

Climate change briefing

Biofuels, nature and people

Implications for environments and livelihoods

December 2007

While developed countries need to reduce their energy use to limit greenhouse gas emissions, 1.6 billion people still lack access to modern energy sources. To meet the rising energy demand while limiting the use of fossil fuels, many countries are promoting the production and use of biofuels.

However, biofuels, particularly those leading to deforestation or land degradation, can result in increased greenhouse gas emissions as well as severe consequences for biodiversity and livelihoods.

Key facts

- Biofuels are liquid fuels derived from biomass, which are being promoted as a substitute for petroleum-based fuels in powering machines, including transport vehicles.
- Whether biofuels have a positive or negative impact on greenhouse gas emissions, ecosystems and livelihoods, depends on the type of feedstock used, how and where it is grown, how and where the biofuel is processed and transported, and for whom.
- The two main types of biofuels are:
 - Bioethanol – produced from sugar or starch crops such as sugarcane, sugarbeet, corn and wheat;
 - Biodiesel – produced from oilseed crops such as oilpalm, jatropha, rapeseed and soy.
- “First generation” biofuels are produced from the edible parts of crops. The growing demand for this type of biofuels contributes to increased food commodity prices and may undermine food security.
- “Second generation” biofuels are generally more sustainable and energy efficient as they can be produced from waste (cellulosic biomass like straw, agricultural waste, woods and grasses). However, the technologies needed to break down ligno-cellulose are not yet commercially available and, due to their high cost, are unlikely to be affordable for the poor.



IUCN Photo Library © Michelle Laurie

Ecosystems and climate change are inextricably linked

- Greenhouse gas emissions over the full “root to tank” lifecycle of a biofuel increase substantially with the use of fossil-fuel powered machinery, the application of fertilisers or damaging farming practices. Deforestation and other land use changes increase greenhouse gas emissions even more significantly.

- Production of first generation biofuels is increasing in tropical countries with a competitive advantage in producing biofuel feedstock, with knock-on effects:
 - deforestation in Indonesia and Malaysia driven by the expansion of palm oil plantations for biodiesel markets,
 - increased corn production in the United States, to feed bioethanol demand, thereby displacing soy production to the Brazilian Amazon,
 - increased use of agricultural “set-aside” land for biofuel feedstock production, reducing the natural capacity of ecosystems to recover.
- If poorly managed, biofuels can exacerbate existing agricultural adverse impacts:
 - soil and land degradation
 - water pollution and scarcity
 - introduction of invasive species
 - biodiversity loss and deforestation
 - higher greenhouse gas emissions
 - limited access to land and food for marginalized groups.

Promoting the positive potential

- If well planned and managed, biofuel markets may create incentives for landscape restoration, converting monoculture farmlands to energy-rich prairie grasses, and promoting rural development.
- Women, who both secure household energy and produce crops in many developing countries, may benefit from “food-fuel” intercropping systems, which can enable rural communities to meet their own energy needs, improve agricultural efficiency and diversify income generation opportunities.
- Robust standards for international biofuel trade, which fully consider greenhouse gases, environmental and social lifecycle impacts, coupled with appropriate incentives, are needed to raise awareness amongst consumers and producers and help drive the positive potential of biofuels.

Key considerations

- Biofuel development only makes sense if combined with major improvements in transport systems and vehicle efficiency to reduce the demand for fossil fuels.
- Well-informed policy decisions are needed to avoid investments in inefficient, unsustainable and inequitable biofuels, and instead promote investment in more sustainable energy options.
- All relevant UN conventions (i.e. CBD, UNFCCC, CSD, UNCCD) should build on increased knowledge and address rapidly the issue of biofuels in a coordinated fashion.

What IUCN is doing

The aim of IUCN's work on energy is to accelerate society's transition to energy systems that are ecologically sustainable, socially equitable and economically viable. To this end, IUCN is:

- Developing a deeper understanding of the risks and opportunities of biofuels to ecosystems and livelihoods.
- Filling gaps in our current knowledge for better informed decision-making by governments, the private sector, resource managers and civil society. IUCN is leading the International Risk Governance Council's work on Governing the Risks and Opportunities of Bioenergy.
- Providing a balanced platform for informed discussion about biofuels in many parts of the world where IUCN is active. Stakeholder dialogues and engagement are critical to creating standards which can be implemented, and have the support of both producers and consumers.
- Bringing relevant knowledge and expertise to standards and criteria-setting processes on ecosystem restoration and management, establishing robust governance frameworks, managing invasive species risks, ensuring rights to land tenure and access. IUCN heads the Environment working group of the Roundtable on Sustainable Biofuels, which is developing principles for sustainable biofuels production.

www.bioenergywiki.net/index.php/Roundtable_on_Sustainable_Biofuels



© IUCN Jim Thorsell

More information

Jeff McNeely, Chief Scientist
jeffrey.mcneely@iucn.org

Andrea Athanas, Energy, Ecosystems & Livelihoods Initiative
andrea.athanas@iucn.org

Nadine McCormick, Energy, Ecosystems & Livelihoods Initiative
nadine.mccormick@iucn.org

www.iucn.org/energy

www.iucn.org/climate