

# Biomass Markets & Trade

**André Faaij**

Copernicus Institute, Faculty of Science, Utrecht University

Task Leader IEA Bioenergy Task 40

**IEA Roadmap Workshop**

***“Sustainable feedstock supply for bioenergy and biofuels”***

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# Needs for market, policy and science...

- Sustainable biomass **resources** and supplies the **foundation** for the biobased economy.
- Biomass & Biofuel Markets HAVE **globalized**
- International trade has proven to be an **important enabling factor** for both suppliers and users.
- Strong **policy** efforts: strategies, certification.
- Major **market activity**: supplies from DC's, new generation fuels, power generation activity and biomaterials.
- Many impacts (food supplies, land use, social) and interactions (development, markets) poorly understood.

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**core objective IEA Task 40:** *“to support the development of a sustainable, international, bioenergy market, recognising the diversity in resources, biomass applications”*

### ***Key working fields***

- Securing sustainable biomass supplies
- Sustainability & certification
- Trade, market and demand dynamics
- Transport, logistics and trade
- Outreach and dissemination

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# Current Member Countries IEA

## Task 40

- Netherlands (T.L.)
  - Austria
  - Belgium
  - Brazil
  - Canada\*
  - Denmark
  - Finland
  - Germany
  - Italy
  - Japan
  - Norway
  - Sweden
  - UK
  - US
- Explored:**
- Australia
  - S. Korea
  - South Africa

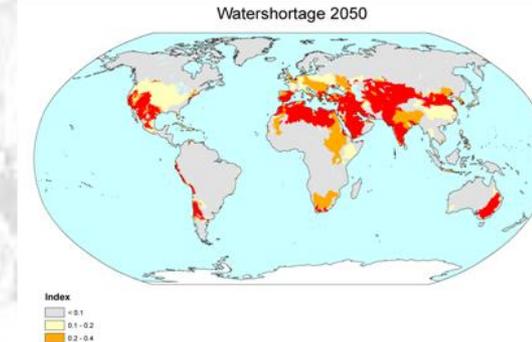
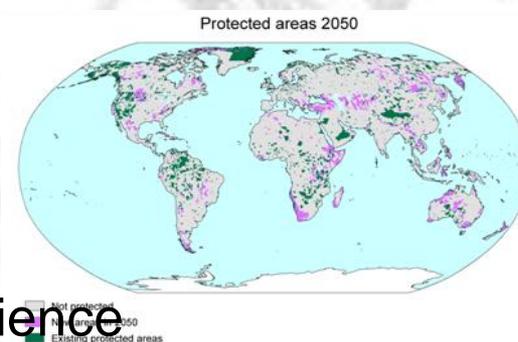
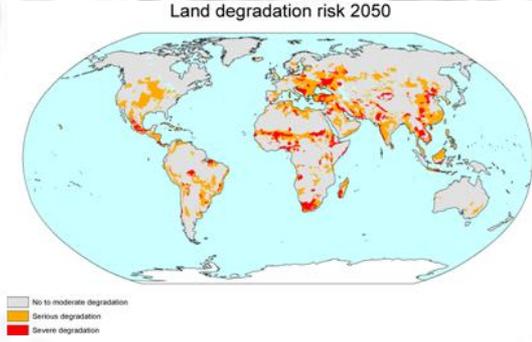
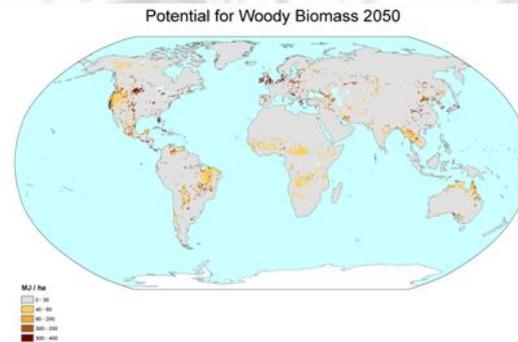
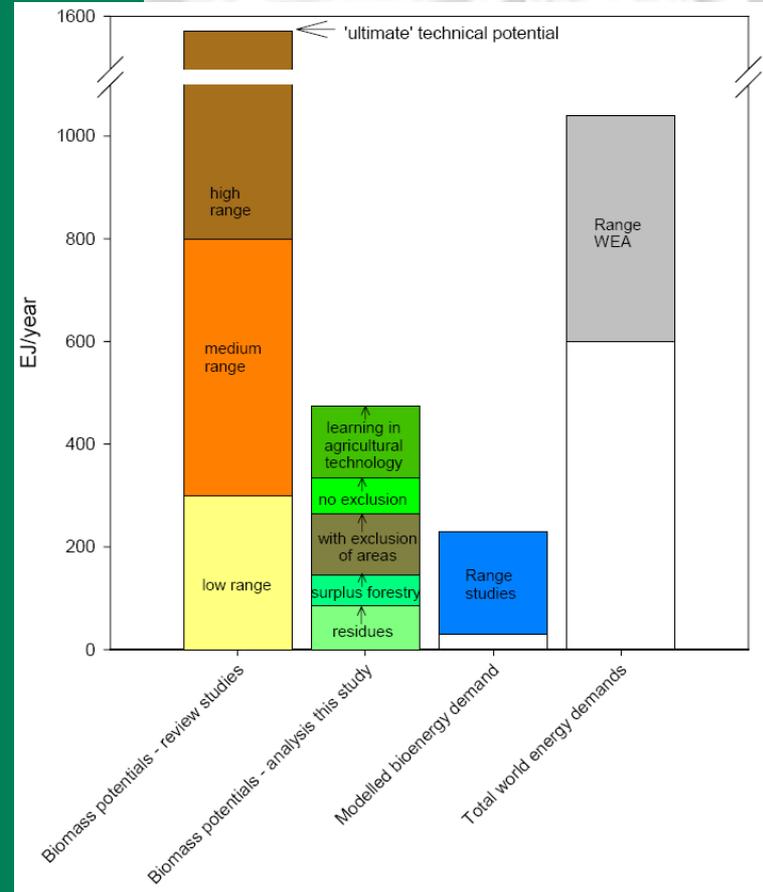
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\* Representation this period to be confirmed

**Good involvement of market parties!**

**Global potentials are large...; but need to be developed.**

**Biomass potentially 1/3 of global energy supplies halfway this century....**



# Negative vision, ahead of IPCC-SRREN...

## Low biomass scenario

Largely follows A2 SRES scenario conditions, assuming limited policies, slow technological progress in both the energy sector and agriculture, profound differences in development remain between OECD and DC's.

High fossil fuel prices expected due to high demand and limited innovation, which pushes demand for biofuels for energy security perspective

Increased biomass demand directly affects food markets

Increased biomass demand partly covered by residues and wastes, partly by annual crops.

Total contribution of bioenergy about 100 EJ before 2050.

Additional crop demand leads to significant iLUC effects and impacts on biodiversity.

Overall increased food prices linked to high oil prices.

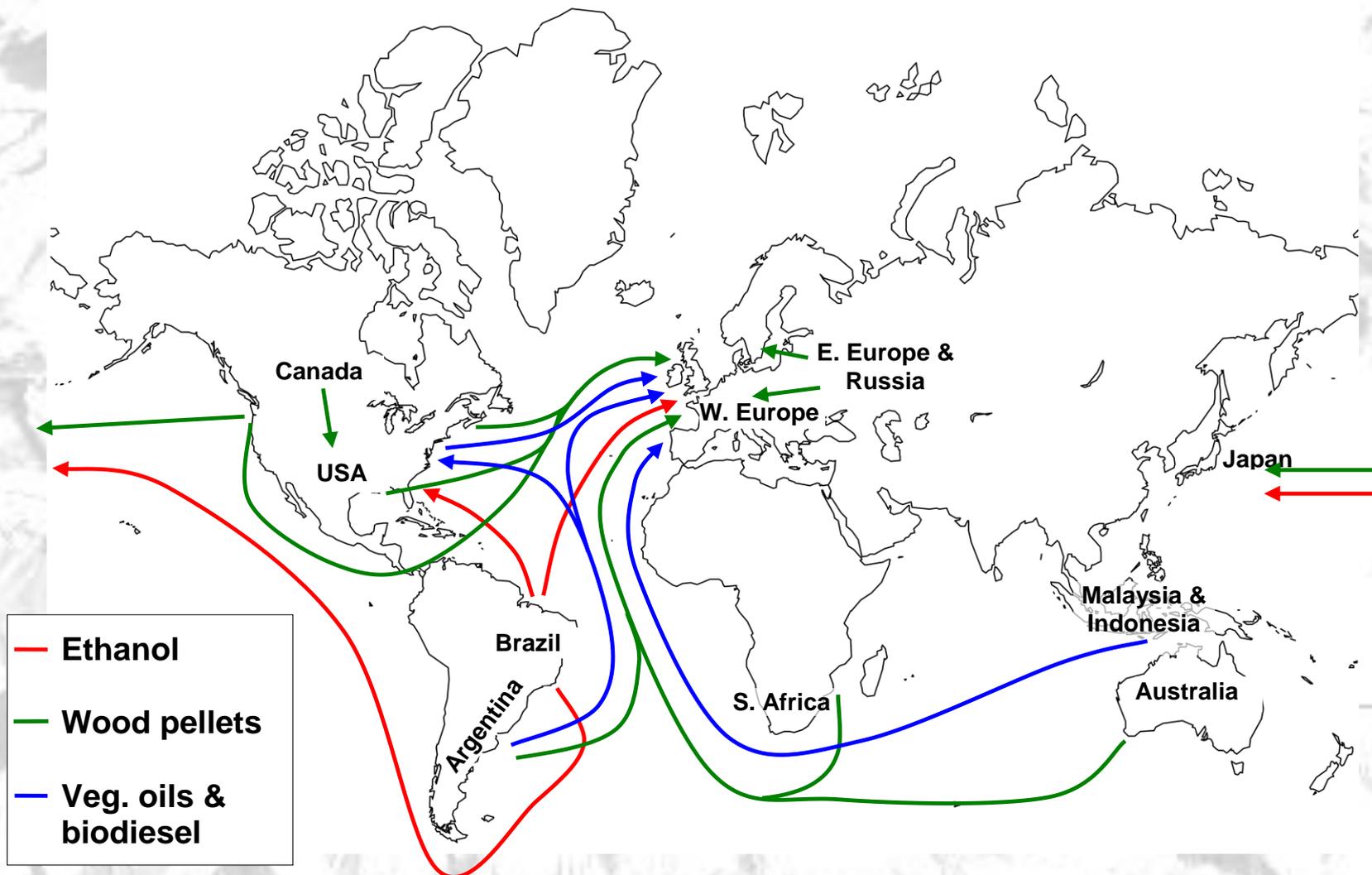
Limited net GHG benefits.

Socio-economic benefits sub-optimal.

# Positive vision (ahead of IPCC-SRREN...)

Storyline	Key preconditions	Key impacts
High biomass scenario		
Largely follows A1/B1 SRES scenario conditions,	<p>Assumes:</p> <ul style="list-style-type: none"> <li>well working sustainability frameworks and strong policies</li> <li>well developed bioenergy markets</li> <li>progressive technology development (biorefineries, new generation bio fuels,</li> <li>successful deployment of degraded lands.</li> </ul>	<p>Energy price (notably oil) development is moderated due to strong increase supply of biomass and bio fuels.</p> <p>Some 300 EJ of bioenergy delivered before 2050; 35% residues and wastes, 25% from marginal/degraded lands (500 Mha), 40% from arable and pasture lands 300 Mha).</p> <p>Conflicts between food and fuel largely avoided due to strong land-use planning and aligning of bioenergy production capacity with efficiency increases in agriculture and livestock management.</p> <p>Positive impacts with respect to soil quality and soil carbon, negative biodiversity impacts minimised due to diverse and mixed cropping systems.</p>

# Current main Shipping Lanes for biomass and biofuels for energy



# Global production and trade of the major biomass commodities (2008)

	Bioethanol	Biodiesel	Wood pellets
<b>Mton in 2008</b>			
<b>Global production</b>	<b>52.9</b>	<b>10.6</b>	<b>11.5</b>
<b>Global net trade</b>	<b>3.72 (*)</b>	<b>2.92</b>	<b>Approx. 4</b>
<b>Main exporters</b>	<b>Brazil</b>	<b>US, Argentina, Indonesia Malaysia</b>	<b>Canada,USA, Baltic countries, Finland, Russia</b>
<b>Main importers</b>	<b>USA, Japan, EU</b>	<b>EU</b>	<b>Belgium, Netherlands, Sweden, Italy</b>

(\*) An estimated 75% of the traded bioethanol is used as transport fuel.

# Key trends bio-ethanol (status 2008)

- two leading *ethanol* producers: United States (26.8 million tonnes) and Brazil (21.3 million tonnes): 91% of the world production.
- US largest consumer: 28.4 million tonnes; 4.6% imported.
- Brazilian consumption amounted to approximately 16.5 million tonnes.
- EU consumption 2.6 million tonnes, the largest users being France, Germany, Sweden and The Netherlands.
- Data related to fuel bioethanol trade imprecise due to various potential end-uses of ethanol (i.e. fuel, industrial use, and beverage use) and also because of the lack of proper codes for biofuels.

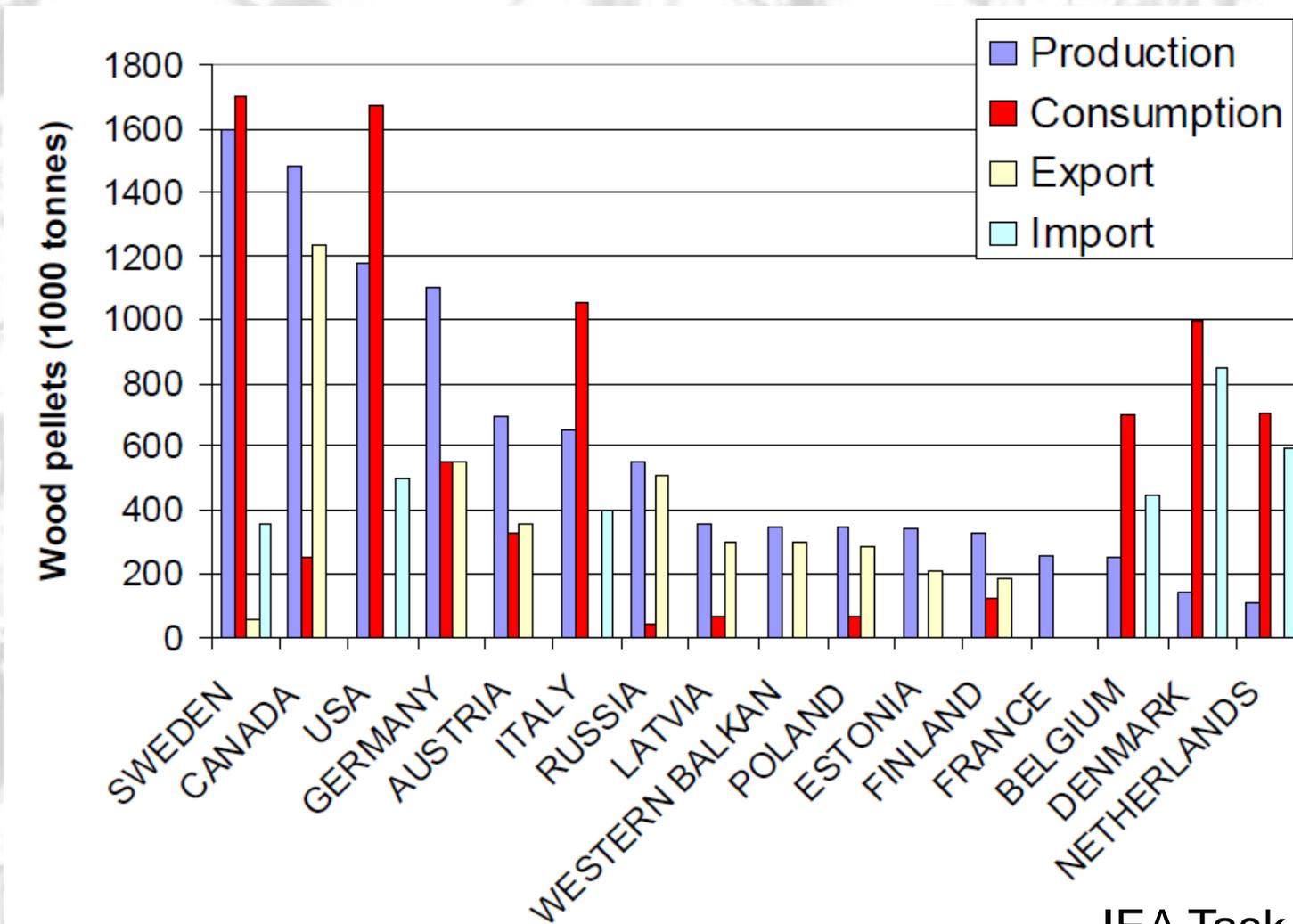
# Key trends biodiesel (2008)

- World *biodiesel* production increased six-fold from 1.8 million tonnes in 2004 to 10.6 million tonnes in 2008.
- EU produces about two-thirds of this (7.8 Mton); Germany, France, Italy and Spain top producers.
- However, EU production declined 7% in 2009 because of strong competition from abroad.
- EU Biodiesel consumption 9.2 Mton (Germany 2.9 Mton)
- Other main biodiesel producers include the United States, Argentina and Brazil.
- International *biodiesel trade* has been increasing strongly since 2005.
  - US gross exports increased from negligible levels in 2005 to about 1.4 million tonnes in 2008
  - Argentine exports to EU increased from 70 000 tonnes in 2008 to ~ 1 million metric tonnes in 2009

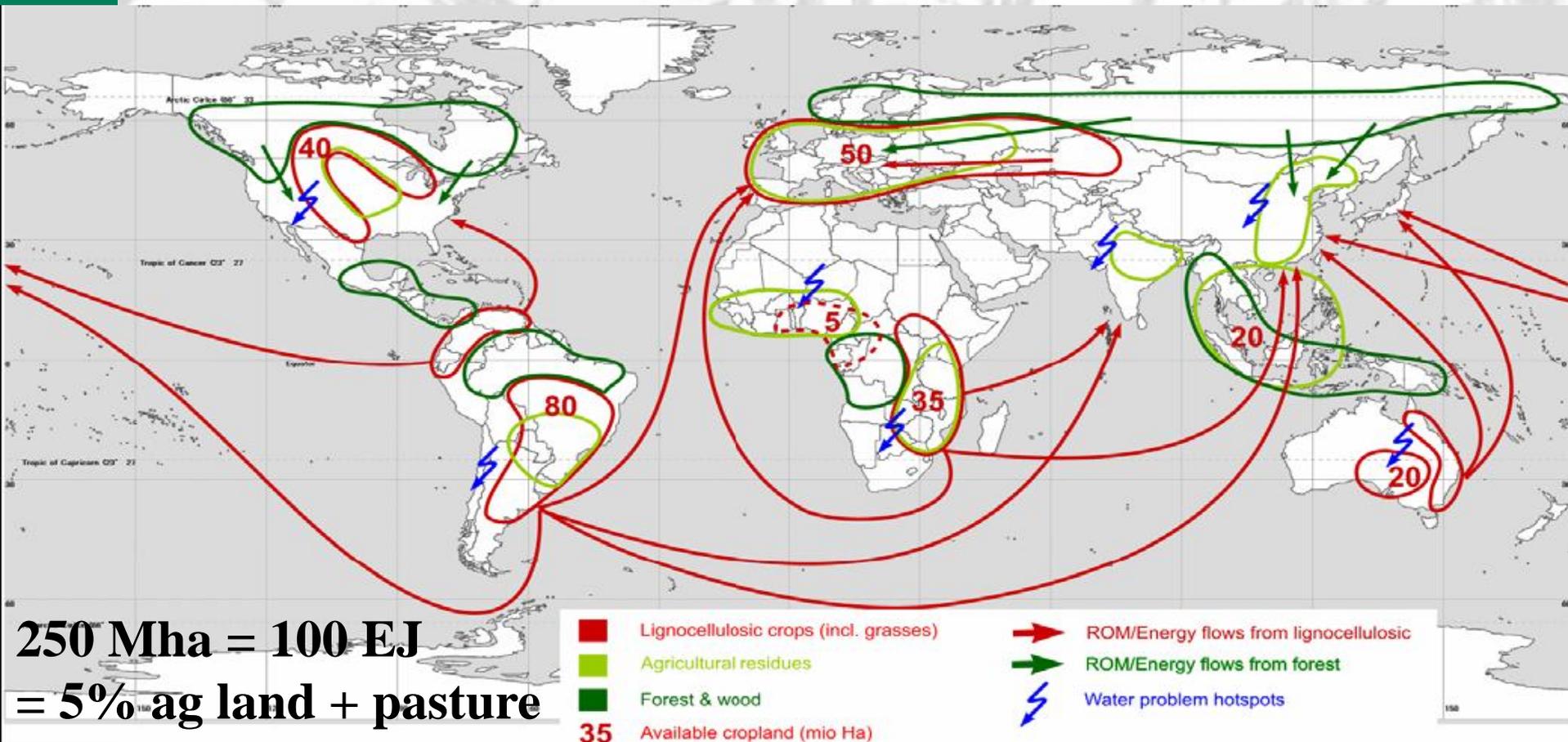
# Key trends wood pellets

- Strong growth production, consumption and trade of *wood pellets* since late 90-ies.
- In 2008 ~ 8 million tonnes pellets produced in 30 European countries, 1.8 million tonnes in the US and 1.4 million tonnes in Canada.
- *Consumption* is high in many EU countries and the US.
- European consumption for 2009 ~ 8.5 million tonnes.
- The largest EU consumers are Sweden (1.8 million tonnes), Denmark, the Netherlands, Belgium, Germany and Italy (all roughly one million tonnes).
- International trade;
  - First wood pellet *trade* in 1998: British Columbia (Canada) to Sweden.
  - Canada major exporter to Europe (especially Sweden, the Netherlands and Belgium) and to the US.
  - 2008: US starts export wood to Europe, Canadian to Japan.
  - Total imports EU 2009 ~ 3.4 million tonnes; about half intra-EU trade.
  - Total export ~ 2.7 million tonnes, predominantly intra –EU trade.

# Key pellet production, consumption and trade flows (2007).



# A future vision on global bioenergy... (2050?)



**250 Mha = 100 EJ**  
**= 5% ag land + pasture**  
**= 1/3 Brazilie**

- Lignocellulosic crops (incl. grasses)
- Agricultural residues
- Forest & wood
- 35 Available cropland (mio Ha)
- ➔ ROM/Energy flows from lignocellulosic
- ➔ ROM/Energy flows from forest
- ⚡ Water problem hotspots

[GIRACT FFF Scenario project; Faaij, 2008]

# Good news on criteria frameworks and frontline of debate:

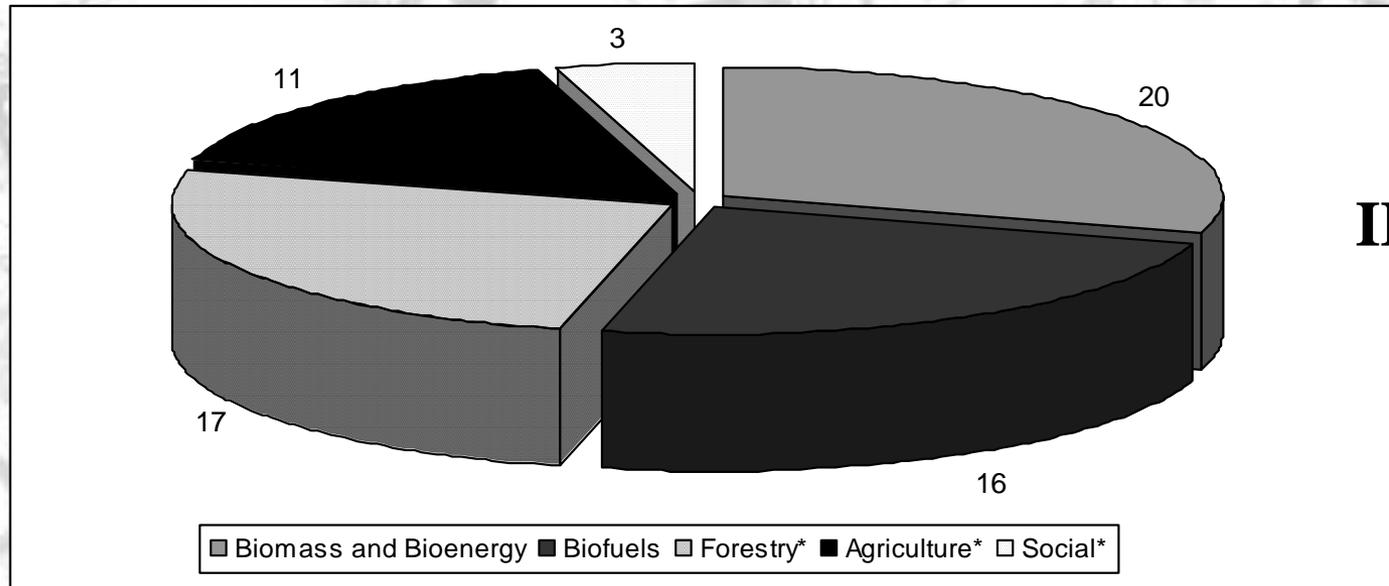
- Debate has come to it's senses a bit.
- Recognition that iLUC for biofuels alone is inconsistent: it is about management of land use.
- Spillover effect from biofuels (< 1% of land for food) to agriculture & livestock; COOL!!!.
- More attention for synergies (e.g.: Committee Corbey, Netherlands, 2010, GSB initiative, 2010)

**of initiatives to guarantee sustainability of bioenergy**

**Preliminary results: **67** initiatives (regulation + systems) included**

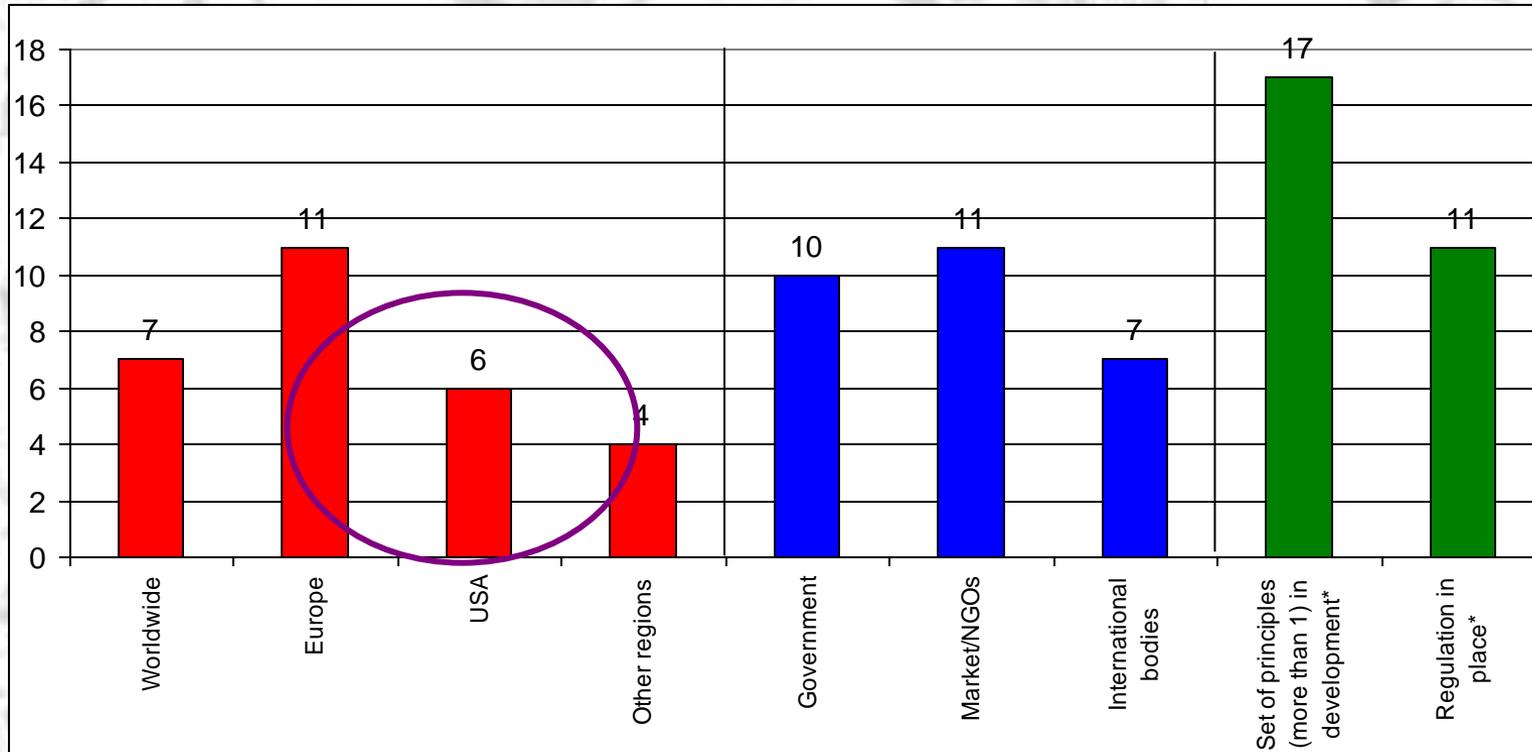
- **All relevant for (some) sustainability issues and/or**
- **Various parts of the bioenergy value chain**

Overview of amount of initiatives and certification systems included in review on biomass and bioenergy certification (\*substantially more systems exist).

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# overview and comparison of sustainability certification schemes (2)

- 28 initiatives cover the sustainability of biofuels
- From which 17 are developing principles

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# The bad news on frameworks:

- The overview of 67 initiatives shows that concerns in various parts of the world are focused on food security and on the socio-economic impacts of bioenergy production. Strikingly, these concerns are generally not included in the existing initiatives.
- The overview shows a strong proliferation of standards and, consequently, the risk for confusion in the market, abuse and “shopping” of standards.

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# Macro-meso-micro level

Examples are: Impacts of Biodiversity, water, socio-economic impacts...

**Micro scale**  
Agrobiodiversity

**Meso scale:**  
Ecological services,  
Agroecological areas

**Macro scale:**  
Genetic diversity species in the world

**Key: Sustainability performance on various levels is influenced by external and internal factors and performance**

# Barriers and opportunities for bioenergy trade (to be published)

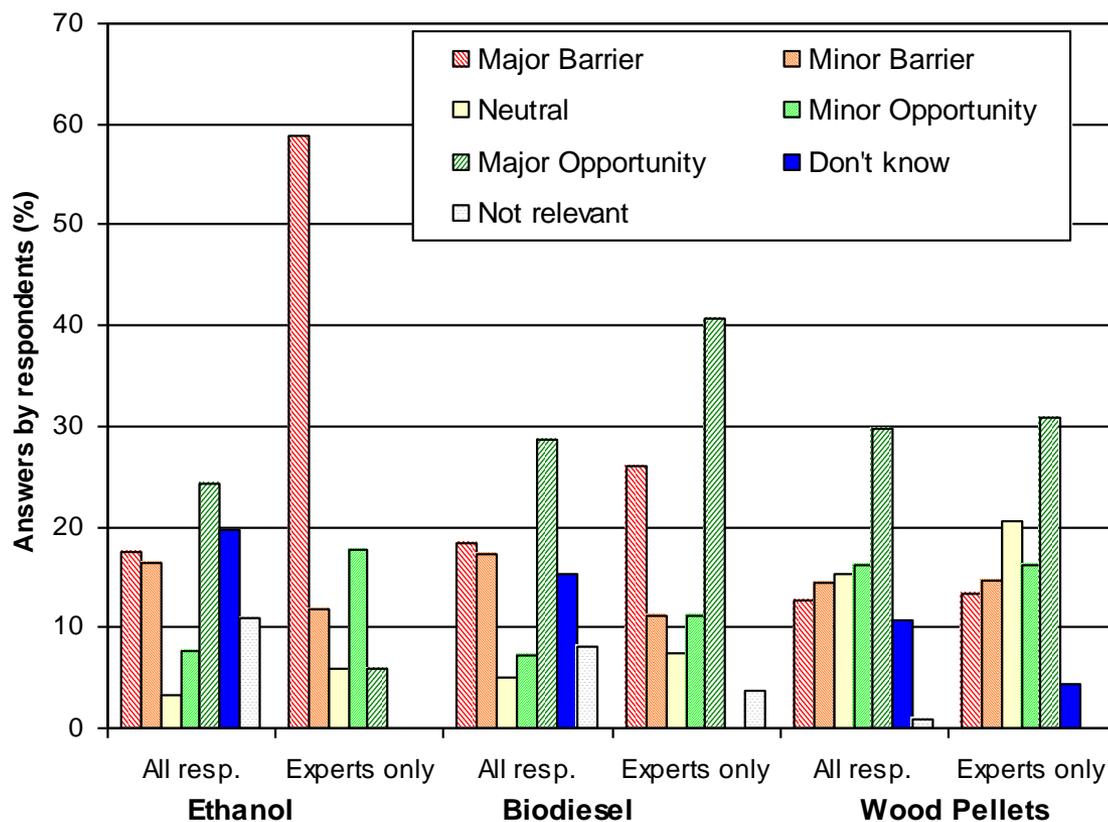
Investigates for wood pellets, ethanol and biodiesel the role of:

- Tariff barriers
- Technical standards
- Sustainability criteria
- Logistical barriers
- Phytosanitary measures, statistics etc.

A background image showing a pile of wood chips. A scale bar in the bottom right corner indicates a length of 5 cm.

5 cm

# Barriers and opportunities for bioenergy trade (to be published)



Questionnaire responses on **sustainability criteria**

Junginger et al., Energy Policy (under review)

# Final remarks

- Bioenergy trade has rapidly become more important in total biomass supplies.
- Plays a major role in balancing out fluctuations in demand (policy!) & supply (variable).
- Markets still immature; ethanol closest to commodity trading.
- Expectations are rapid growth will continue in particular ('advanced') pellets; cultivated wood is becoming more important.

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# Thanks for your attention

For more information, see:

**[www.bioenergytrade.org](http://www.bioenergytrade.org)**

- Detailed activities
- Background information
- Results
- Events
- Subscribe to the newsletter (2x per year)

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