

Challenges for sustainable ecosystems, land use and biodiversity

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ENVIRO-DEV

environment and development consulting

- Recent trend

Renewable fuels to substitute for
and/or complement fossil fuels

- *due to growth of oil prices*
- *pressure to reduce atmosphere
emissions of CO₂*

LAND

Need for arable land for rapidly expanding the liquid biofuel production - Worldwide Trend

e.g., growth in rates of land area for biofuel production is higher than for crops themselves
(FAO 2009)

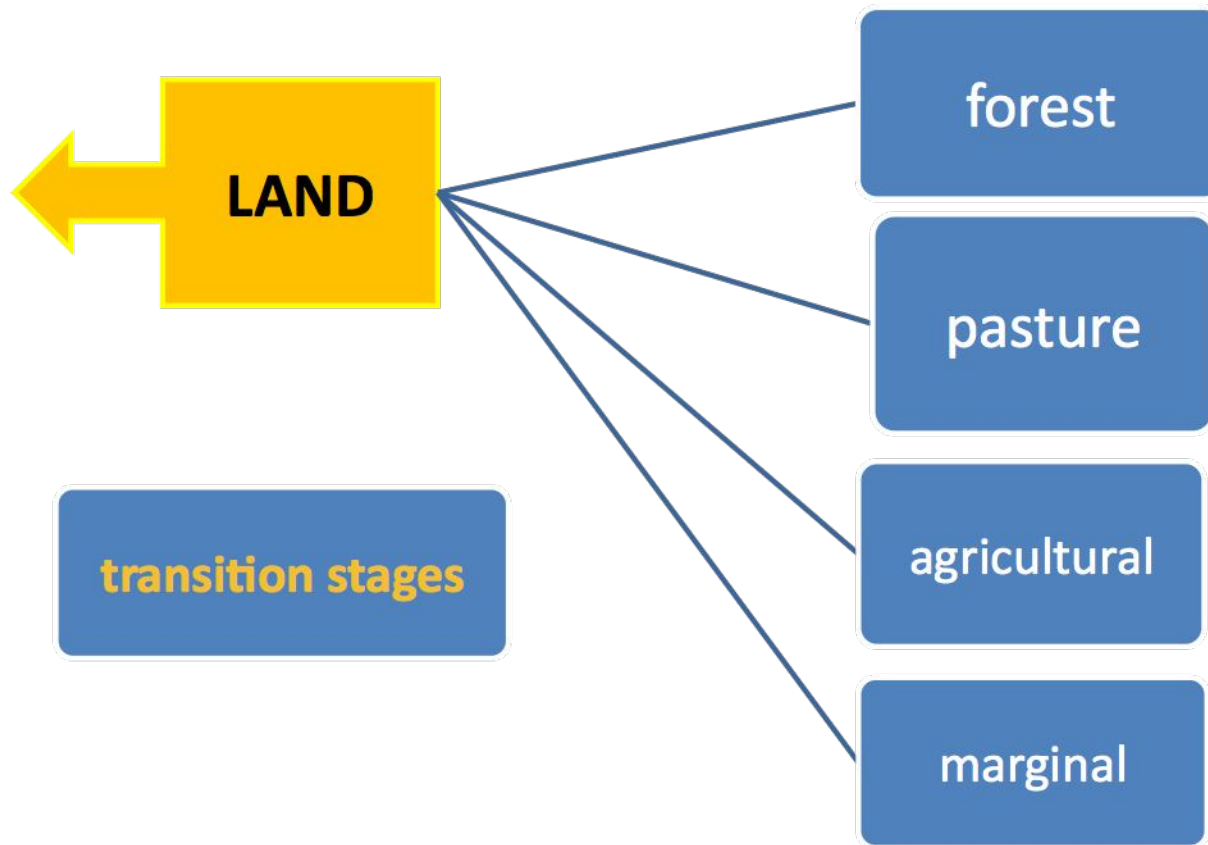


growing trend for all biofuel crops

Arable Land for Biofuels (% of total arable land)

| Regions | 2007 | 2008/9 |
|-----------------|------|--------|
| Africa | 1.20 | 2.30 |
| Asia | 0.73 | 1.01 |
| Central America | 1.88 | ? |
| Europe | 0.12 | 0.16 |
| North America | 8.01 | 8.25 |
| South America | 5.81 | 6.11 |
| World | 2.85 | 3.20 |

Source: FAO, 2009



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- it is clearly more profitable to produce biofuels than food products. e.g. Growing incentive and subsidy base

DEBATE

competiton for land ?

LAND

there is competition for land

Main Impacts

- ✓ - shifts in production systems (food to biofuel plants) (USDA 2008)
- ✓ - increase price of land (and food) (Simson et al 2003, Service 2007)
- ✓ - reduced stocks of wheat, cotton and soybeans (Service 2007)
- ✓ - generation of carbon deficits due to land conversion (Fargione et al 2008; Serachinger 2008)

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there is no competition

Main evidence and arguments

- ✓ **Use of crop residues and use of marginal lands only** (Dale 2007, FAO)
- ✓ **Only a small proportion of arable will be shifted to biofuels (1-10%)** (Kerchow 2007, Sanders et al 2008)
- ✓ **Modelling shows no competition due to sufficient amount of marginal land** (Pimental 2007; Petzik 2007) **& that ample is available to increase biofuel production**
- ✓ **Fallowing land practices and requirements open up for energy crop production** (Turpin et al 2009, EC soil website 2009)

(Cases in Malaysia, Brazil , India, USA, Brazil, EU)

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Ecosystem Services

millennium ecosystem assessment

- **Fresh Water**
- **Food**
- **Timber, fuel and fiber**
- **New biodiversity products**
- **Biological regulations**
- **Nutrient cycling**
- **Climate and air quality**
- **Waste processing and detoxification**
- **Regulation of floods and fires**

**Provisioning
services**

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graph LR; A[Provisioning services] --> B[Fresh Water, Food, Timber, fuel and fiber, New biodiversity products]; C[Regulating and Supporting Services] --> D[Biological regulations, Nutrient cycling, Climate and air quality, Waste processing and detoxification, Regulation of floods and fires];
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**Regulating and
Supporting Services**

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Ecosystem Services

Forest Conversion

- ✓ Fresh Water and Food
- ✓ Timber, fuel and fiber
- ✓ New biodiversity products
- ✓ Biological regulations
- ✓ Nutrient cycling
- ✓ Climate and air quality
- ✓ Waste processing and detoxification
- ✓ Regulation of floods and fires



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Ecosystem Services

Pasture Conversion

- ✓ Fresh Water and Food
- ✓ Nutrient cycling
- ✓ Waste processing and detoxification



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Ecosystem Services

Use of Marginal Land

Unless barren the land has vegetation

- ✓ **Water ??**
- ✓ **Nutrient cycling ??**



When converted it is established that nutrient input is significantly higher –water table, toxic to near by forest and low-input systems
(Pimental 2009, Dubois et al. 200, etc)

- **High input of fertilizers and herbicides required for biofuel production** (www.fao.org)

- **Impacts?**

Toxic Run-off, water table, flora and fauna

- Impacts and consequences are mixed
- Case specificity is needed
- The rapid surge into biofuel production and their impacts has been uncontrolled due to the lack of guidelines/regulations in place
- Perhaps treated as an issue separate from other 'land take' interventions from the North

So what can be done?

- **Process and adjustments**

For Industry/Producers

- Impact assessments (ESIA), Public Communication and Disclosure, Participation, and transparency
- Explore compensatory mechanisms, benefit sharing, capacity development
- Environment-friendly approaches
- Utilize adaptive management approach
- *Corporate Social Responsibility (CSR) portfolio*

- **Process and adjustments**

For Donors and Investors

- Require Impact assessments (ESIA) and Public Communication and Disclosure *benchmarked against international standards*
- Require assessment of needs for *compensatory mechanisms*
- Continue to foster *Capacity Development* as core aim for development cooperation
- Require assessment of *ecosystem functions and services* as part of impact assessment
- Best Practice yardstick

thank you