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IEA Bioenergy ExCo 63 WS Indirect Land Use Change
Rotterdam 12 May 2009

INTERNATIONAL UNION FOR CONSERVATION OF NATURE

International Union for Conservation of Nature (IUCN)

- A unique democratic Union of more than 1,000 organizational members
- National states, government agencies and NGOs from over 160 countries
- 10,000 scientist in six commissions of expertise
- A neutral forum for governments, NGOs, scientists, business and local communities to find pragmatic solutions
- UN observer status

Outline of the presentation

- Introduction ecosystem and ecosystem services
- Trends in ecosystem degradation
- The effects of ILUC on landscapes and livelihoods
- Conclusions

Introduction

Human well-being is dependent on ecosystems and the services they provide.

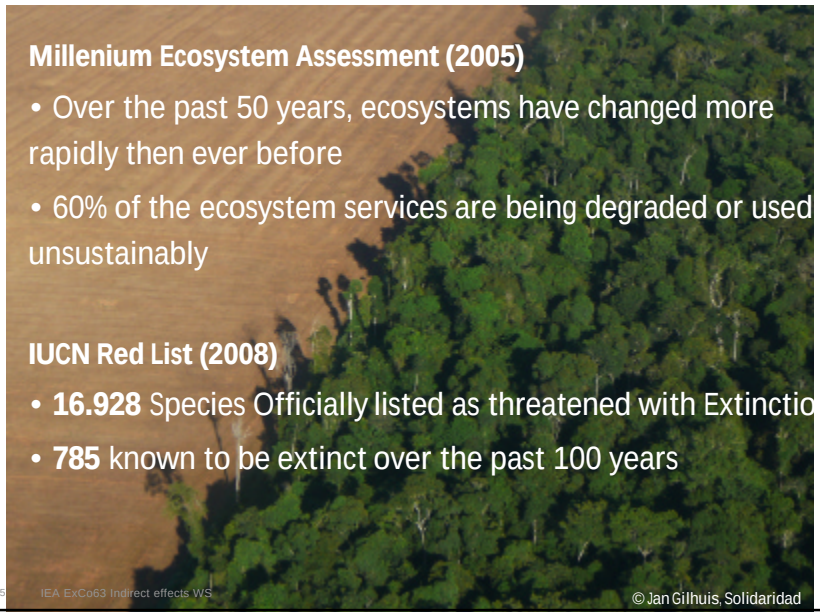
- provisioning services (food, water and genetic resources)

- regulating services (regulation of climate, flood protection, and water quality)

- cultural services (recreational and spiritual benefits)

- supporting services (soil formation, pollination, and nutrient cycling)

Trends in ecosystem degradation



Millenium Ecosystem Assessment (2005)

- Over the past 50 years, ecosystems have changed more rapidly then ever before
- 60% of the ecosystem services are being degraded or used unsustainably

IUCN Red List (2008)

- **16.928** Species Officially listed as threatened with Extinctio
- **785** known to be extinct over the past 100 years

Trends in ecosystem degradation

Palm oil expansion in Indonesia has led to 18 mil ha of tropical forest to be cleared (only 6.5 mil ha were developed).

Trends in ecosystem degradation

- 40 % of our world economy is underpinned by ecosystem services

- 75% of the world population below the poverty line (1.2 billion people) depend **directly** on ecosystem services for their subsistence and livelihoods*.

- 2.6 billion people are dependent on traditional forms of bio-energy (e.g fuelwood/charcoal)$.

*Lipton (2004) in Climate Change - IPCC, Parry 2007

$ World Energy Outlook 2006

Indirect Land Use Change

Land requirements for biofuels production

	2004[1]		2030 Reference scenario[2]		2030 Alternative policy scenario[3]		2030 Second-generation biofuels case[4]	
	million ha	% arable	million ha	% arable	million ha	% arable	million ha	% arable
United States and Canada	8.4	1.9	12.0	5.4	20.4	9.2	22.6	10.2
European Union	2.6	1.2	12.6	11.6	15.7	14.5	17.1	15.7
OECD Pacific	neg.	neg.	0.3	0.7	1.0	2.1	1.0	2.0
Transition economies	neg.	neg.	0.1	0.1	0.2	0.1	0.2	0.1
Developing Asia	neg.	neg.	5.0	1.2	10.2	2.5	11.5	2.8
Latin America	2.7	0.9	3.5	2.4	4.3	2.9	5.0	3.4
Africa and Middle East	neg.	neg.	0.8	0.3	0.9	0.3	1.1	0.4
World	**13.8**	**1.0**	**34.5**	**2.5**	**52.8**	**3.8**	**58.5**	**4.2**

Sources: farm land — FAO; land requirements — International Energy Agency analysis

1 land used for biofuel production in 2004 and as a percentage of total arable land;
2 situation in 2030 if current trends remain unchanged;
3 situation if countries adopt all of the policies they are currently considering related to energy security and CO_2 emissions;
4 situation in which some biomass for biofuels production comes from non-arable land and residues, reducing arable land requirements. neg = negligible; ha = hectares

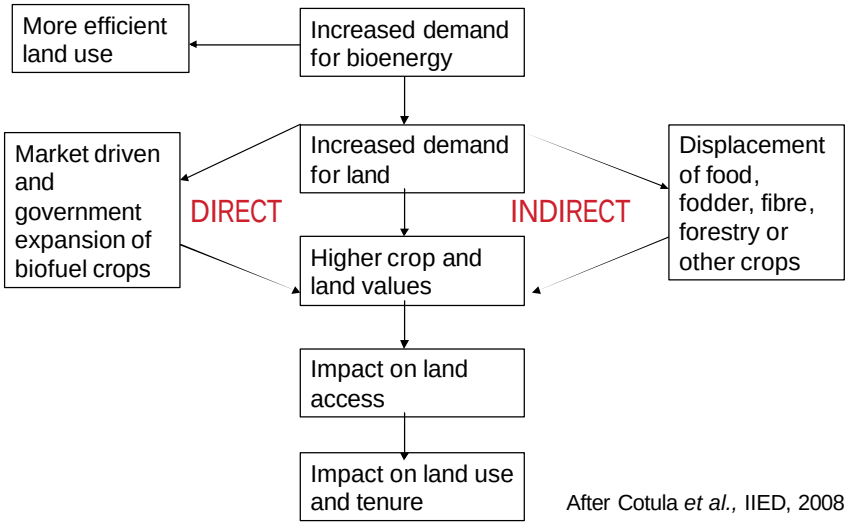
Indirect Land Use Change

What is the potential extra land available for bio-energy?

- 'reserve', 'under-utilised', 'marginal' or 'degraded' lands
- Estimations vary widely (300 – 680 million ha)#
- 80% of the 'reserve' land is expected to be in Africa or South-America (Fischer *et al.* 2002)
- What is 'marginal' or 'degraded'?

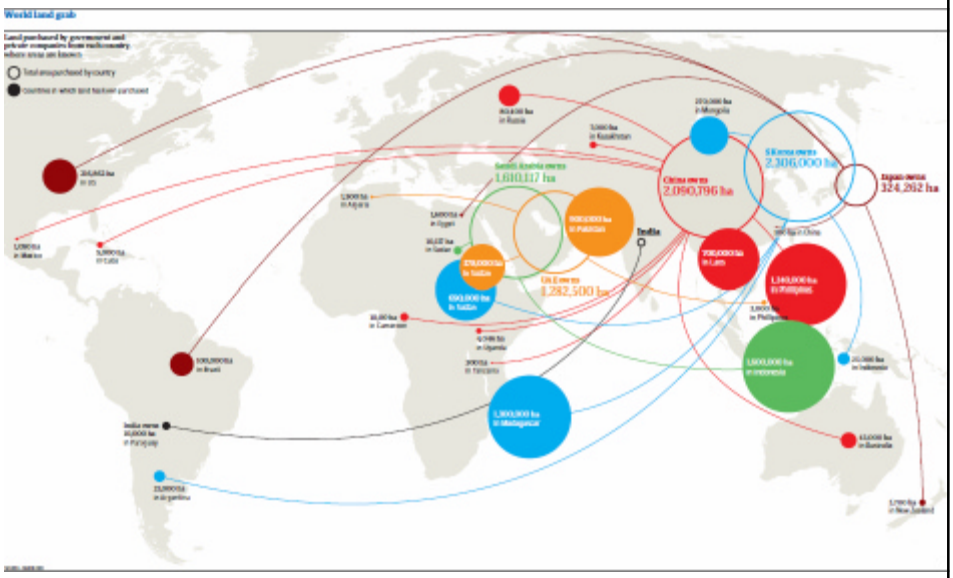
Field, 2007 and Fischer, 2002

Indirect Land Use Change – social impacts



After Cotula *et al.*, IIED, 2008

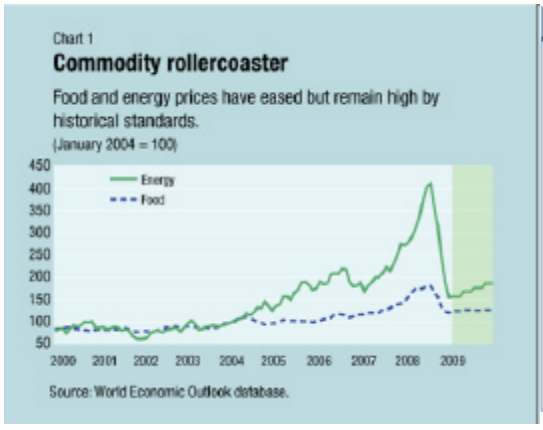
Indirect Land Use Change – social impacts

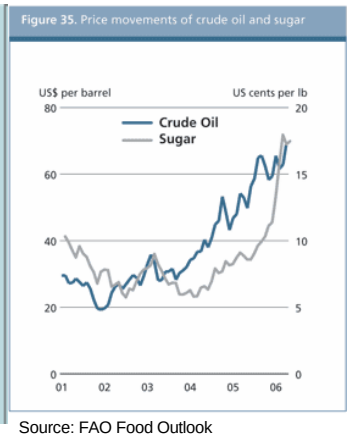


Source: *http://www.guardian.co.uk/environment/2008/nov/22/food-biofuels*

Indirect Land Use Change – social impacts

Food and energy prices get closely intertwined





Source: FAO Food Outlook

Effects on landscapes and livelihoods

Land tenure and access to land

- Value of land has increased 20% on average in Brazil.
- In Africa more than 90 percent of land remains outside the formal legal system. (FAO, 2008).
- Women produce about half of the world's food but they own only about two percent of all land. (FAO, 2008)

Effects on landscapes and livelihoods

Socio – economic impacts

- Competition of available labour for food or bio energy feedstock.
- Bio energy projects may cause migration to the area thereby increasing the pressure on the available resources (food, water, energy)

With the changing patterns of land tenure, social inequity increases.

Effects on landscapes and livelihoods

Jatropha on 'marginal', 'idle' or 'waste' land?

Ghana-Yendi

- 14,000 ha
- no consultation
- replacing subsistence land use
- irrigation with drinking water from community

Conclusions

- Not all bio energy systems pose equal risks to landscapes and livelihoods.
- Much depends on the security of land tenure and social equity.
- Clearer definitions of 'idle' 'marginal' or 'degraded' land are needed.
- Regional approach is needed in developing bio energy projects.
- Mitigation of indirect effects is going to be a challenge.
- NGOs, governments, scientist and private sector should make a joint effort.

THANK YOU !