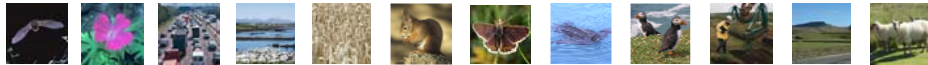


# Biofuels and Biodiversity

**Jason Reeves**

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Biofuels: Opportunity or Threat?  
EFAEP Conference, Florence, Italy, 11 September 2008



# Biofuels and Biodiversity

“There can be no doubt that stopping the loss of biodiversity and limiting climate change are the two most important challenges facing the planet.”

Stavros Dimas, EU Environment Commissioner  
(Opening Speech, Green Week 2006)



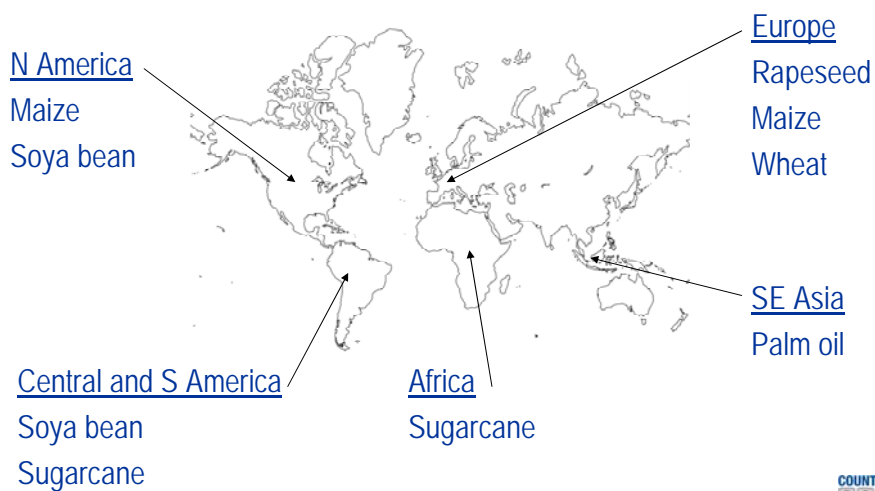
## Types of Biofuels

### Types of liquid biofuels

- Biodiesel
  - Made from - vegetable or grain oil and recycled cooking oil
  - Major sources - palm oil, rapeseed and soya bean
  - Other sources - coconut oil, castor bean, jatropha, peanuts and sunflower seeds
- Bioethanol
  - Made from - plant starch, sugar and cellulose
  - Major sources - maize and sugarcane
  - Other sources - cassava, sugar beet, sweet sorghum and wheat

## Geographical Spread

### Geographical spread of major crops



## Generations

### Generations of biofuels

- First Generation
  - produced from edible parts of plants
- Second Generation
  - produced from cellulosic biomass
- Third Generation
  - produced from algae and/or genetically modified plants

## Positive Potential

### Positive potential of biofuels

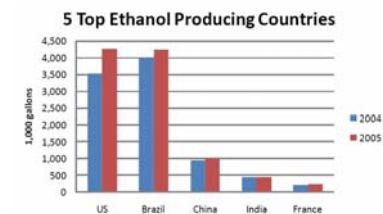
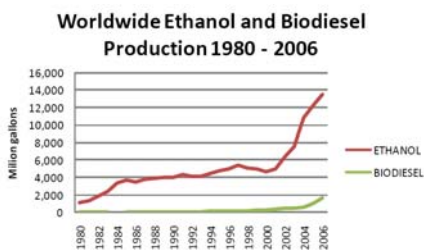
- Reduced reliance on fossil fuels
- Improving energy security
- Reduced production costs
- Reduced GHG emissions
- Benefitting local economies
- Replacing less biodiversity-beneficial crops
- Rehabilitating degraded land

## Negative Impacts on Biodiversity

- Habitat loss, degradation and fragmentation
- Soil and land degradation
- Water pollution and scarcity
- Higher greenhouse gas emissions
- Introducing invasive species

## Habitat Loss, Degradation and Fragmentation

- The single biggest impact on biodiversity as a result of biofuel production
- Biofuel production is expanding at an accelerating pace
- Tropical deforestation
- Agricultural land use change
  - Intensification
  - Displacement



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**Habitat Loss, Degradation  
and Fragmentation**

South America

- Cerrado
- Mata Atlantica
- Amazon
- Pantanal




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**Habitat Loss, Degradation  
and Fragmentation**

Africa

- Tana River Delta, Kenya
- Elephant migration routes,  
Ethiopia




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# Habitat Loss, Degradation and Fragmentation




UNITED NATIONS  
ENVIRONMENT

South East Asia




- Borneo, Indonesia and Malaysia
- Sumatra, Indonesia




**Palm Oil Export Malaysia/Indonesia 1990 - 2005 (excluding palm kernel oil)**



Year	Indonesia (1,000 tons)	Malaysia (1,000 tons)
1990	1,000	2,000
1991	1,000	2,000
1992	1,000	2,000
1993	1,000	2,000
1994	1,000	2,000
1995	1,000	2,000
1996	1,000	2,000
1997	1,000	2,000
1998	1,000	2,000
1999	1,000	2,000
2000	1,000	2,000
2001	1,000	2,000
2002	1,000	2,000
2003	1,000	2,000
2004	1,000	2,000
2005	1,000	2,000





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# Habitat Loss, Degradation and Fragmentation



UNITED NATIONS  
ENVIRONMENT

North America

- Grasslands of USA and Canada












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**Habitat Loss, Degradation  
and Fragmentation**

Europe

- Grasslands and Agro-biodiversity

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**Soil and Land Degradation**

- Fertilizer
- Pesticides
- Monocultures
- Conversion of pasture to cultivation
- Soil micro-organisms

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## Water Pollution and Scarcity

### Increased water use

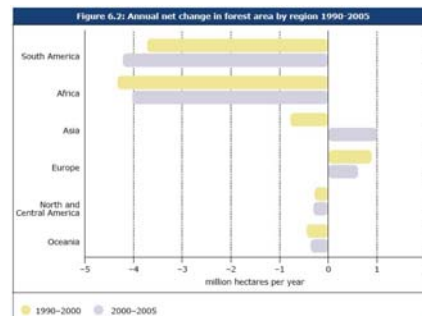
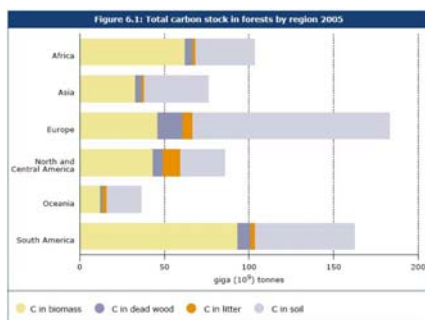
- Agricultural expansion
- Inappropriate abstraction activities

### Water pollution

- Fertilizers
- Pesticides
- Conversion process effluent

## Higher GHG Emissions

- Degraded carbon sinks
- Agricultural activities





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**INTRODUCTION TO ENVIRONMENTAL ECONOMICS**


## Introducing Invasive Species

Current biofuel species

- *Arundo donax*
- *Phalaris arundinacea*

Potential biofuel species

- *Miscanthus*



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**INTRODUCTION TO ENVIRONMENTAL ECONOMICS**

## Why the Implications for Biodiversity are Important

Ecosystem services and integrity

- Water resources
- Pollination services
- Local livelihoods
- Global health and well-being

Climate change and carbon storage



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## Solutions

- Policy change
  - reduce biofuel targets, or replace with emissions targets
  - only from sustainable sources with social and environmental standards/criteria
- Better enforcement of policies
- Use of idle land (with conservation)
- Only part of renewable energy mix
- Technological advancement
- Overall behaviour change
  - reduce energy demands and increase energy efficiency
  - incorporating the ecosystems approach



## More Information

More information on biofuels and biodiversity can be obtained from:

- Convention on Biological Diversity (CBD)
- Friends of the Earth (FoE)
- Report of the Gallagher Review 2007
- Institute for Agriculture and Trade Policy (IATP)
- IUCN – The World Conservation Union
- Organisation for Economic Co-operation and Development (OECD)
- RSPB and BirdLife International
- United Nations Environment Programme (UNEP)
- World Wide Fund for Nature (WWF)