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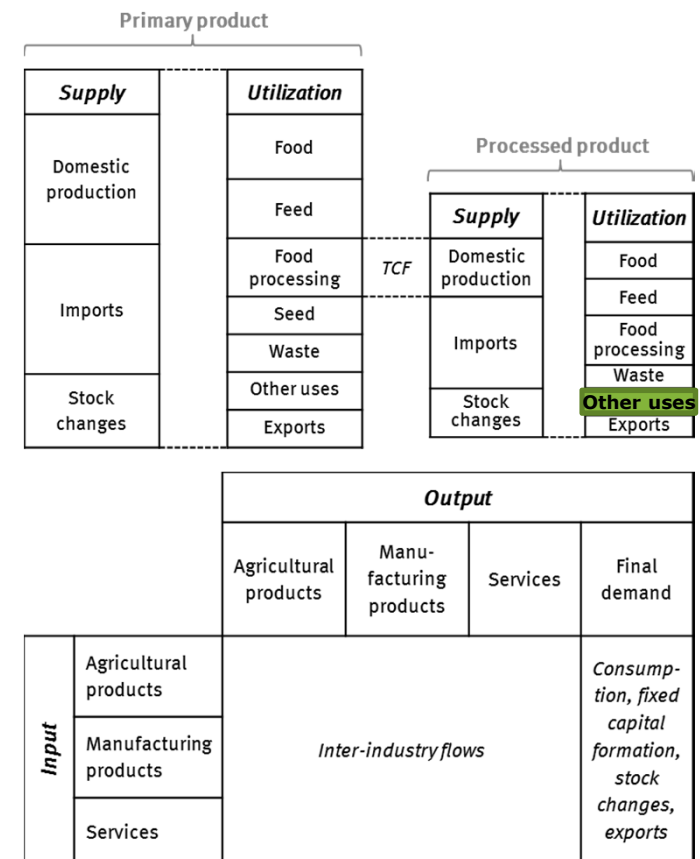
# **Global biomass flows driven by the bioeconomy and their land footprint and biodiversity impacts**

Martin Bruckner, ICABR Conference, 18.06.2015

Günther Fischer (IIASA), Mark Huijbregts (RU), Henrique Pereira (idiv), Karlheinz Erb (SEC)

# Hybrid Biomass Accounting Model LANDFLOW + EXIOBASE

- **LANDFLOW**  
*Global biomass flow accounting model*
  - Based on FAO Commodity Balances
  
- **EXIOBASE 3**  
*Multi-regional input-output (MRIO) model*
  - Processing 'other uses' only



# Land and biodiversity footprint

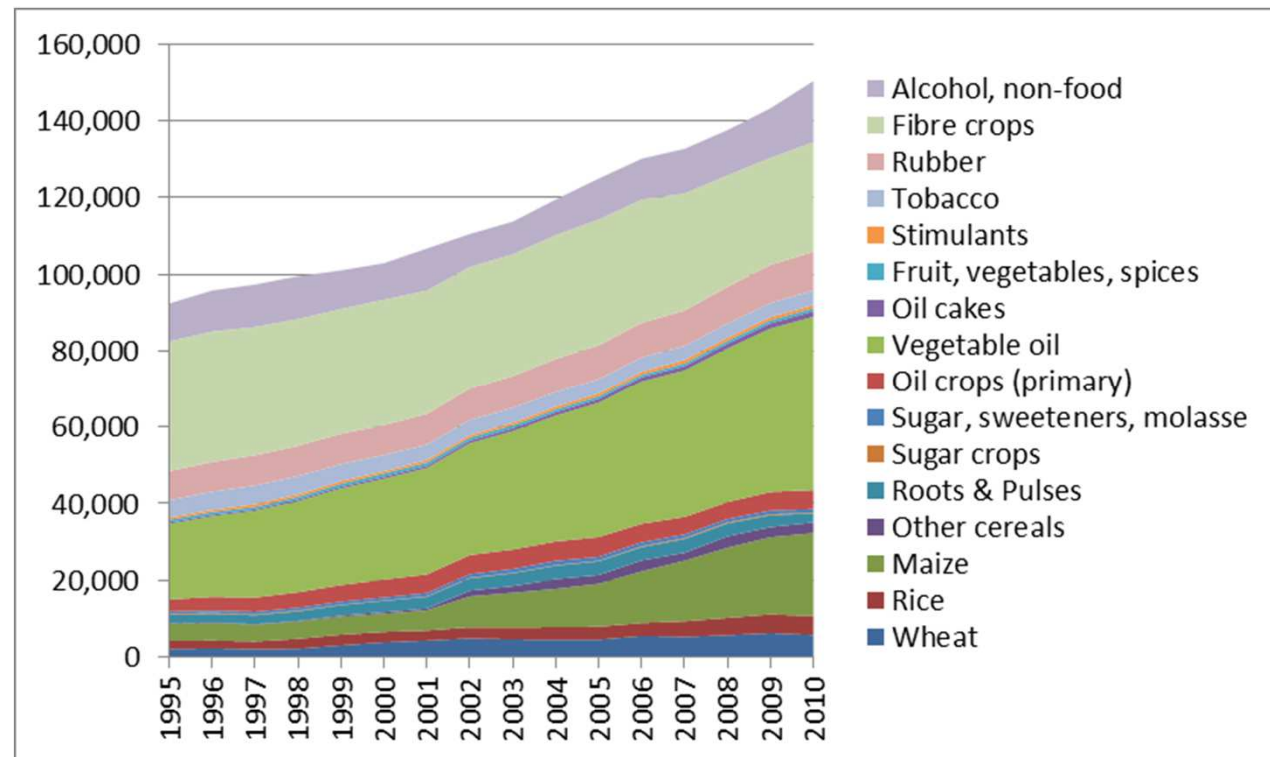
- **Land footprint:**  
direct model output based on national yields from FAOSTAT
- **Biodiversity footprint:**  
Aggregate **extinction risk potential** (ERP) for 148 carnivorous mammals calculated for 16 land use sectors and 46 regions.  
The ERP assessment is based on **Population Viability Analysis**, which assesses the extinction risk of a species based on a limited number of wildlife demographic parameters, such as diet group and body size.

# Results – Land use

Global land use for the production of crop-based non-food biomass, per crop

in 1000 ha

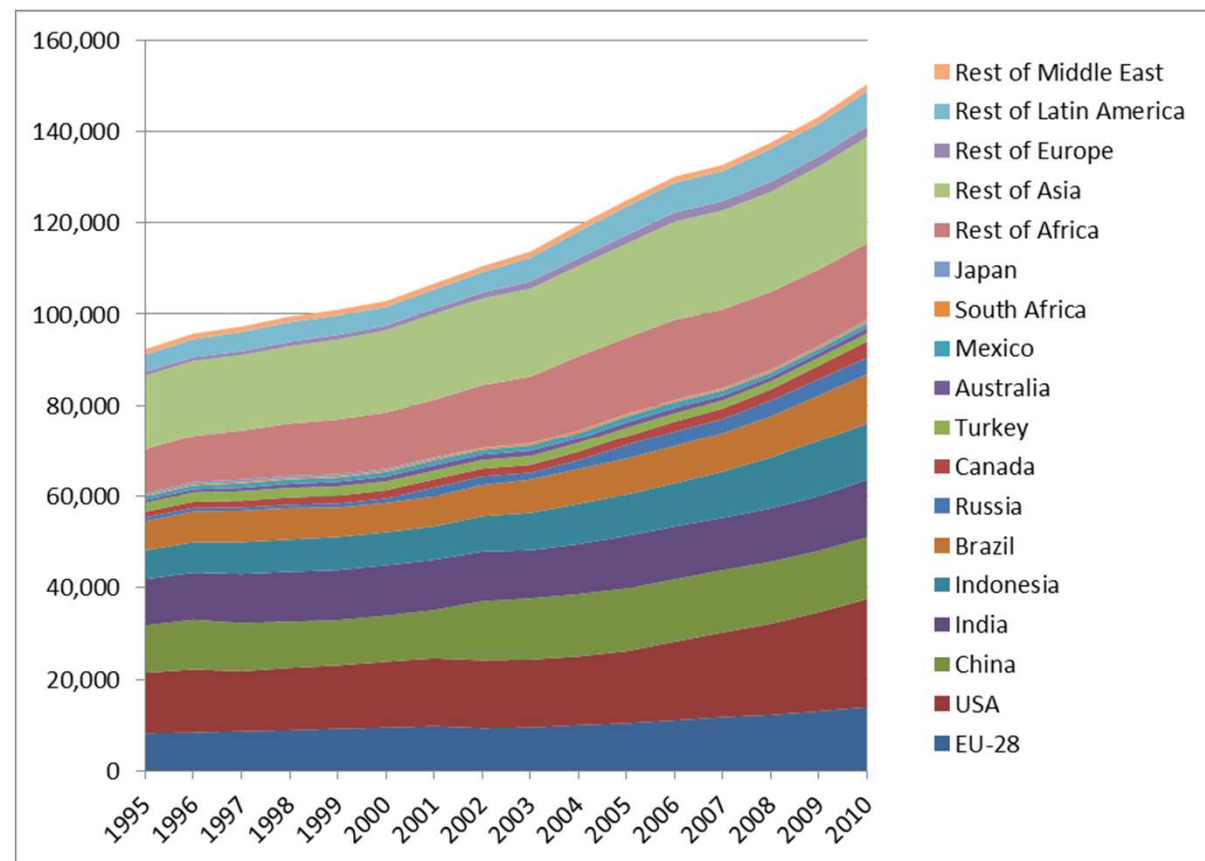
Note: In 2010 the required land amounts to 10% of globally available cropland.



# Results – Land use

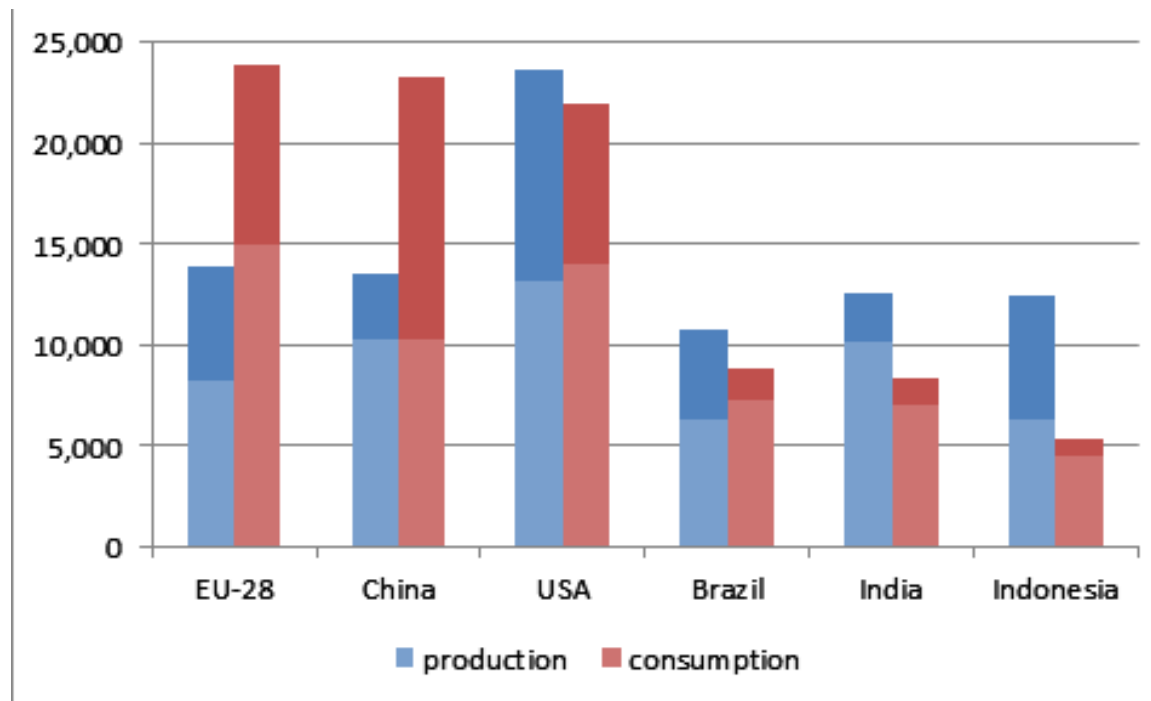
Global land use for  
the production of  
crop-based non-  
food biomass, per  
region

in 1000 ha



# Results – Land use

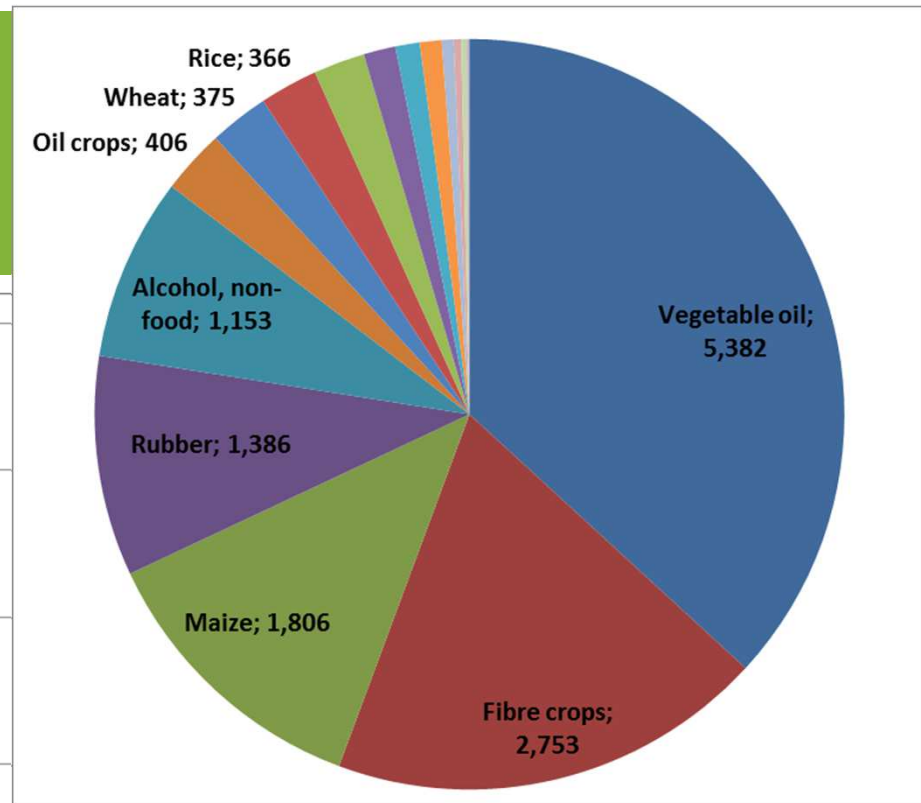
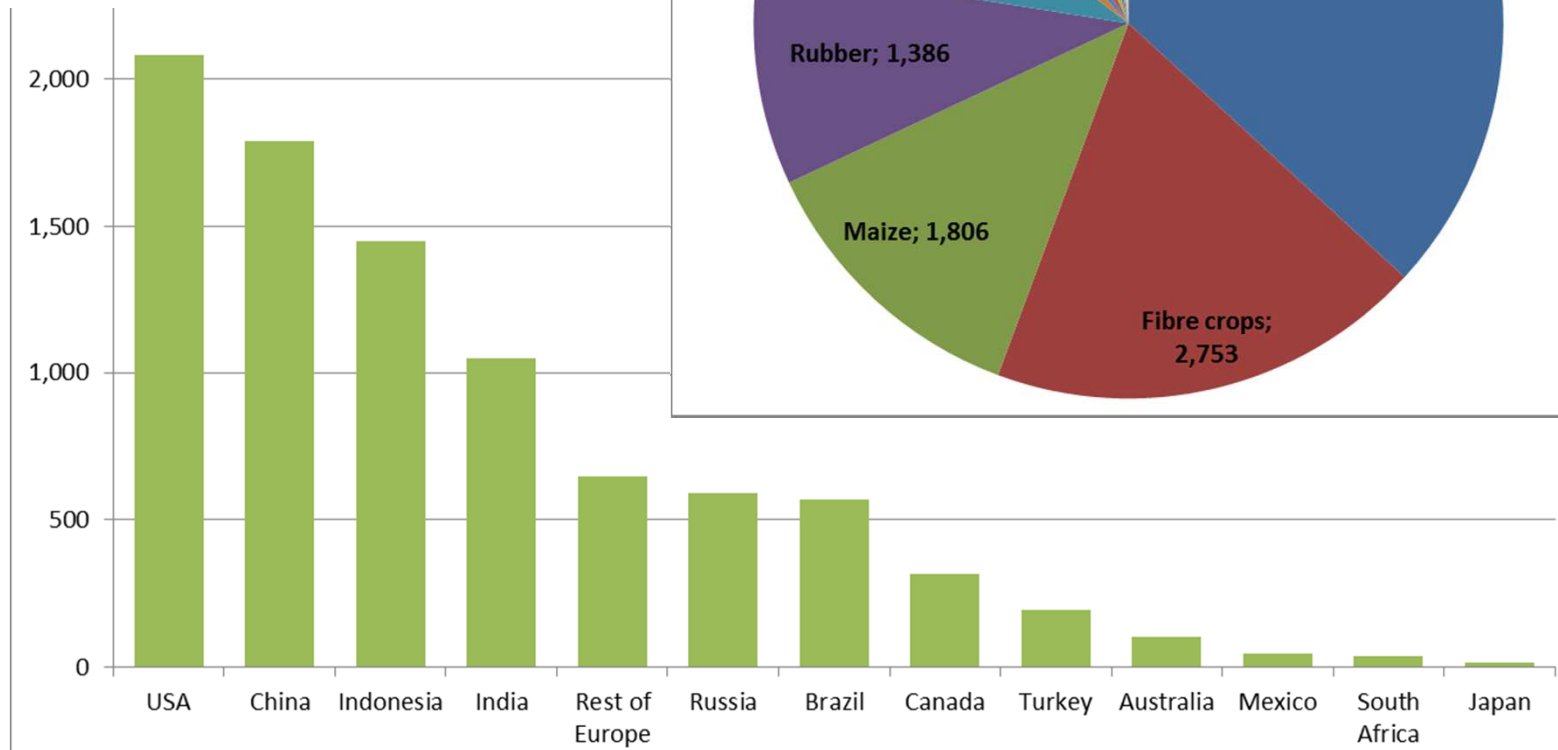
From production to consumption, in 1000 ha in 1995 and 2010 (lighter/darker bars)



Note: 20% of the EU's cropland necessary to satisfy consumption!

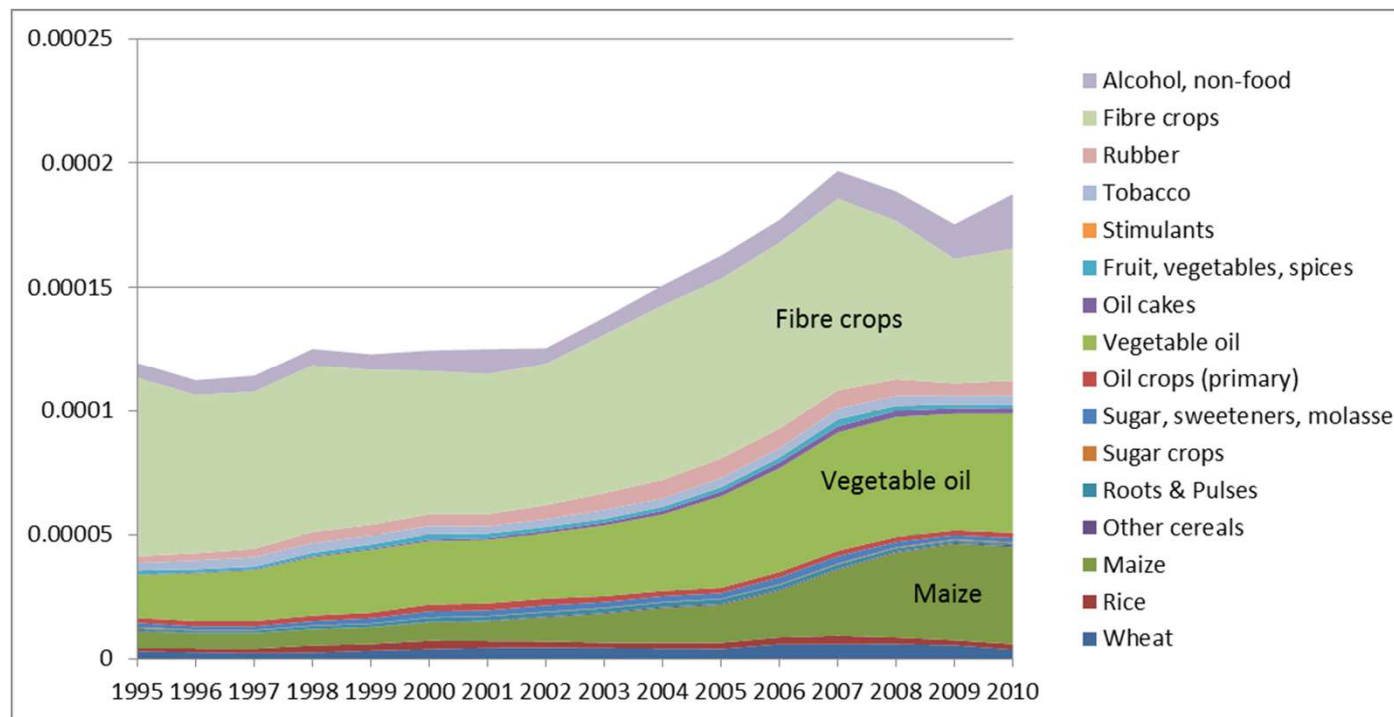
# Results – Land use

EU imports in 2010, in 1000 ha



# Results – Biodiversity

Extinction risk potential (ERP) due to **EU consumption** of crop-based non-food biomass, in %

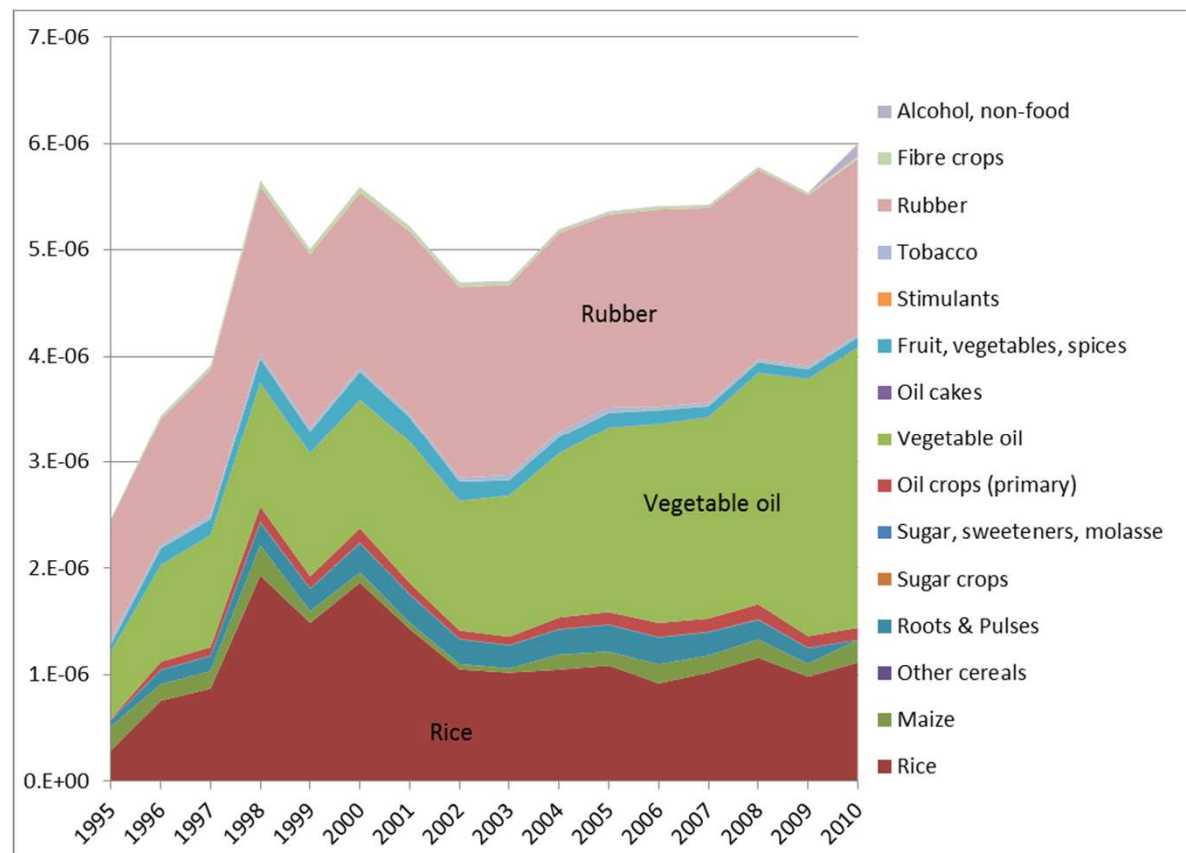


This equals 10% of the total ERP caused by global production of crop-based non-food biomass.



# Results – Biodiversity

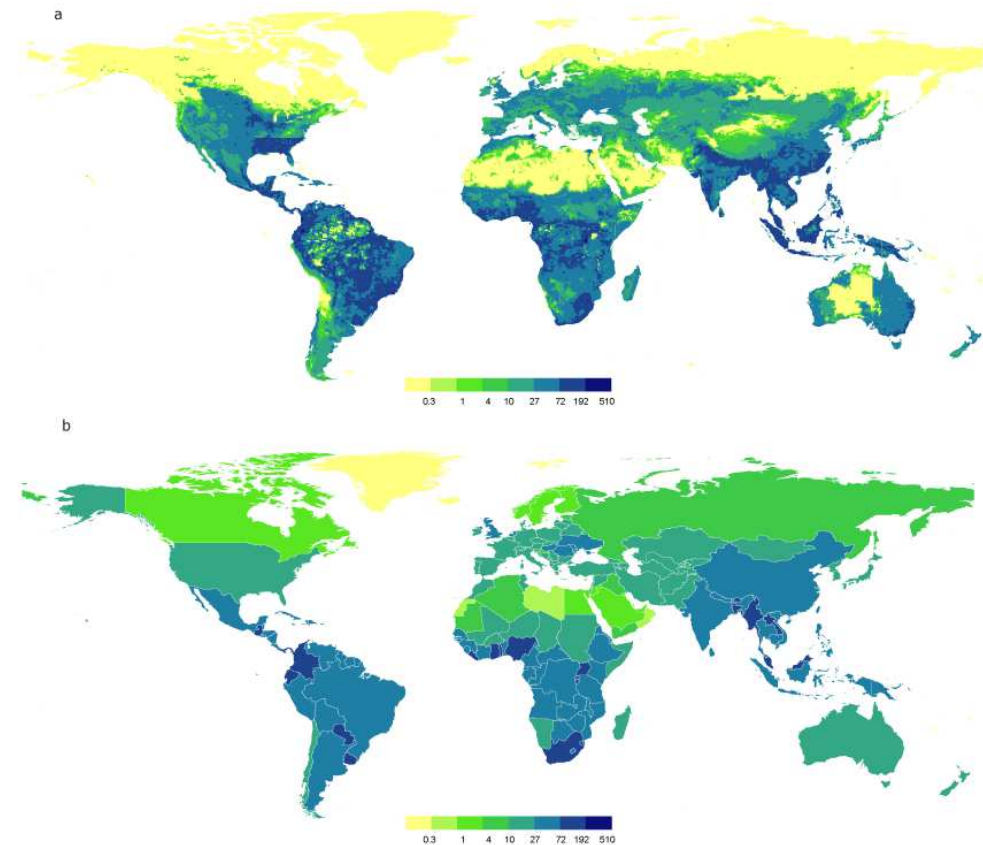
ERP in **Indonesia** due to **EU consumption** of crop-based non-food biomass in 2010





# Next steps

- **Commodities:**  
Include animal and forestry products into the analysis
- **Regions:**  
Higher regional detail for RoAfrica & RoAsia
- **Indicators:**
  - Loss of bird species related with the production of non-food biomass
  - Deforestation footprint
- **Scenario analysis:**  
Potential impacts of future bioeconomy scenarios



# Questions welcome!

**Martin Bruckner**

Vienna University of Economics and Business  
Institute for Ecological Economics  
[martin.bruckner@wu.ac.at](mailto:martin.bruckner@wu.ac.at)



# Multi-regional input-output table

		Country 1			Country 2			Final demand ( $y$ )		Total output ( $X$ )
		Agriculture ( $z_{11}$ )	Industry ( $z_{12}$ )	Services ( $z_{13}$ )	Agriculture ( $z_{21}$ )	Industry ( $z_{22}$ )	Services ( $z_{23}$ )	C1	C2	
Country 1	Agriculture ( $z_{1j}$ )									$\Sigma$
	Industry ( $z_{2j}$ )									$\Sigma$
	Services ( $z_{3j}$ )									$\Sigma$
Country 2	Agriculture ( $z_{1j}$ )									$\Sigma$
	Industry ( $z_{2j}$ )									$\Sigma$
	Services ( $z_{3j}$ )									$\Sigma$



Domestic economy



International trade