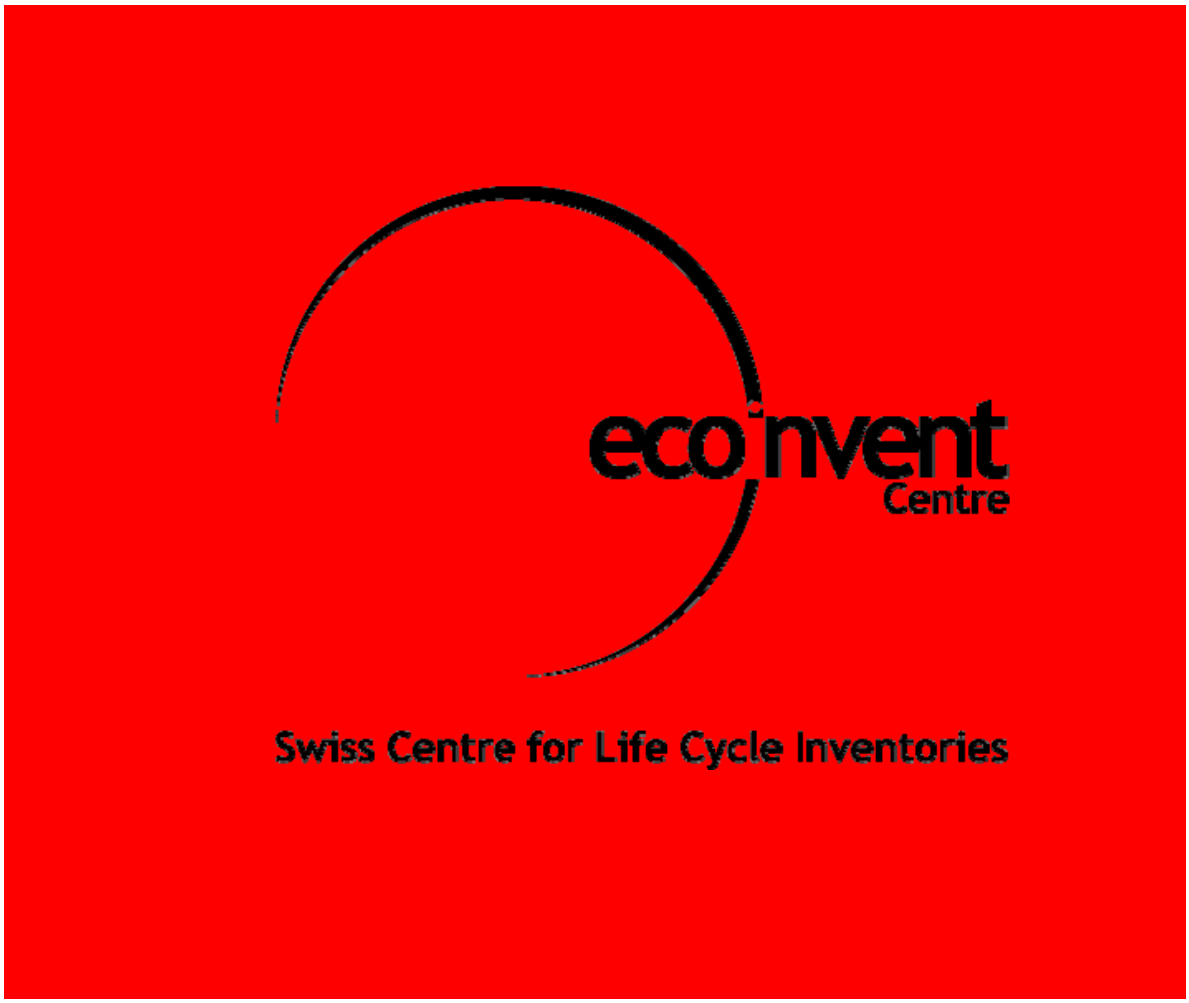

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Lausanne, March 14, 2008

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biomass production:
raw materials of imported biofuels

Niels Jungbluth, ESU-services Ltd., www.esu-services.ch

Topics

- Goal and scope of the project “Life cycle inventories of bioenergy”
- Specific regional inventory issues of oil producing plants
- Conclusions

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Problem setting “Ökobilanz von Energieprodukten”

- Diverging results for bioenergy in separate studies
- ecoinvent data v1.3 covered only a small part of bioenergy chains. No common database
- Aims to fully cover the most important bioenergy chains also for imported products
- Support for energy policy (fuel tax reductions)
- Examination for GHG reduction potential
- Investigation of several environmental aspects of “biofuels” supply chains

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Goal and Scope

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- Time frame 2005 or new future technologies
- Consistent investigation of energy, food and material products from biomass
- Clear differentiation of fossil and organic carbon
- Investigation of imported products with differences due to transports and production

Soybean production and land transformation

Increase of agricultural area

This area was cleared by soybean farmers in Novo Progreso. Brazilian Government figures show that the rate of clearing has increased.

Presentation: Niels Jungbluth

Annual forest loss in Brazilian Amazon

nearly 20‘000km^2
= 600m^2 per second

http://rainforests.mongabay.com/amazon/deforestation_calculations.html

 http://sitemaker.umich.edu/section2group3/results_and_discussion

Presentation: Niels Jungbluth

Clear cutting of primary forests

- Agricultural area in Brasil and Malaysia is increased by clear cutting
- Land transformation leads to CO_2 emissions from soil and biomass
- Burning of residues with further emissions
- Loss of biodiversity
- CO_2 from land transformation accounts for about 90% of Brazil CO_2 emissions
- Particles from residue burning are an important problem in South-East Asia

Principle of investigation

- What is the increase in agricultural area for the production in the reference year?
- What is emitted per m^2 of clear cut land?
- Allocation of emissions between wood and stubbed land
- Stubbed land is the main driver
- New elementary flow „CO_2, land transformation“ as used by IPCC for different possibilities of analysis

Inventory Clear Cutting

Name	Location	InfrastructureProcess	Unit	clear-cutting, primary forest	round wood, primary forest, clear-cutting, at forest road	provision, stubbed land
Location				BR	BR	BR
InfrastructureProcess				0	0	0
Unit				ha	m3	m2
round wood, primary forest, clear-cutting, at forest road	BR	0	m3	5.21E+1	100	-
provision, stubbed land	BR	0	m2	1.00E+4	-	100
Wood, primary forest, standing	-	-	m3	1.82E+2	29	71
Transformation, from tropical rain forest	-	-	m2	1.00E+4	-	100
Transformation, to forest, intensive, clear-cutting	-	-	m2	1.00E+4	-	100
power sawing, without catalytic converter	RER	0	h	1.24E+1	100	-
Carbon dioxide, land transformation	-	-	kg	1.20E+5	-	100
Carbon monoxide, fossil	-	-	kg	7.84E+3	-	100
Methane, fossil	-	-	kg	5.14E+2	-	100

Inventory agricultural product

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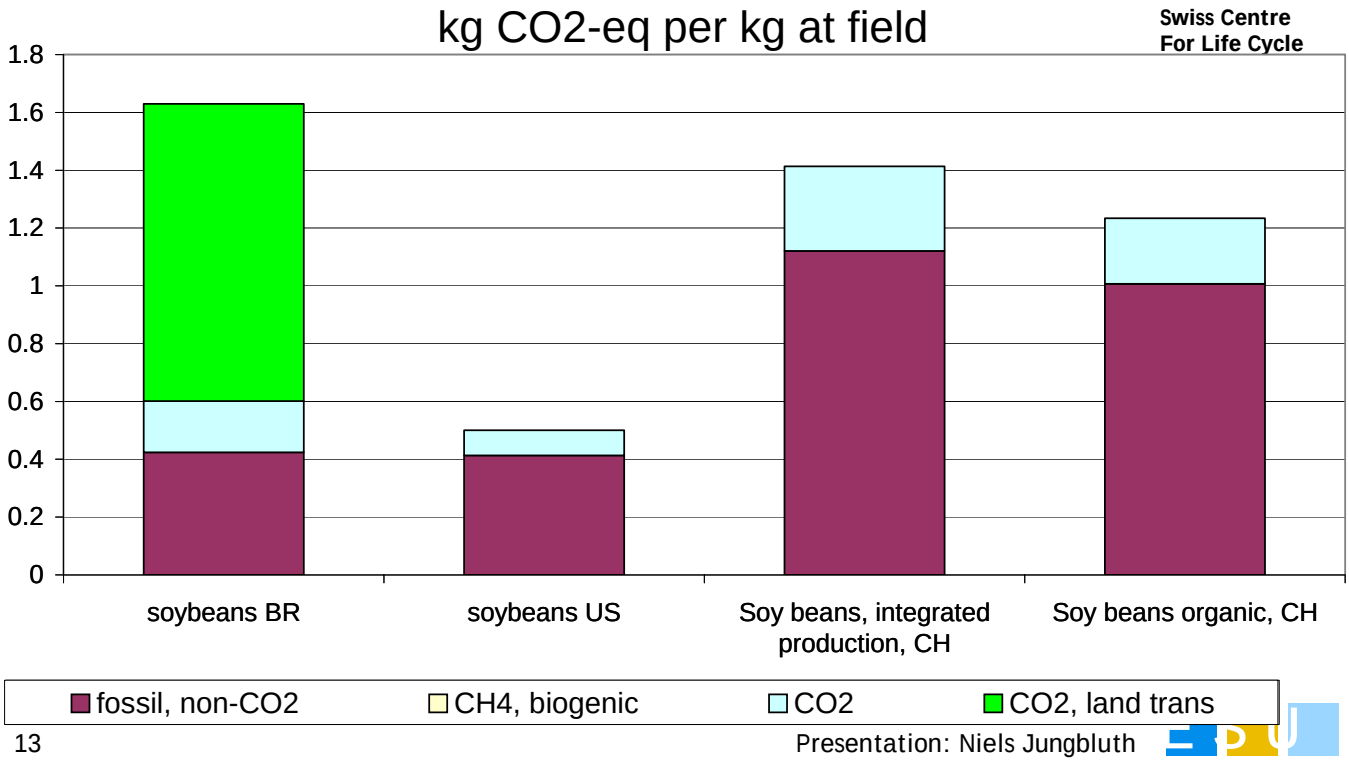
Name	Location	Unit	soybeans, at farm
Location			BR
InfrastructureProcess			0
Unit			kg
Occupation, arable, non-irrigated		m2a	1.97E+0
Transformation, to arable, non-irrigated		m2	3.93E+0
Transformation, from forest, intensive, clear-cutting		m2	6.22E-2
Transformation, from arable, non-irrigated		m2	3.77E+0
Transformation, from shrub land, sclerophyllous		m2	1.03E-1
provision, stubbed land	BR	m2	6.22E-2

Soybean greenhouse gasses



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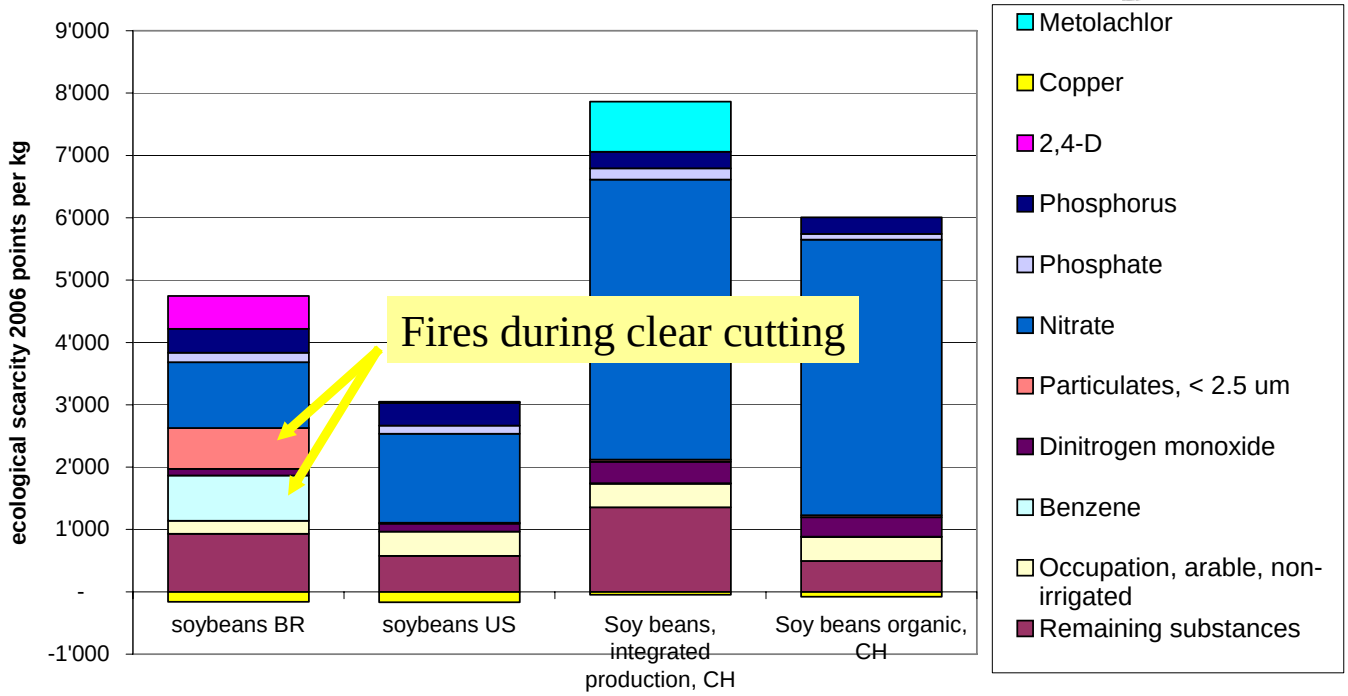
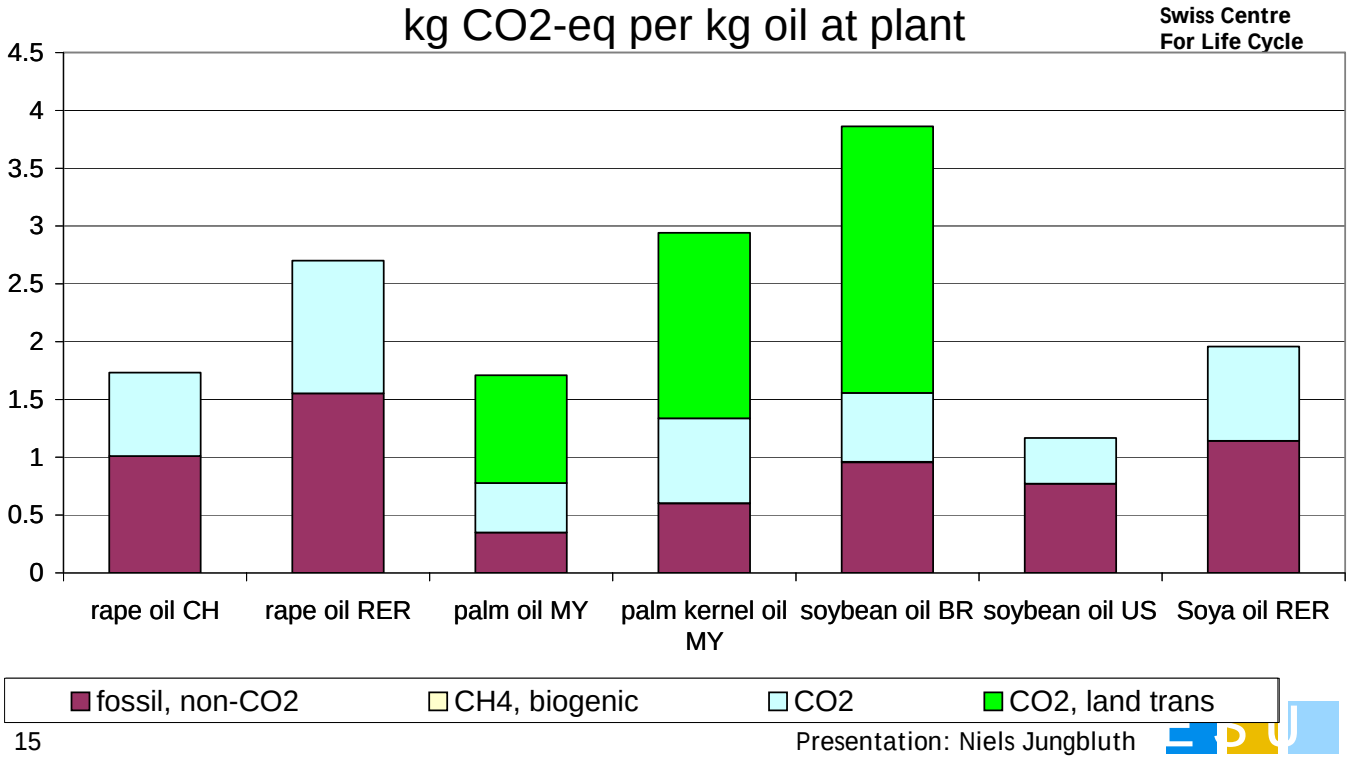
Soybean (ecological scarcity 2006)



➢ **Important differences in environmental profile**

Plant oil production



Conclusions

- Regional differences in agricultural production are more important than differences due to transports
- Products show environmental "Achilles' tendon" in different areas

  => Focus of investigation depends on product analysed
- "Biofuels" example:

  - burning of residues

  - CO_2 emissions due to land transformation

  => acknowledge and model regional differences
- ecoinvent data provide the necessary information

Outlook

- Full LCA based on investigated data published in the framework of the project (http://www.esu-services.ch/bioenergy.htm)
- Next session will provide more details on the investigation of biofuels and materials from different biomass

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