Strategic Environmental Assessment and Biofuels: Establishing Linkages

- What are biofuels
- What are the costs and benefits of biofuels
- Biofuel sustainability criteria
- Why SEA for biofuel policies, plans or programmes (PPP)
- Principles of SEA applied to biofuel PPP

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Strategic Environmental Assessment and Biofuels: Establishing Linkages

The challenges and impacts of biofuels are the subject of much debate among the general public, policy-makers, the NGO community and industry. Strategic Environmental Assessments (SEA) provide a means of informing relevant stakeholders about the potential impacts of biofuel policies, plans or programmes in parallel or prior to their planning and implementation. Further, they can help promote informed, strategic decision-making, including elaboration of alternatives, best options, win-win strategies and measures to enhance positive impacts and minimise negative ones. This fact sheet describes the challenges facing biofuel policies, plans or programmes (PPP) and a generic approach to using SEA for PPP planning and assessment.

What are biofuels?

Biofuels are energy carriers derived from processed or unprocessed plant biomass. Bioethanol and biodiesel are the most common forms of biofuels. *Bioethanol* is derived from sugar or starch crops (e.g. sugar beets, sugar cane or corn). *Bioethanol* can be used directly in specially designed internal combustion engines or blended with petroleum-based fuels. Biodiesel is derived from vegetable oils (e.g. rapeseed and soy). Waste residues (e.g. waste cooking fat) can also be converted into biodiesel. Biodiesel can be fired directly in diesel engines or blended with diesel derived from fossil fuels.[1] So-called second generation biofuels are derived from cellulosic materials (e.g. timber, grasses and some water-crop residues). However, these technologies are not yet available on a commercial scale.

Facts

Fact 1:
Biofuel production in Brazil has created 1 million new jobs while keeping 30% of sugarcane plantations in the hands of independent, predominantly small-scale farmers. (SDC, 2007. p. 6)

Fact 2:
Some biofuel production has been associated with large-scale deforestation and related increases in GHG emissions and decline in biodiversity. This is particularly the case with Malaysian an Indonesian palm oil and Brazilian soy products. (von Braun, Joachim and R.K. Pachauri, (2006): The Promises and Challenges of Biofuels for the Poor in Developing Countries)

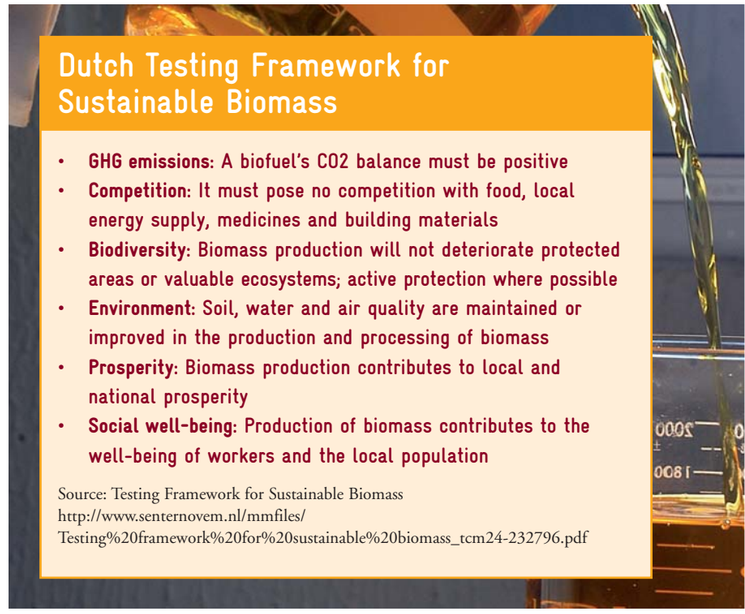
What are the costs and benefits of biofuels?

Sustainably produced biofuels are arguably a means of reducing dependency on fossil fuels and reducing global greenhouse gas (GHG) emissions while simultaneously enhancing economic productivity and livelihood benefits, particularly in rural areas. However, intense policy debates reveal that many questions remain unanswered and not all impacts have been evaluated, thus demonstrating the need to develop a model for sustainable biofuel production and adequate policies addressing biofuels.

[1] The fact sheet focusses on biofuels for transport. Biofuels for stationary uses – electric power and heat production – are not taken into account, even though the impacts, etc. are comparable.

On the one hand, biofuels may reduce dependency on petroleum and help ensure energy security in an era of unprecedented growth in energy demand by providing an alternative to oil and a decentralized supply of energy available locally (thus implying currency savings through reduced oil bills). Other benefits may include lower greenhouse gas emissions, increased job and income opportunities – often for the rural poor – and creation of new markets for farmers to sell their crops.

However, biofuel production may lead to greater conflict for scarce land and natural resources. It can acerbate market competition for scarce food resources (such as corn used both as a food staple and for biofuel production, driving food prices higher and weakening food security), adversely affect water, land and air quality and negatively impact biodiversity and forest conservation efforts. Furthermore, depending on the production method used, biofuels can release more rather than less GHG.



Dutch Testing Framework for Sustainable Biomass

- **GHG emissions:** A biofuel's CO2 balance must be positive
- **Competition:** It must pose no competition with food, local energy supply, medicines and building materials
- **Biodiversity:** Biomass production will not deteriorate protected areas or valuable ecosystems; active protection where possible
- **Environment:** Soil, water and air quality are maintained or improved in the production and processing of biomass
- **Prosperity:** Biomass production contributes to local and national prosperity
- **Social well-being:** Production of biomass contributes to the well-being of workers and the local population

Source: Testing Framework for Sustainable Biomass http://www.senternovem.nl/mmfiles/Testing%20framework%20for%20sustainable%20biomass_tcm24-232796.pdf

Biofuel sustainability criteria

Many organisations and governments are currently developing sustainability standards and criteria for biofuels in order to ensure that biofuels are produced in a sustainable manner. One example is the Dutch *Testing Framework for Sustainable Biomass* developed by the *Cramer Commission*, which can serve as a review framework for a biofuel-related SEA (see box). The European Commission is to link promotion of biofuels to compliance with sustainability standards.

Why Strategic Environmental Assessment for biofuel PPPs?

The OECD Good Practice Guidance defines SEA as *"analytical and participatory approaches that aim to integrate environmental considerations into policies, plans and programmes and evaluate the inter linkages with economic and social considerations".*

Hence, SEA is not a single, fixed and prescriptive approach, but rather an umbrella approach using a basket of analytical and participatory tools.

Implementation of SEA for biofuels can help provide better insight into the trade-offs between environmental, economic and social issues related to biofuels, thereby enhancing the chance of using alternatives instead of producing biofuels and finding win-win options or an adequate balance at early stages of the policy-making or programme-planning process. However, while an SEA can serve as a starting point for developing policies on sustainable biofuels, it does not guarantee sustainable production as such. SEA is not a cure-all instrument to "repair" damages caused by unsustainable production of biofuels.

Application of SEA to strategic planning and decision-making concerning biofuels provides compliance with the EU SEA Directive, the OECD Good Practice Guidance for SEA in Development Cooperation, the guidelines articulated in the Convention on Biological Diversity and with the

Paris Declaration on Aid Effectiveness, which encourages all signatories to develop and apply common approaches for SEA. SEA is mandatory in most industrialised countries, and many developing and transition countries have begun developing legal frameworks for SEA.

Principles of SEA applied to biofuel PPPs

Start early

Once a PPP is well underway it is very difficult to make fundamental changes, truly consider alternative means of achieving objectives, or even to integrate meaningful mechanisms to maximise benefits and mitigate costs. It is therefore best to start the SEA as early as possible in the biofuel development planning process in order to pro-actively influence decision-making before implementation. Thus, it is beneficial to undertake SEA and PPP development in parallel.

Have thorough knowledge of the context

The IIED decision tree (see chart) gives a good overview of the types of questions to ask and alternatives to be considered when planning biofuel development. Using the IIED decision tree as a starting point, SEA can be used to provide insight into:

What the primary objective(s) of the biofuel-related PPP are, e.g. energy security, livelihood impacts, export development and GHG reductions (see next section);

When decisions need to be made and which have priority;

Who the responsible agencies, owners/developers and stakeholders of the PPP are;

Where the PPP draws its boundaries, both spatially (geographically) and temporally (what is the timeframe?);

How problems that might be encountered can be solved.

Consider all key impacts for example on energy security, livelihood impacts, biodiversity, land use, export and GHG reduction

Any biofuel-related PPP is likely to have impacts on all of the areas listed in the above heading. While there may be potential to focus on one area in particular depending on local and/or national priorities, it is important to consider positive and negative impacts in all areas.

Significant questions to consider in the SEA include:

- Is biofuel development likely to contribute to energy security in a national context? In an international context? In rural as well as urban areas? Are there alternatives and other best options?
- What are the likely impacts on livelihoods, job creation, economic growth, land use and associated land for agriculture, and food prices? What are the impacts in urban vs. rural areas? If biofuels are likely to increase income, whose income?
- What regulations are in place to ensure sustainable production of biofuels? What is needed to enable sustainable production?
- Is existing trade legislation conducive to supporting export of the biofuel once produced? What impact could restrictions have?
- What is the likely effect on greenhouse gas emissions? What types of production processes (e.g. transport, conversion factors) could be changed to minimise emissions?
- How can associated risks in the regional/national context be avoided? What measures need to be taken?
- Is biofuel development the best option for economic development of the area concerned?

Undertake the SEA in a participatory manner

Preparing effective stakeholder participation requires mapping of the main actors and their concerns. It is therefore essential to identify not only the stakeholders involved in biofuel production itself, but also those groups it could impact. Examples may include – but are not limited to – energy companies, private sector actors involved in energy marketing or development, local farmers, poor and vulnerable groups that could be threatened by land disputes or increase in food prices, and indigenous people, etc. Interview, assess and document potential "winners and losers". A substantial part of the SEA budget should be allocated to communication with key actors.

Incorporate process chain analysis

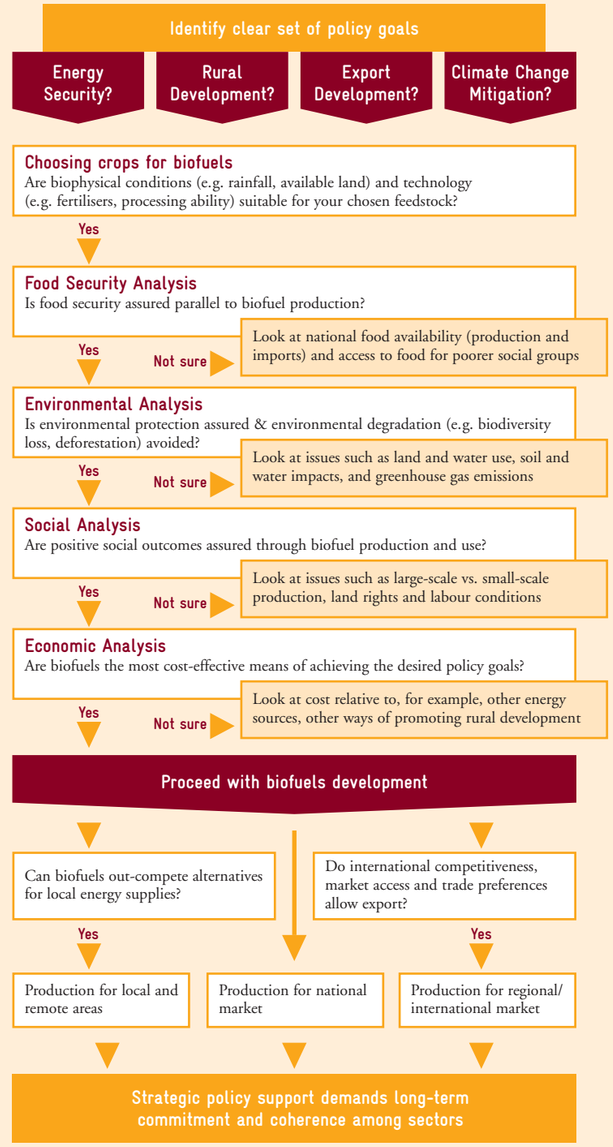
Many of the potential positive and negative impacts of biofuels can be enhanced or negated by elements of production, as shown in the diagram below. For example, positive impacts on GHG emissions can be negated by energy-intensive production requiring changes in land use and heavily energy-dependent machinery, use of fertilisers and pesticides, or by deforestation. A process chain analysis applies the "well to wheel" principle, providing full-chain analysis of water efficiency, energy efficiency, fossil energy ration, biodiversity impacts and sustainability impacts.

General steps of SEA

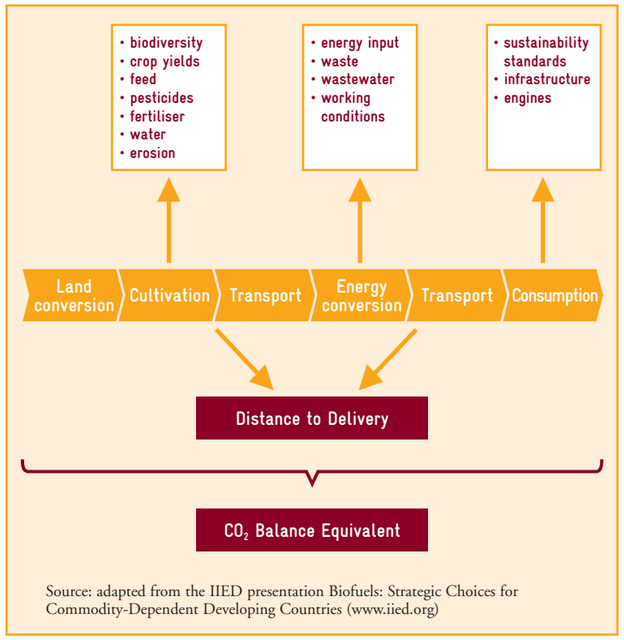
1. Establishing the context
   - screen the need for the SEA
   - set objectives
   - identify stakeholders
   - develop a communication plan
2. Implementing the SEA
   - collect baseline data
   - scope in dialogue with stakeholders
   - identify alternatives and their impacts
   - identify options for mitigation and compensation
   - arrange quality assurance of the assessment
3. Informing and influencing decision-making
   - Make recommendations in dialogue with stakeholders
4. Monitoring
   - Monitor and evaluate effects on plans and programs after implementation

Source: OECD (2006): Applying SEA: Good Practice Guidance for Development Co-operation. www.seataskteam.net

IIED Decision Tree



Source: adapted from the IIED presentation Biofuels: Strategic Choices for Commodity-Dependent Developing Countries (www.iied.org)



Source: adapted from the IIED presentation Biofuels: Strategic Choices for Commodity-Dependent Developing Countries (www.iied.org)

Use capacity analysis at the policy level

Application of SEA at the policy level is still relatively rare, and codification of the prescribed steps is difficult, as the processes of policy-making vary considerably and ultimately, by definition, involve political considerations. SEA undertaken at the policy level demands a thorough understanding of politico-economic factors and institutional settings. To be able to reduce risks and ensure preparedness for the consequences of biofuel development through a policy-level SEA, the following three issues should be addressed:

- Identification of environmental and poverty-combating priorities and how these may be influenced by different biofuel development options and alternatives;
- Assessment of the country's/region's related institutional and economic capacity to deal with the identified negative consequences of biofuel development;
- Where systems fail, recommendation of institutional and governance-strengthening measures.

Recommendations

As demand for energy continues to grow, it is very likely that biofuels will play an important part in meeting this need. If decisions are taken to implement or even expand biofuel production that involves risks, it is essential to ensure that biofuel-related development is sustainable – i.e. economically, environmentally, socially and over the long term. In this context, it is essential to never lose sight of the "big picture." The IIED decision tree illustrates just how important it is to integrate identification of environmental, economic and social impacts into every step of the development process – from choice of crop to end-use as fuel.

In order to successfully apply SEA to biofuels, the following recommendations should be considered:

- **Context:** Communicate and ask questions to ensure that the process is as well-informed as possible; include all stakeholders; inform and consult with the public;
- **Planning:** Begin early and integrate the SEA in into the PPP to maximise participation in decision-making; plan for now and for the long-term;
- **Analysis:** Use process chain analysis to increase awareness; find out how different options or alternatives concerning issues such as transportation or renewable energy sources can tip the scales towards or away from a positive CO_2 balance; use capacity analysis to understand the institutional framework helping or hindering biofuel development; identify whether alternatives to biofuel production exist that would be economically more promising, in particular for the poorest;
- **Implementation:** Understand the risks and benefits associated with biofuel production; find the mixture that provides the best balance within your established context;
- **Monitoring:** Evaluate whether reality is in line with the assessment made; use lessons learned to improve future SEA processes.

Sources of information and further tools

- CBD Guidelines on SEA and Biodiversity (2006): UNEP/CBD/COP/8/27/Add.2, Annex II.
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