task group „GHG related effects“**
- **Running project: Synopsis of actual models and methods about iLUC**
- **National consultant for both, the Ministry of Environment and Federal Agency of Environment, several projects**
- **Co-organiser of GBEP iLUC workshop New York May 15, 2009**

1: CEN: Initial document (extract)



→ Positive criteria safeguarding the exclusion of iLUC effects

Criterion 1: Leakage effects are excluded because biomass production on area...

Criterion 2: Leakage effects are excluded because biomass is from waste...

Criterion 3: Leakage effects are excluded because production measures ...

Criterion 4: Leakage effects are excluded because of other evidences like ...

→ Negative criteria considering the incidence of iLUC effects

Criterion 5: Bioenergy competes with 3 F on a domestic level ...

Criterion 6: Bioenergy competes with 3 F on an international level ...

Criterion 7: Biomass production in geographical regions with dynamic LUC ...

2: The iLUC Factor Approach (3)



Indicative values for iLUC factor (2005)

- **“low”**, assuming 25 % of biofuels subject to theoretical full iLUC factor = 5 t of CO₂/ha/year
- **“medium”**, i.e. 50 % of feedstock subject to theoretical full iLUC factor = 10 t of CO₂/ha/year, and
- **“maximum”**, representing 75 % share of feedstock = 15 t of CO₂/ha/year

Further Work on iLUC factor

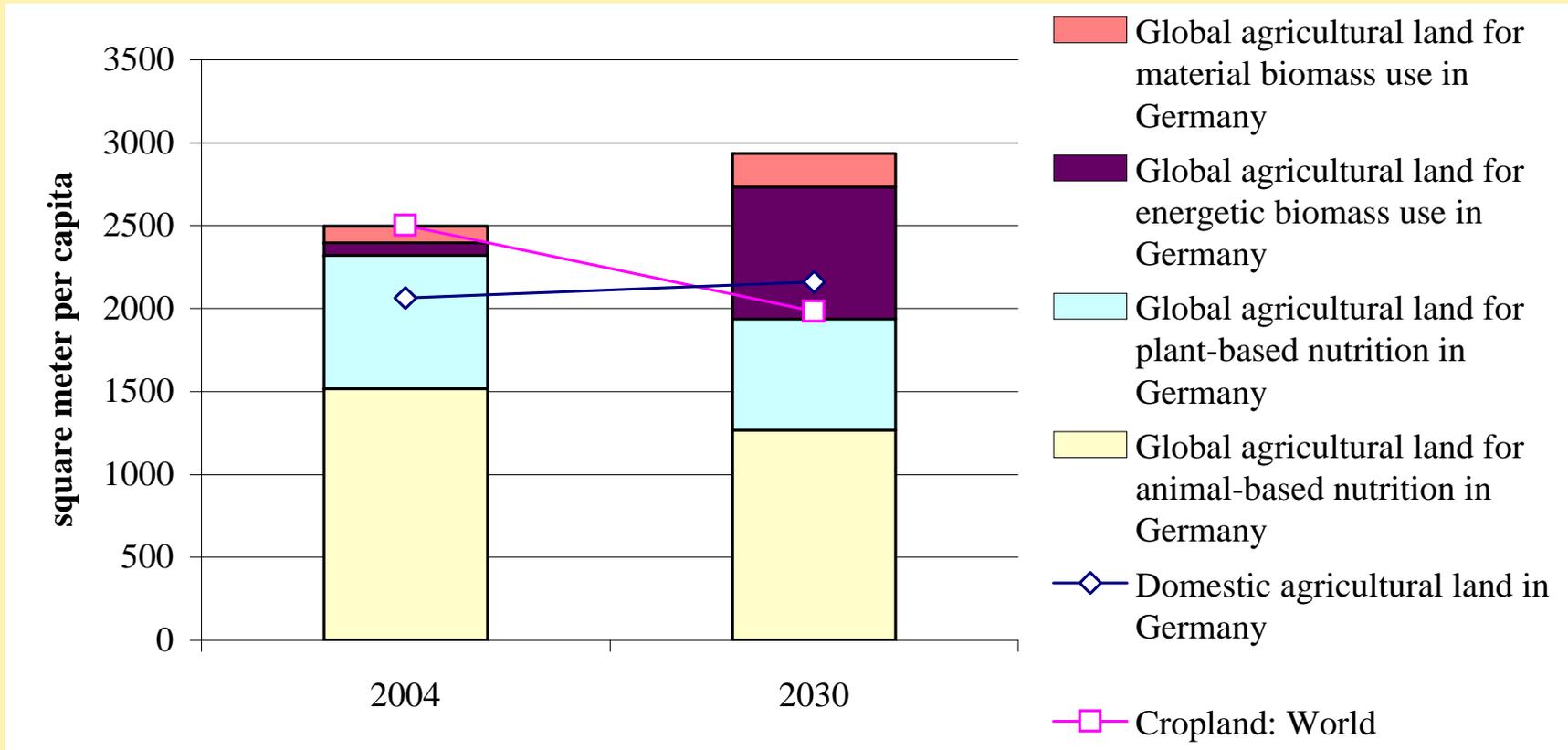


- Derive **2010 estimate** for iLUC factor (late 2009)
- Better understanding of dLUC characteristics of displacement: e.g., Gibbs (2009) mapping of past LUC (1980-2000) → revise iLUC factor?
- “**Risk mapping**“: identify potential countries/areas under thread of iLUC using CGE model results (GTAP etc.) + suitability maps + infrastructure + biodiversity/carbon maps, OECD/JRC/EEA workshop Jan. 09 Paris + own work CN,ZA,IN,BR
- More research **beyond EU** (with UNEP, GBEP): include developing countries views

3. Global land use of Germany



Example: ... for biomass consumption



Policy targeted BAU: biofuel demand will contribute to expansion of global crop land

3. Biofuels for German supply



→ Land use change will induce GHG emissions

In 2030		Gross production land for Biodiesel		Net consumption land for all agricultural goods (additional to basis of 2004)	
		BAU I	BAU II	BAU I	BAU II
Land requirements in Mha		7.21	6.88	2.49	3.44
of which: Palm oil Indonesia		0.56	1.09	0.19	0.55
of which: Soya beans Brazil		6.65	5.79	2.29	2.89
GHG Emissions absolute from LUC in Mt CO ₂ -Equivalents	a	37	54	13	27
GHG Mitigation through Biodiesel	b	-14	-17	-14	-17
Net-Effect GHG for Biodiesel	a plus b	23	37	-1	10
Year when GHG saving begin		2039	2050		
GHG Mitigation through Biomass	c	-25	-35	-25	-35
Net-Effect GHG for Biomass	a plus c	12	19	-12	-8

Source: Bringezu et al. 2008

→ In particular biodiesel imports will lead to increased GHG emissions due to land use change - even in case of successful certification

Source: Bringezu et al. 2008c

Thank you for your attention!



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