WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

The global cropland footprint of the non-food bioeconomy

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1. Background & Aim
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1. Background & Aim

Background

- Share of global agricultural areas devoted to the production of biomass for non-food purposes is rapidly growing
- Far-reaching global implications of an expanding non-food bioeconomy

Aim

- Determine the cropland footprint of non-food products produced, traded and consumed globally

1. Background: Three perspectives on the bioeconomy

1. Land use Crops → **2. Ind. Processing** Intermediate products → **3. Consumption** Final products

2. Methods: Hybrid Biomass Accounting Model

LANDFLOW (IIASA)
Global biomass flow accounting model

EXIOBASE 3
Multi-regional input-output (MRIO) model

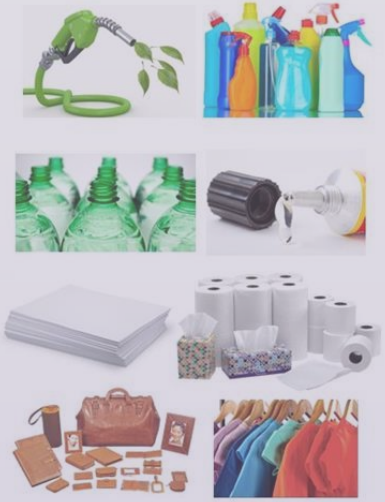
1. Land use
Crops

→

2. Ind. Processing
Intermediate products

→

3. Consumption
Final products

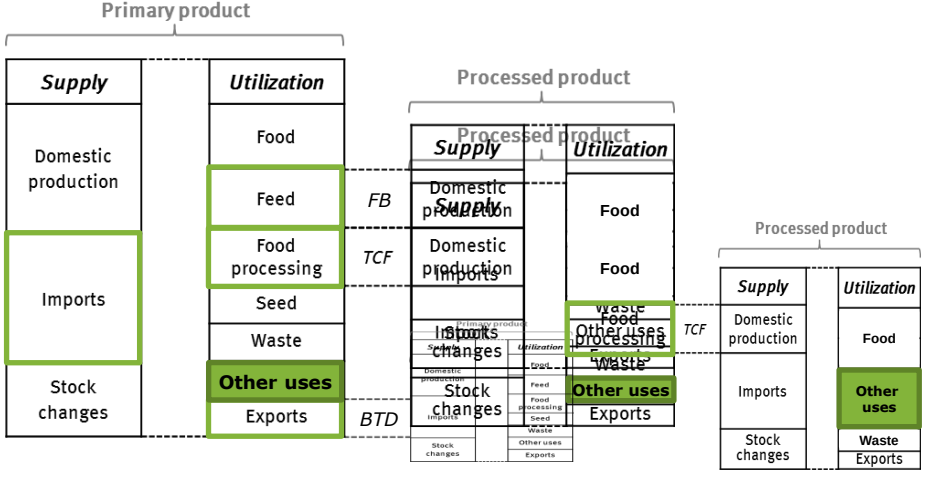


2. Methods: Hybrid Biomass Accounting Model

- **LANDFLOW**

  Global tree structure for all agri. commodity flows (based on FAO CBS)

  a. Trade linking (via FAO bilateral trade data)
  b. Feed allocation (based on feed balances)
  c. By-product allocation (in relation to their economic value)



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22 regions		27 com-modities	Other use (in ha)
From	To		
Brazil	EU-28	Ethanol	###
Brazil	China	Soybeans	###
US	Canada	Maize	###
…	…	…	…

2. Methods: Hybrid Biomass Accounting Model

- **EXIOBASE 3**
  Multi-regional input-output (MRIO) model

		Country 1			Country 2			Final demand (y)		Total output (X)
		Agriculture (z_{i1})	Industry (z_{i2})	Services (z_{i3})	Agriculture (z_{i1})	Industry (z_{i2})	Services (z_{i3})	C1	C2	
Country 1	Agriculture (z_{1j})									Σ
	Industry (z_{2j})									Σ
	Services (z_{3j})									Σ
Country 2	Agriculture (z_{1j})									Σ
	Industry (z_{2j})									Σ
	Services (z_{3j})									Σ
	Land use (e_j)									

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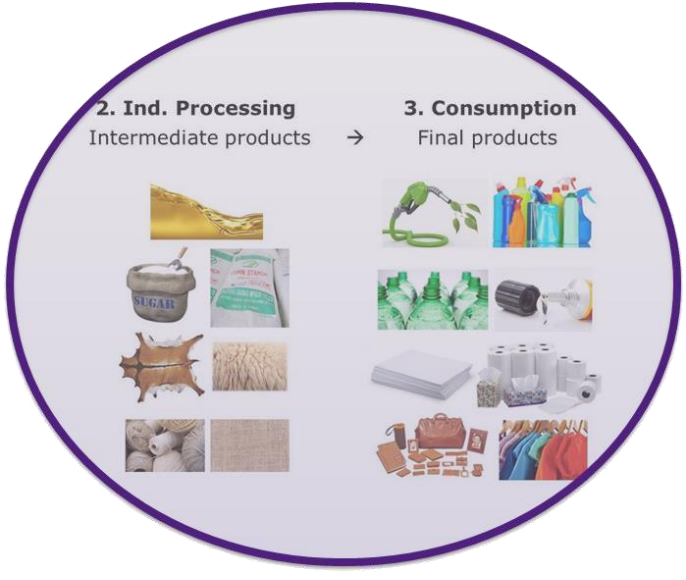

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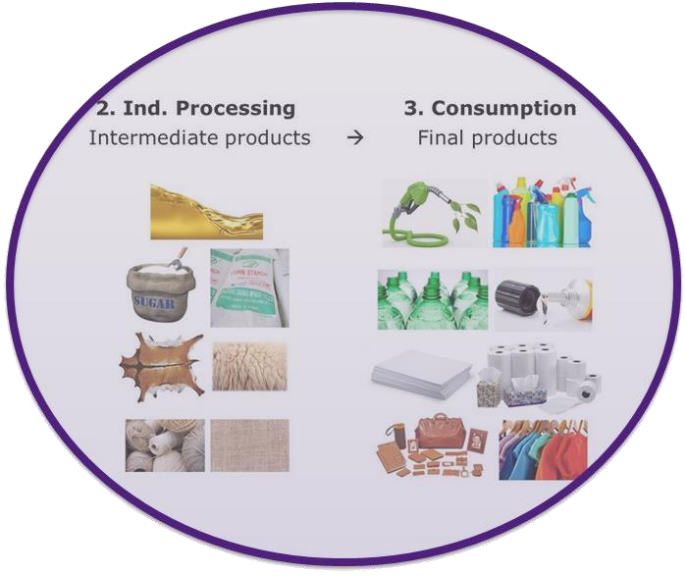
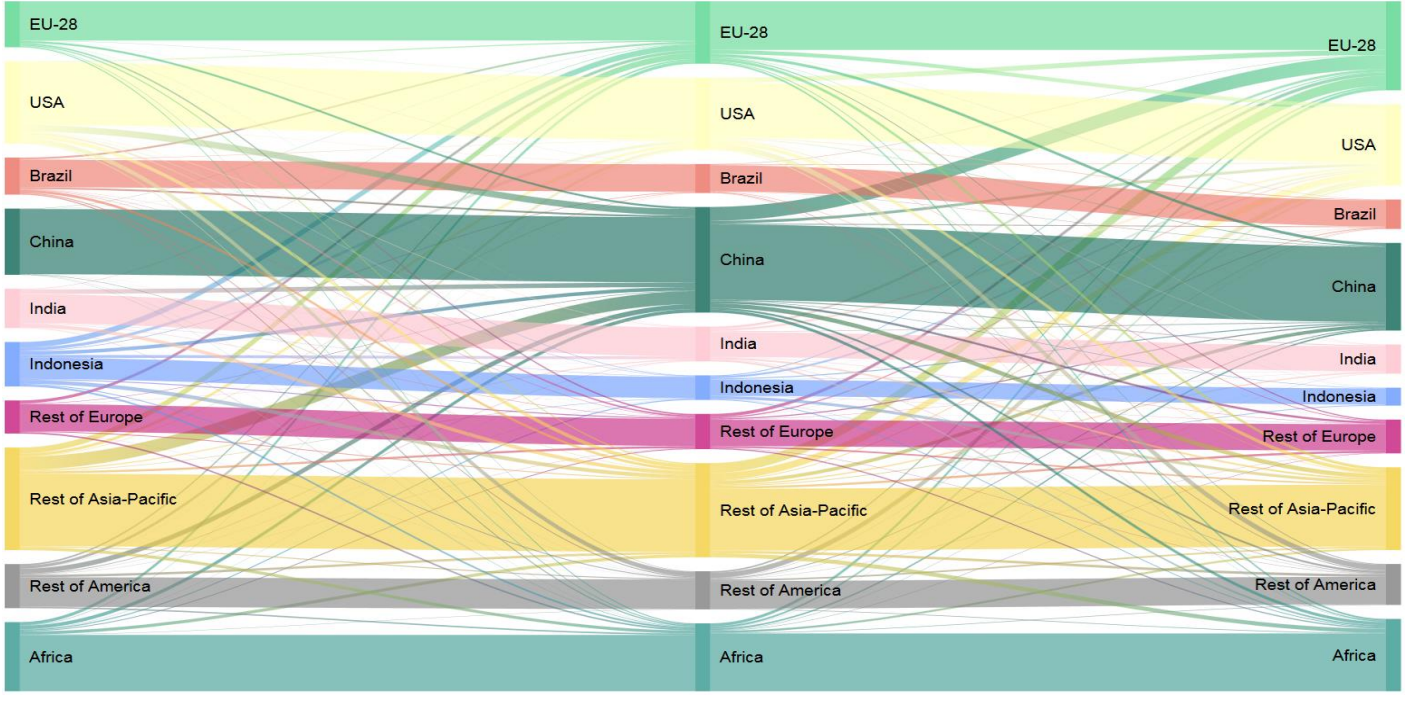
22 regions		27 commo-dities	Other use (in ha)				
From	To		Sector 1	Sector 2	Sector 3	Sector 4	…
Brazil	EU-28	Ethanol	###	###	###	###	…
Brazil	China	Soybeans	###	###	###	###	…
US	Canada	Maize	###	###	###	###	…
…	…	…	…	…	…	…	…



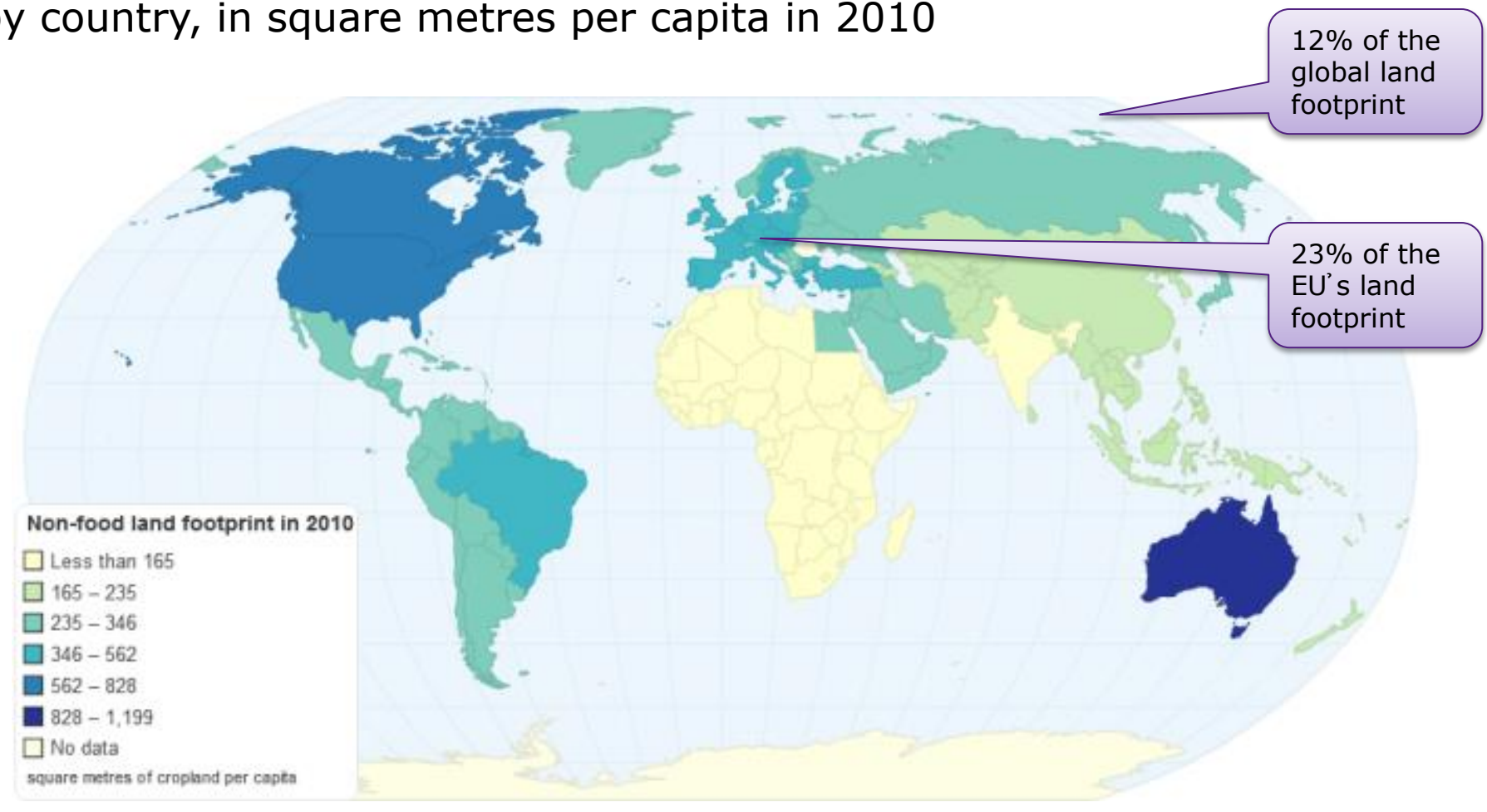
3. Results: Global non-food cropland flows, 2010

1. Land use → **2. Ind. Processing** → **3. Consumption**



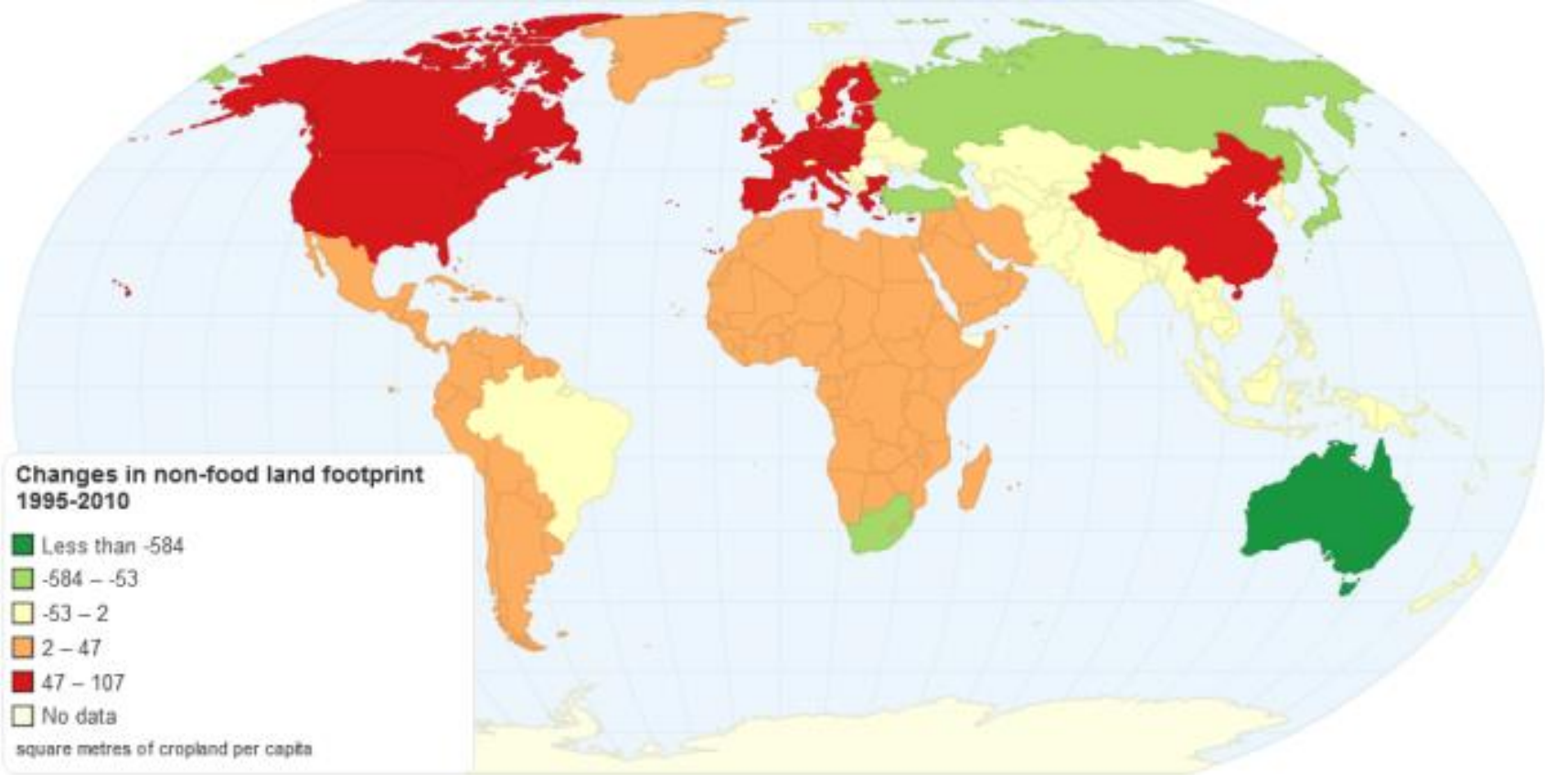
3. Results: Global non-food cropland footprints

by country, in square metres per capita in 2010

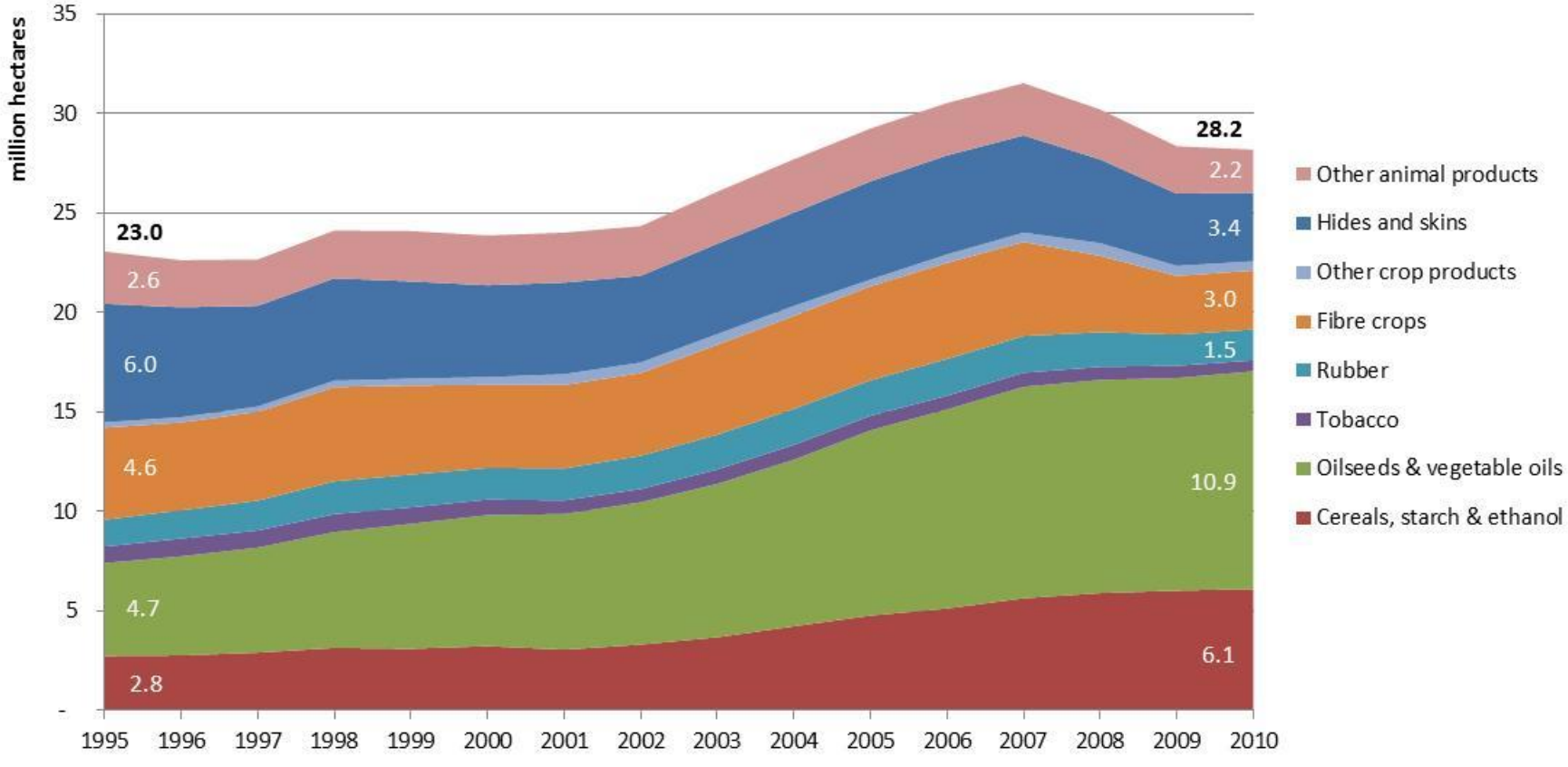


3. Results: Changes in the non-food cropland footprint

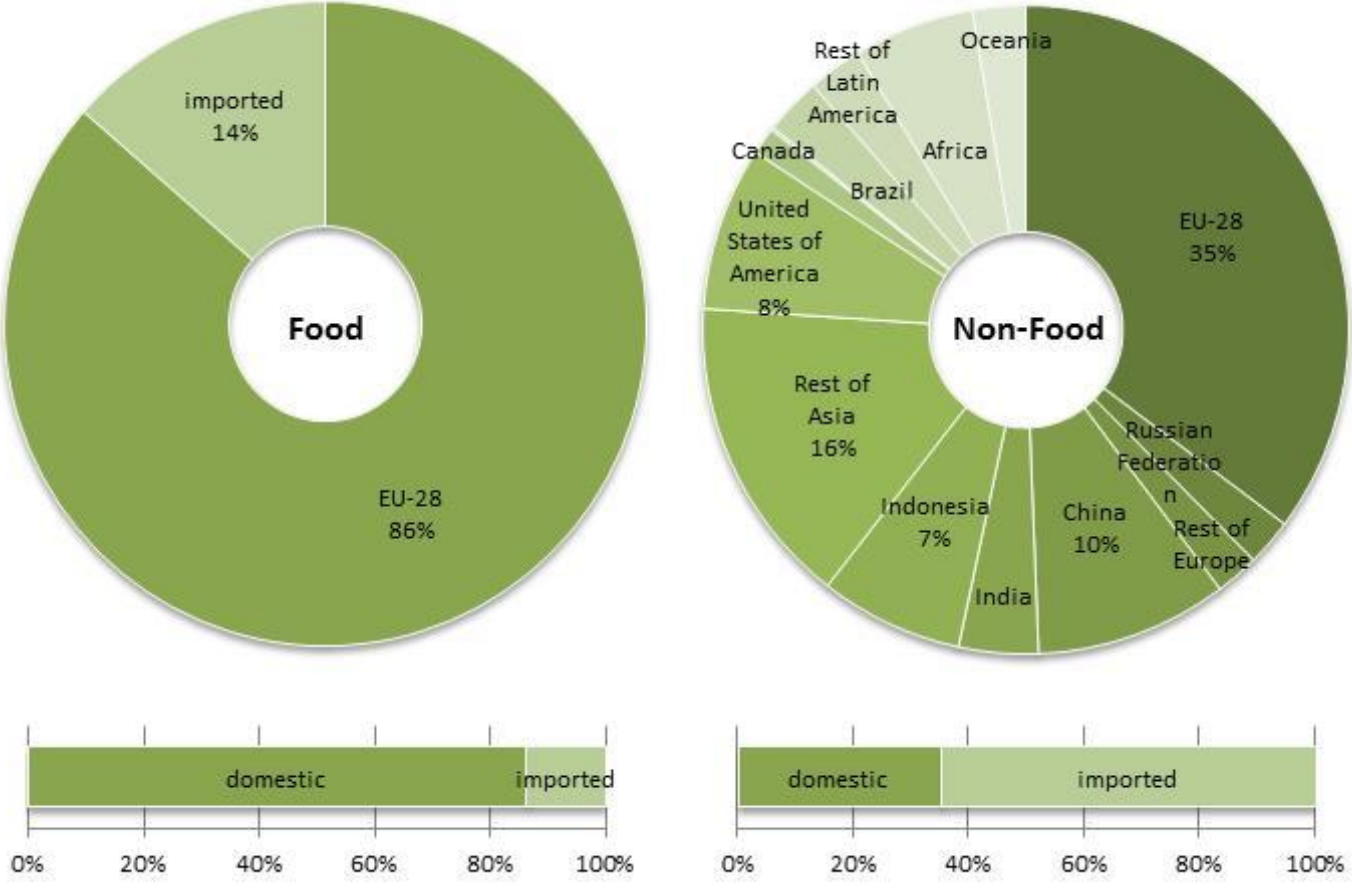
Changes 1995-2010, in square metres per capita



3. Results: EU non-food cropland footprint, by commodity



3. Results: Origin of food vs. non-food cropland, EU, 2010



4. Outlook

- **FABIO:** Physical Biomass Input-Output Tables for 1986-2014
- **FINEPRINT:** Spatially explicit land flow tracking
- **BioWay:** Mapping of the global bioeconomy
- **bioMASS:** Sustainable bioeconomy expansion pathways in a Consequential MRIO-LCA framework