



Findings of the meeting

Workshop & Business Forum on Sustainable Biomass Production for the World Market

Organized by IEA Tasks 40, 30 & 31 with UNICAMP

André Faaij, Arnaldo Walter, IEA Task 40

Copernicus Institute - Utrecht University

UNICAMP



Copernicus Institute

Sustainable Development and Innovation Management



Objectives of the workshop

- How can large-scale **sustainable** biomass production for the emerging world market be realized?
- Highlight **(business) opportunities** for sustainable international bio-energy trade and address key barriers.
- How can **developing markets** be combined with sustainable growth of biomass & bio-energy production capacity?
- **Subsequently:** formulate **advice** and priorities for policy, business and RD&D&D.





A new motto...

“...Creating an equal playing field in world to make sustainability happen...’

Stolen from Dr. Woods, ICEPT





What have we seen (I)?

- Brazilian experience; a world leading example:
 - Pro-Alcool; strong expansion, fully competitive, learning achieved, also in reaching a sustainable situation; not without struggles though.
 - Major plantation forestry experience.
 - Biodiesel, charcoal.
 - Export developing rapidly
- International level activity:
 - FAO-IBEP, UNCTAD-Biotrade initiative, UNEP, UNECE, WB, IEA, WTO...





What have we seen (II)?

- Trading experiences
 - Developing capacity in Canada (pyrolysis, pellets) and many other places
 - Complex trading patterns in countries as Finland and the Netherlands.
 - First steps to expectedly large scale imports (biofuels, sustainability demands); UK, NL, (Germany, Belgium, Italy)
- Impressive experience with forestry and SRC:
 - Potential positive impacts
 - Wide, though diverse, experience with certification; many lessons learned...





Emerging issues...

- The importance and various implications of the emerging international bio-energy market can hardly be overstated:
 - ‘Real economics’ are now driving; this is unique.
 - Potentials point to 1/3 of the future world energy demand/key alternative for oil halfway this century.
 - Potential economic value larger than of current agriculture.
 - GHG mitigation potential of **modern** applications clear.
 - Land-use (Gha...), socio-economic and ecological implications *can* be vast (+/-).
- Nevertheless, many barriers occur:
 - Markets (demand often) still vulnerable
 - technological, infrastructure, market uncertainties, resistance, underdeveloped markets, lack of investment...





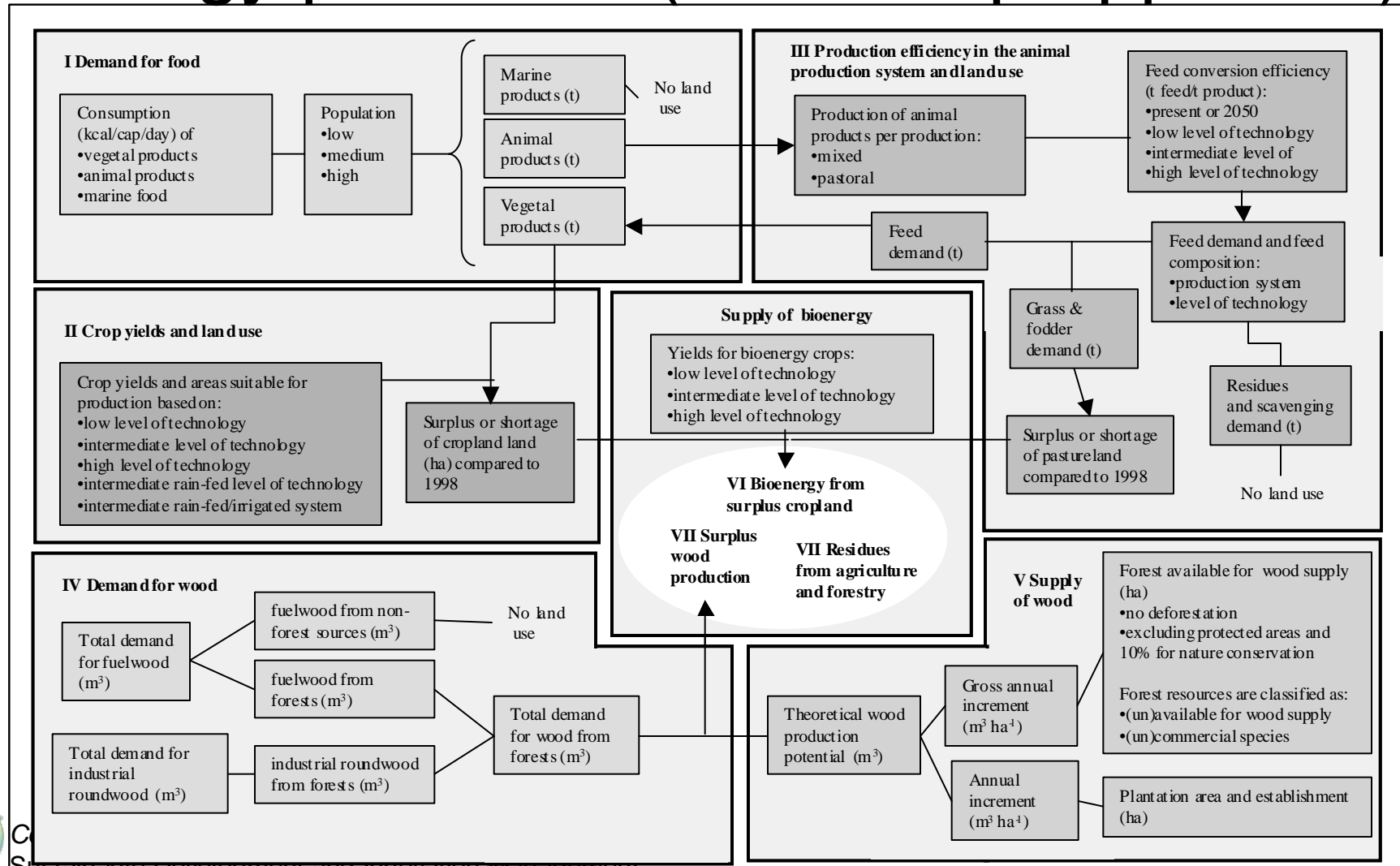
Emerging issues

- Key concerns:
 - Competition for land, with food, forest, other markets, water resources.
 - Who will benefit?; how to secure the benefits for those who need it most?
 - Despite available certification efforts (forestry, GGL, other) many aspect only globally covered.
 - Land-use (and induced land use) the essential lacking component.
 - Other: GHG balances, chain approach, reference systems
- Otherwise: value of positive impacts not covered either; this is also a concern!.





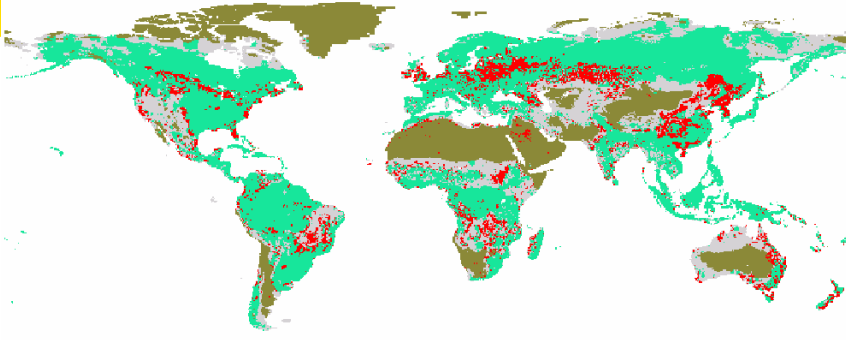
Key elements for assessing future bioenergy potentials (bottom-up approach)



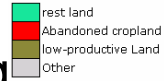
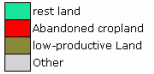
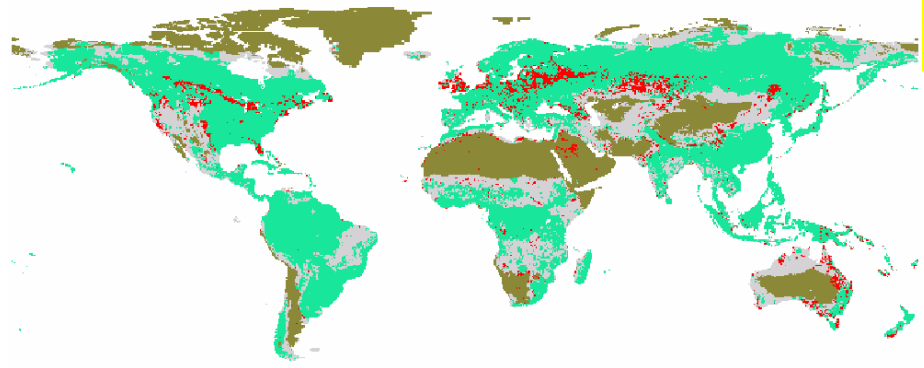
Source: Smeets, Faaij 2004



A1-2050



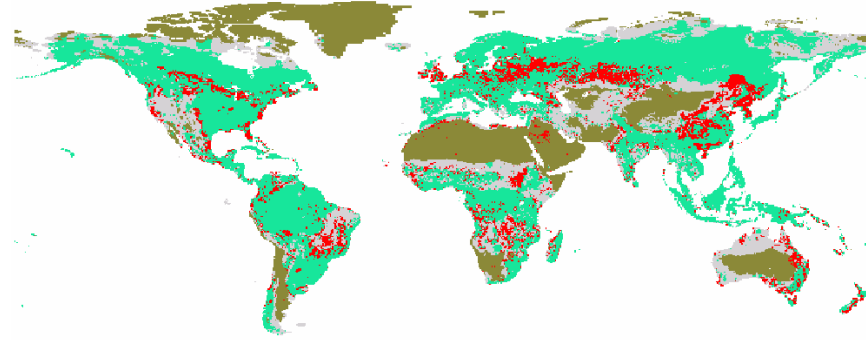
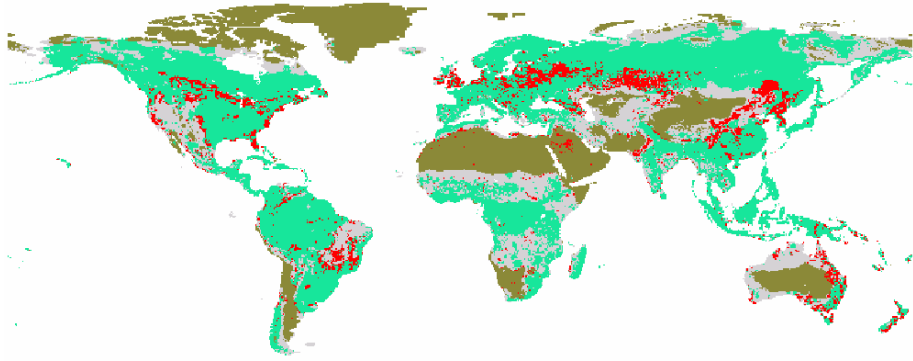
A2-2050



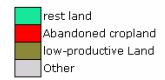
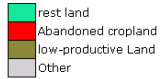
Integrated assessment modelling

for assessing land-use and production potentials of biomass for energy

B1-2050



B2-2050



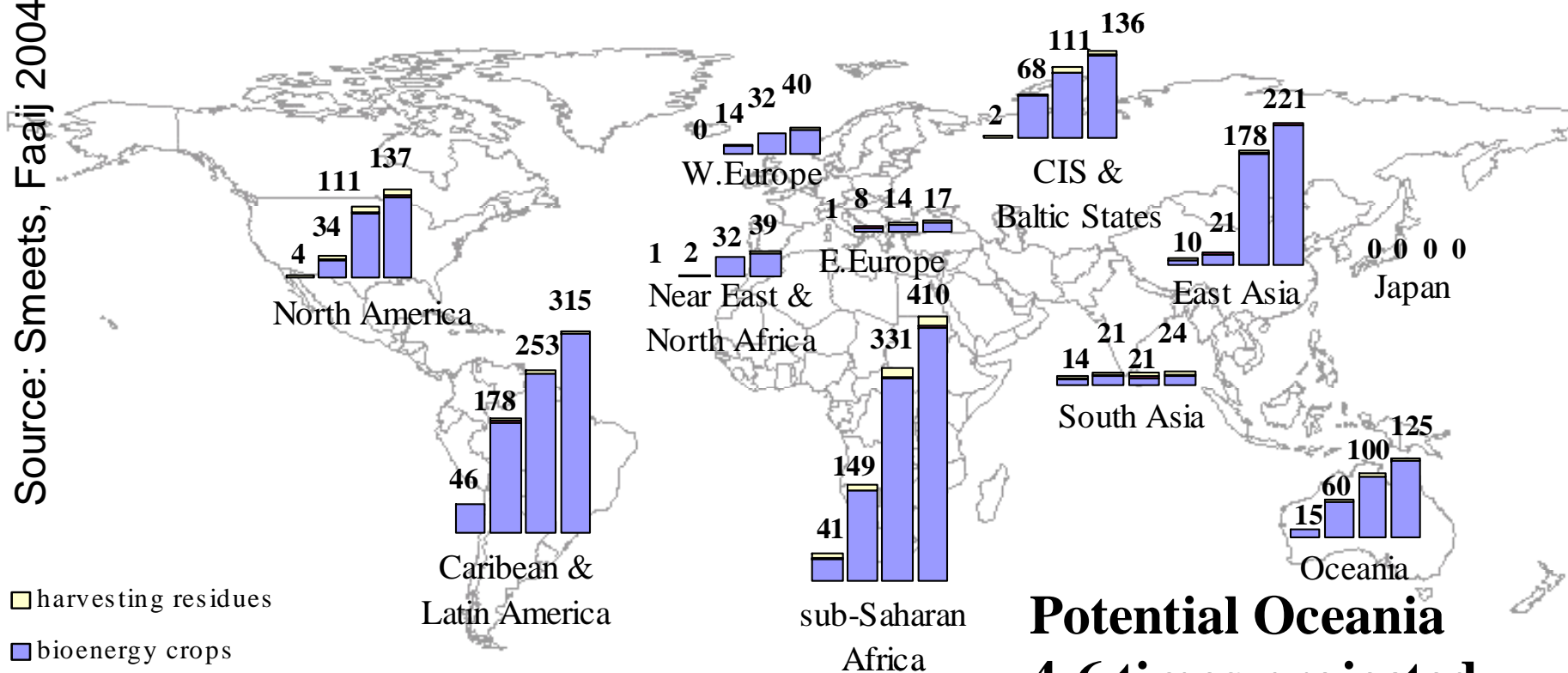
Source: Hoogwijk, Faaij 2004





Bioenergy production potential in 2050 for different levels of change in agricultural management

Source: Smeets, Faaij 2004



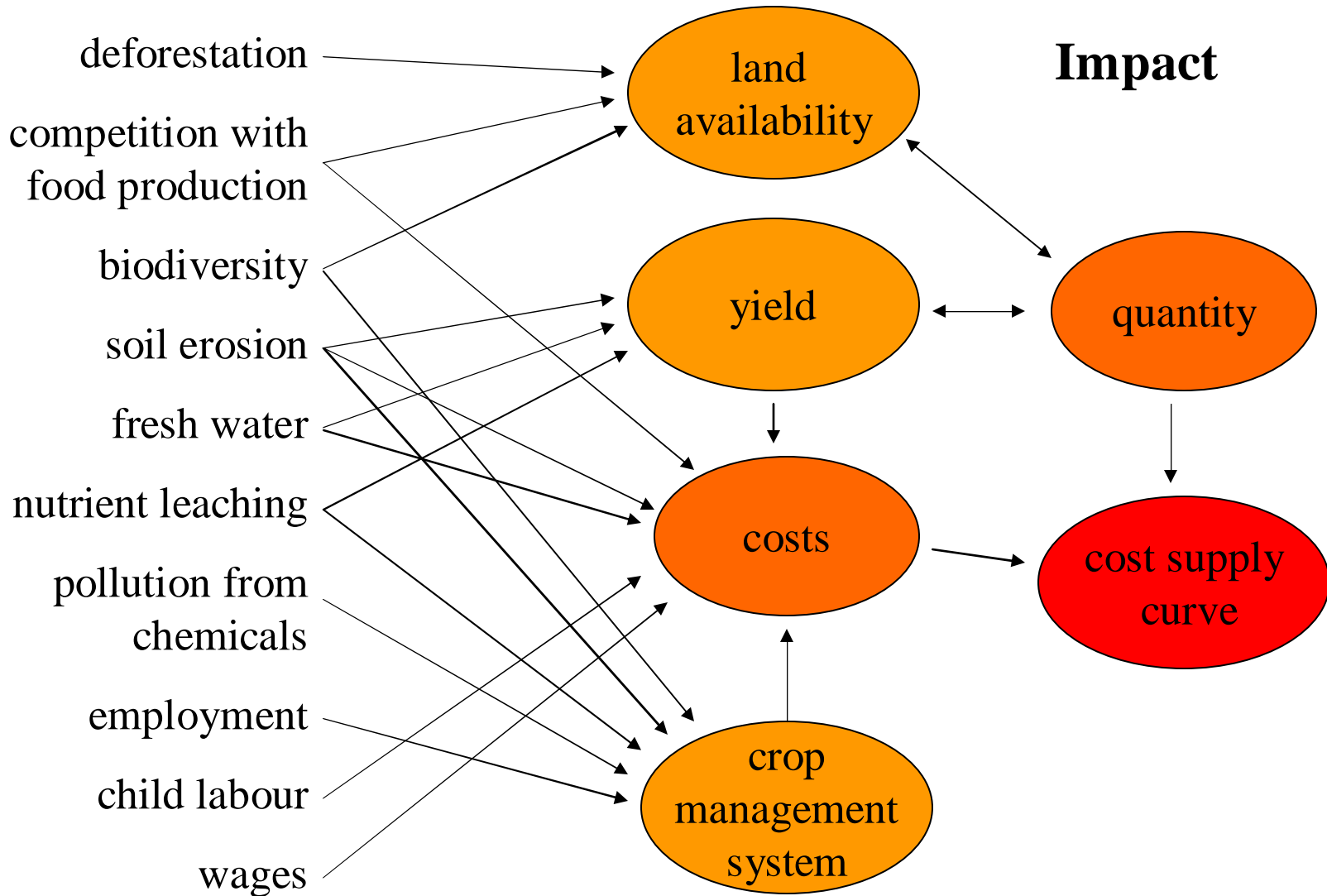
**Potential Oceania
4-6 times projected
primary energy use**



Operationalisation of sustainability criteria



Criteria



[Smeets et al., 2005]





Regional selection

- potentials on short term (2015), modest assumptions:
- Ukraine: central region poplar
- Brazil: southern region eucalyptus

	crop yield increase	feed conv.eff. increase	surplus agric. area	surplus agric. area	bioenergy crop potential
			(%)	(mln ha)	(PJ)
Brazil	2.2	1.5	19	3.3	1250
Ukraine	1.9	1.0	13	7.7	1500

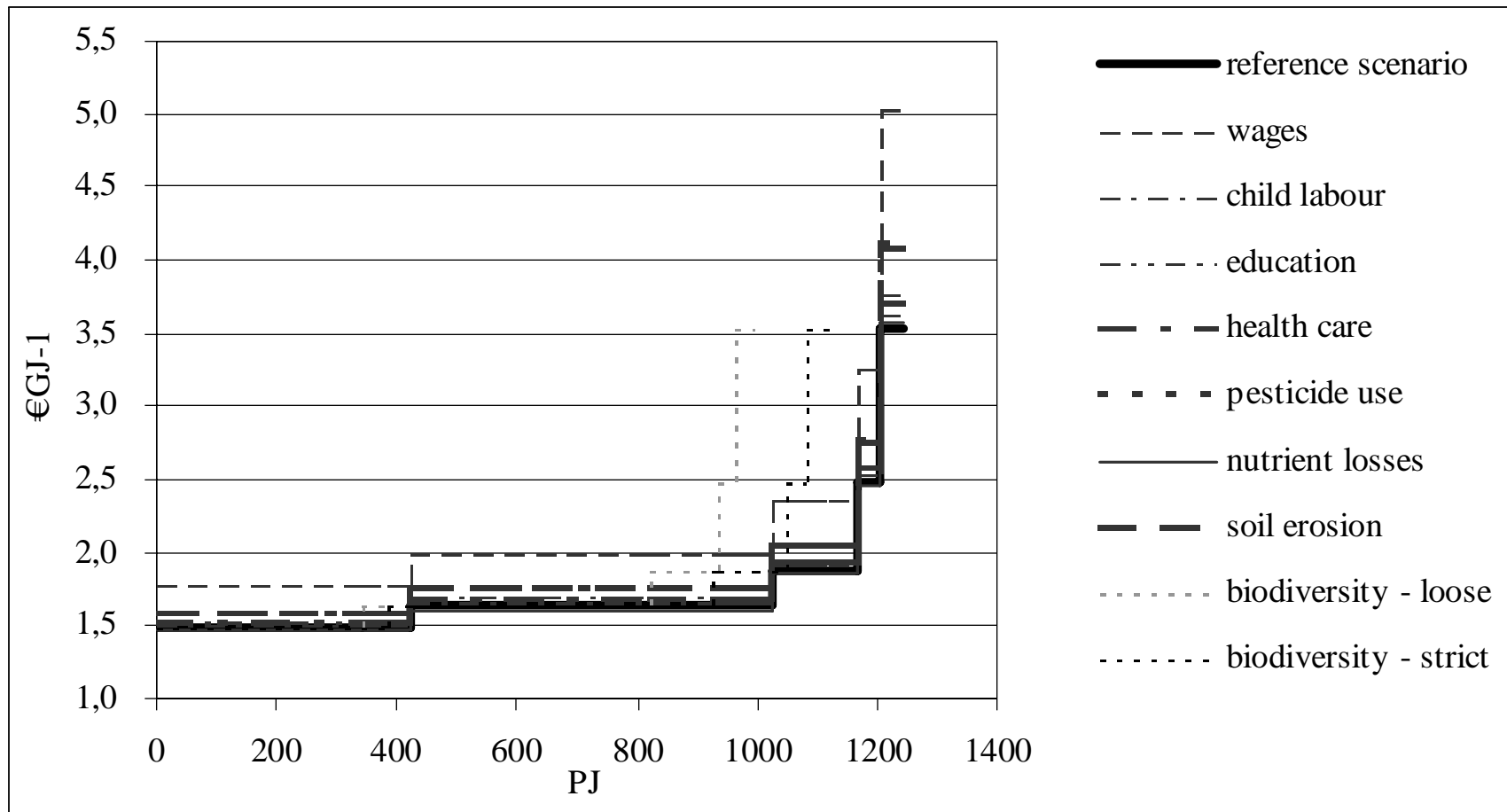
[Smeets et al., 2005]





Cost supply curve

Brazil with sustainability demands



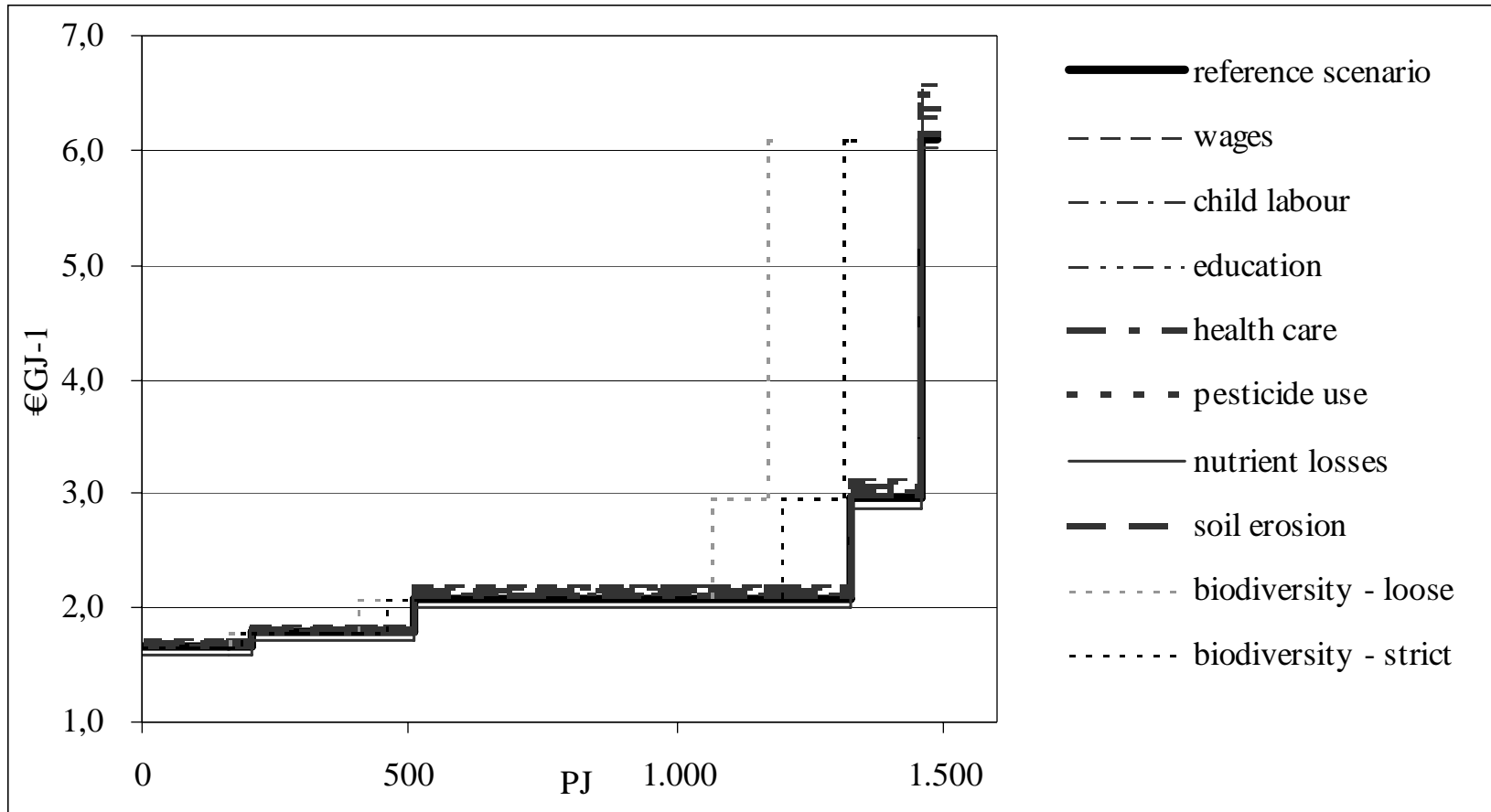
[Smeets et al., 2005]





Cost supply curve

Ukraine with sustainability demands

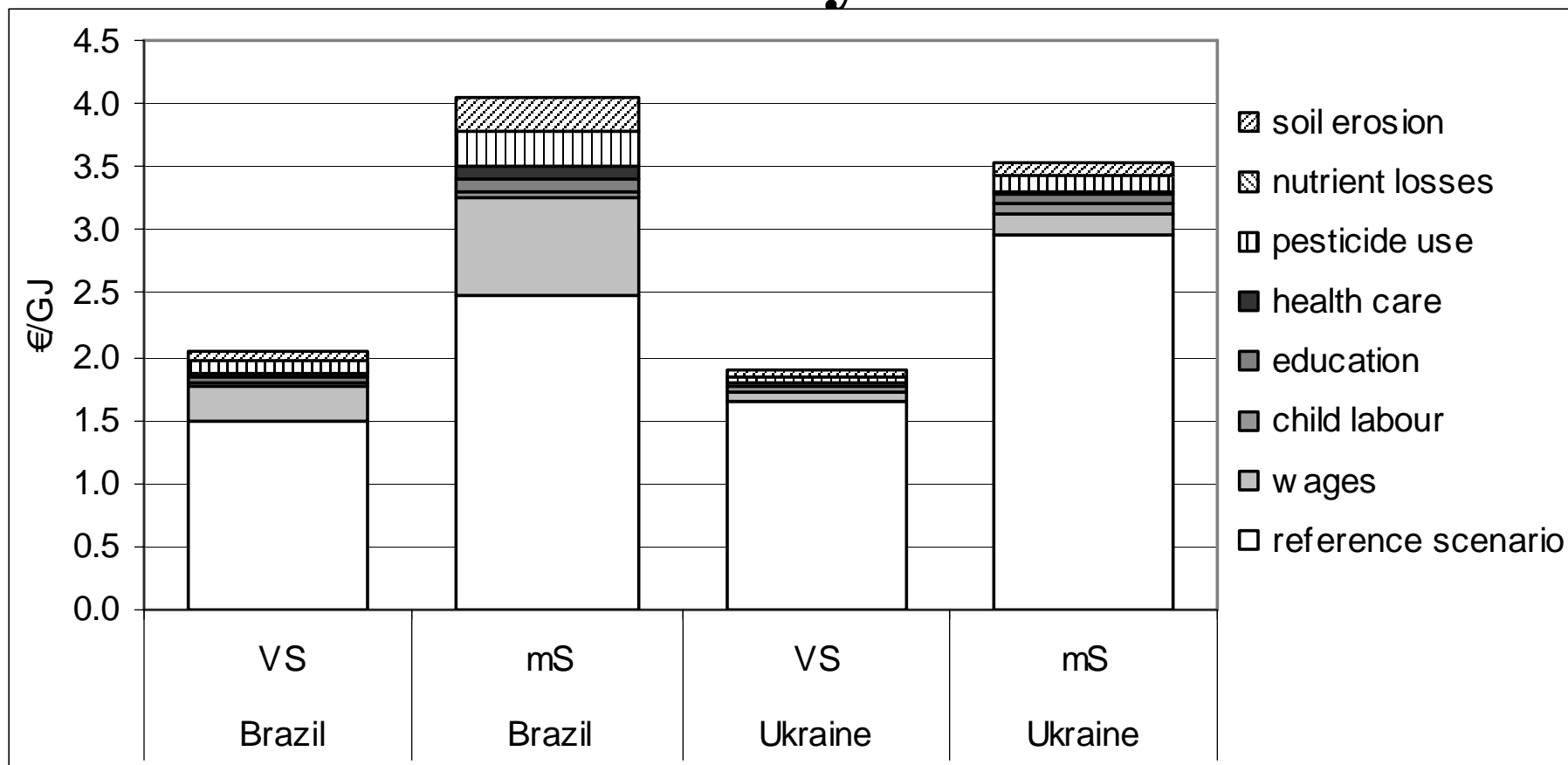


[Smeets et al., 2005]





Indicative cost impacts of applying sustainability criteria...



[Smeets et al., 2005]





Key recommendations...

- Removal of barriers; markets are still vulnerable (...);
- Information & outreach; also needed for achieving a much needed level playing field.
- What information?: Examples, experiences, potentials, fundamentals, statistics...
- Create an international advisory group that communicates with key sectors and governments (UNCTAD?).





Key recommendations...

- Strive for an internationally accepted framework (and not a great diversity of competing systems) based on existing experiences.
- Initiate a gradual process for certification procedures: regional level, stakeholder based, flagship projects...
- With high quality scientific support (credibility!).
- Work fast and do not create new barriers (no copy of CDM).
- Acknowledge that gradual development is needed; build credibility (verification, accreditation).





Further on with T40...

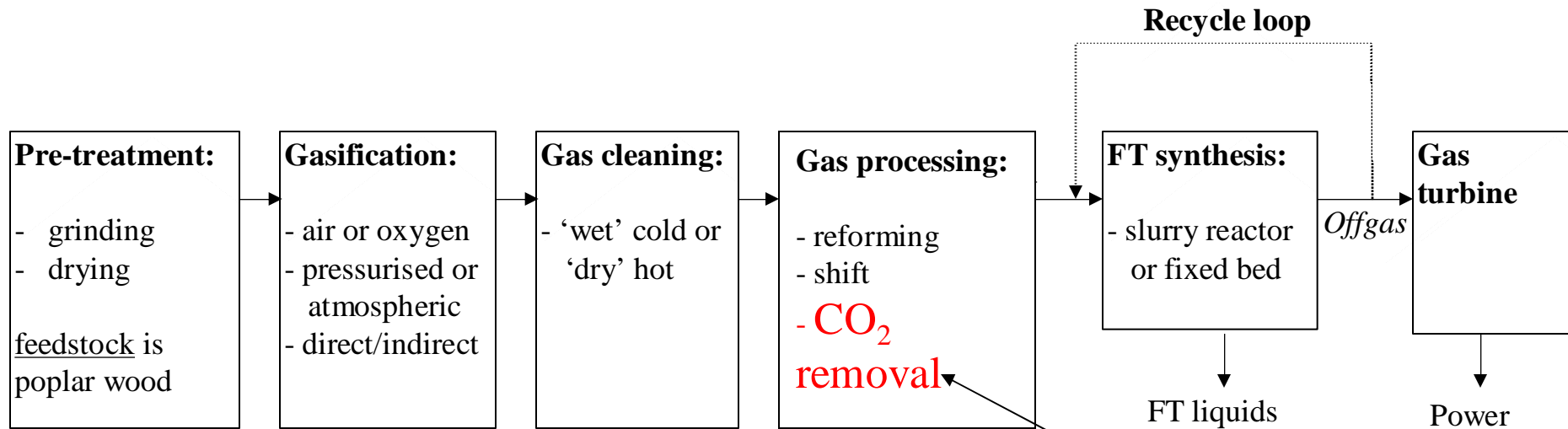
- This is partly beyond an IEA Task (although too much modesty may be overdone 😊)
- Initiate!: debate, projects, monitoring.
- Many links to be made (other IEA, govt. int bodies and especially key economic sectors)
- Clearinghouse of information (where there is little now).
- Design (future trading schemes, certification, production) & fundamentals.
- MoU's?...
- Membership seems to follow biotrade; doubling each year... (B, It, UK, int. bodies...); we may soon be out of potential country supply though.



Sugar cane ethanol is a clear winner, BUT:



gasification to FT liquids - with gas turbine



Major investments in IG-FT capacity ongoing in China **right now**:

- **Where is the energy sector (i.c. Shell???)**

About 50% of carbon!





Fire away!





Thanks!

- All participants and speakers.
- Ministries of Mines & Energy + Agriculture.
- IEA Tasks 30 (SRC) and 31 (Forestry)
- Arnaldo Walter & staff, UNICAMP, Martin Junginger.

