Biofuels: A tool for conservation?

Background paper for UN CSD15 Side Event
2nd May 2007, 1.15 – 2.45pm, Conference Room 4

Introduction

Energy for sustainable development
Access to reliable and sustainable sources of energy has a direct relationship with human development. It therefore is appropriate that the 15th Session of the Commission on Sustainable Development is focussing on this topic. The discussion should give full attention to ecosystem goods and services, upon which both human development and energy systems depend (Mainka et al, 2005).

In recent years, energy has been pushed up the international agenda by a combination of security concerns over energy supply and increasing attention to climate change. Higher oil and gas prices combined with supportive government polices are driving significant private sector investment into alternative energy sources. In particular, the search for transport fuels with a lower carbon footprint has reinvigorated the biofuels market (see box for key terms). In 2005, biofuels represented 1% of world road-fuel use; this is projected to increase to between 4% and 7% by 2030, an annual rate of growth of between 7 and 9% (IEA, 2006).

Biofuel production will affect and be affected by many topics on the CSD agenda. Thus any discussions on biofuels should be conducted within a framework that links appropriate sectors including agriculture, forestry and energy sectors. In this way, biofuels and biomass for energy should also be considered in the context of the upcoming CSD 16-17 cluster on agriculture, rural development, land, drought, desertification and Africa. It is imperative that environmental as well as social benefits are captured for sustainable development.

Biofuels as part of a sustainable energy future
Every energy choice has some effect on biodiversity and ecosystems, even those that are portrayed as environmentally-friendly. The ecosystem and livelihood implications of poorly-planned biofuels production are already significant. Furthermore, inappropriate policies relating to biofuels can prevent rural farmers from benefiting from biofuel markets or undermine food security through displacement of food production.

For example, the increasing demand for palm oil-based biofuels is leading to higher rates of deforestation, primarily in Indonesia and Malaysia. The carbon emissions associated with this land-use change are also significant (Delft Hydraulics and Wetlands International, 2006). This issue is, in part, being addressed through emerging standards developed by the Roundtable on Sustainable Palm Oil and Roundtable on Responsible Soy, which includes criteria specifying that new plantings should not replace primary forest.

Before second generation biofuels become commercially available, the immediate demand for biofuels will be met through crops in existing agricultural systems, primarily (in descending order) sugar cane, sugar beet, corn, palm and jatropha (WRI, 2006). Though each potential feedstock has different land and water resource needs, the overall additional demand for agricultural products will inevitably result in further expansion of agricultural systems.

This paper highlights how well-planned biofuels production can contribute to a more sustainable energy future by enhancing ecosystems through landscape restoration and provide for rural livelihoods. Potential options and tools are outlined that can help this transition to a sustainable and equitable biofuels future.

- Bioenergy – biomass systems (woody, non-woody or organic waste) that produce heat and/or electricity.
- Biofuels – liquid fuels derived from biomass that can be used for transport or heating purposes:
  - bioethanol – produced from crops such as sugarcane, sugarbeet, corn, wheat and barley;
  - biodiesel – produced from seeds such as palm, jatrohpa, rapeseed, sunflower and soy.
- "First generation" biofuels – produced from agricultural crops.
- "Second generation" biofuels – produced from agricultural waste, wood and grasses (Dufey, 2007).

Envisaging a sustainable and equitable biofuels future

Biofuels driving sustainable agriculture

The Millennium Ecosystem Assessment (2005) highlights conventional agriculture as one of the main drivers for ecosystem degradation, leading to:

- conversion of forest to agriculture;
- depletion of water tables;
- soil erosion; and
- excessive nutrients levels in soil and water.

However, the adoption of an approach such as ecoagriculture can help promote biodiversity conservation through diversified patches and ecosystem mimicry. Conservation buffer zones within and around plantations can also serve to increase biodiversity.

This type of approach also takes into account stakeholder goals and appropriate crop choices for the respective landscape and ecosystems. As such, it can combine multiple objectives of food production and biofuel feedstock in a way that contribute positively to ecosystems and livelihoods.

With biofuels developing as an agricultural commodity, energy companies are introduced into the agricultural production chain. This presents an opportunity to strengthen support for existing sustainable agriculture initiatives as buyers seek to ensure that their feedstock does not conflict with overall corporate social and environmental policies.

Diversifying crops for biofuel production

When cellulosic technologies become available for the commercialisation of “second generation” biofuels (estimated in five to ten years), the diversity of feedstock will expand into non-food crops such as agricultural waste, wood and grassy sources.

These feedstocks are more efficient due to their higher energy content, which also increases their potential reduction in overall greenhouse gas emissions.

According to recent studies, advanced biofuels could replace over a third of US transport fuel, up to a quarter in Europe, and more if combined with greater fuel efficiency. Many small developing countries could potentially meet all their fuel needs (WRI, 2006).

From an ecological perspective, the most important potential is a transition from annual to perennial crops for biofuel production, which could help stabilize ecosystems by reducing disturbance levels resulting from tilling and planting. Natural vegetation may also be re-introduced into landscapes.

For example, intensively-farmed grain production areas could be converted to mixed native grasses, providing a sustainable feedstock for biofuels which require less water and fertiliser and also sequester carbon in the roots and surrounding soil (Tilman et al, 2006).

Restoring landscapes and promoting livelihoods through biofuels

Biodiversity values can also be enhanced if biofuels are produced on degraded lands (such as those abandoned after grazing) or non-agriculturally productive land. This also improves overall greenhouse gas emissions through carbon sequestration.

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By producing biofuel feedstock in addition to food crops, smallholder farmers can generate income from local, national and potentially international markets. They thereby reduce financial risk by diversifying from perishable food crops. Energy crops such as jatrohpa also tend to be more drought-resistant (Dufey, 2006).

Jatropha production projects in Kenya have also demonstrated that local biofuel markets not only provide incentives for landscape restoration but also provide farmers with cash which in turn can support an energy switch from fuel-wood to cleaner, more efficient energy sources.

Enabling a sustainable and equitable biofuels future

Biofuels encouraging free and fair trade
The rapidly developing biofuels market has the potential to change the face of agricultural production systems around the world, particularly for developing countries whose economies tend to be based on agriculture.

The new demand for agricultural products increases their value and provides opportunities for refined, value-added products, furthering opportunities for economic development. However, the potential for international trade in biofuels is currently limited by tariffs to protect domestic industries (WRI, 2006). Large subsidies on crops, particularly corn, also serve to distort the commodities market. The role of trade needs to be enhanced at all levels.

Although at least 90% of biofuel production is currently consumed domestically, international trade is expanding rapidly as countries with limited land availability for growing biomass feedstock import. Brazil already supplies half of the global bioethanol market and has recently signed a significant deal with the US. Indonesia and Malaysia are increasing supplies to meet EU targets for fuel transport blends (Dufey, 2006). This desire by many governments to promote biofuels presents an opportunity to change agricultural polices that currently prevent efficient trade of biofuels, such as through the Doha round of world trade talks.

Market tools for biofuel development
Governments should go further than the removal of harmful subsidies in energy markets, by identifying ways of internalizing negative externalities associated with all energy production, distribution and consumption in the price of energy options. For example, the harmful effects of climate change should be reflected in policies which promote a price on greenhouse gas emissions.

Biodiversity offsets and payments for ecosystem services are mechanisms which should be explored as ways to internalize externalities associated with energy production, distribution and consumption. Such measures would help create a more level playing field for available renewable technologies and would encourage further innovations towards more sustainable technologies. National targets in addition to certification schemes can also serve to create new markets and increase demand.

Cooperatives for biofuels
Agri-business and larger farms are likely to have an increasing role in the biofuels market. To ensure that low-income farmers and foresters are able to benefit from developments in biofuels, supportive government policies are required to protect vulnerable rural communities, such as land reform and local ownership. Successful coffee and cotton cooperative models could be replicated for biofuel production. Labour standards should also be incorporated into biofuel production criteria.

Meta-certification for biofuels
Clear guidelines for biofuel feedstock best practice are required, accompanied by strong and well-implemented policies to prevent environmental degradation and potential social conflicts. Incentives linked to international standards and certification, adapted to local landscapes, offer one such tool.

The Roundtable on Sustainable Biofuels is a new multi-stakeholder initiative to define sustainability in biofuels and promote more sustainable and equitable production systems through a global meta-standard and certification scheme. Led by École Polytechnique Fédérale de Lausanne, the Roundtable, will build on national criteria already developed by the Netherlands, the UK and Germany, and will also link to the respective roundtables on soy and palm oil and existing certification schemes such as FSC, fair trade and organic agriculture.

The Roundtable will develop a scorecard process that not only encourages minimum sustainability requirements but will also reward behaviour which enhances ecosystems and livelihoods, such as those highlighted in this background paper. Given the pace of change in the biofuels sector, the Roundtable aims to have the criteria in place by the end of 2008.

Biofuels as part of an appropriate energy mix
Biofuels should only be considered within the context of a low-carbon energy mix including alternative energy sources, which in turn should be accompanied by campaigns on energy optimization, such as energy efficiency legislation and awareness campaigns to reduce energy wastage.

This concept applies also to the different types of biofuels; careful attention should be paid to overall efficiencies and emissions in the lifecycle of various feedstock, including farming and conversion processes. This lends itself to the promotion of using locally-available biofuel feedstocks that are readily available such as waste products.

Summary

Well-planned biofuels production can contribute to a more sustainable energy future while providing opportunities for landscape management and rural livelihoods development, though policies relating to biofuels may undermine food security, degrade ecosystems and prevent rural farmers from benefiting from biofuel markets.

Clear guidelines for biofuel feedstock best practice are required, accompanied by strong and well-implemented policies to prevent environmental degradation and potential social conflicts.

The desire of many governments and industry to promote biofuels presents an opportunity to ensure biofuel development proceeds, as part of an appropriate energy mix, in ways that support and complement agricultural landscapes, providing and enhancing ecosystem services and livelihoods.

References

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CSD Side event agenda

Wednesday 2nd May, 2007 1.15-2.45 pm in Conference Room 4, UN, New York

Time	Session and speaker
1.15pm	**Welcome and overview** Ms. Andrea Athanas, World Conservation Union (IUCN)
1.25pm	**Session 2 – Current trends in bioenergy** Mr. Jeff Tschirley, Chairman of the FAO Interdepartmental Working Group on Bioenergy
1.35pm	**Session 1 – Visions of a sustainable and equitable biofuels future** Ms. Barbara Bramble, National Wildlife Federation
1.45pm	**Session 3 – Sustainable agriculture for biofuels** Ms. Suzanne Hunt, Worldwatch Institute (TBC)
1.55pm	**Session 4 – Jatropha for landscape restoration and sustainable livelihoods** Dr. Daniel Nyamai, Trees On-Farm Network (World Agroforestry Centre)
2.05pm	**Session 5 – Fair Trade for biofuels and sustainable development** Ms. Annie Dufey, IIED
2.15pm	**Session 6 – Ensuring that biofuels deliver on their promise of sustainability** Ms. Charlotte Opal, Roundtable on Sustainable Biofuels
2.25 – 2.45pm	**Session 7 – Open discussions** Facilitated by Andrea Athanas

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