



Key research findings

Forests and biofuels

What policymakers should know

- **First generation liquid biofuels:** Fluctuating oil prices and growing concerns about climate change have led to a renewed commitment to renewable energy – mainly from industrialised countries – aimed at expanding the production and use of first generation liquid biofuels from crops such as oil palm, sugarcane, soybean and *jatropha* for transportation. However, because first generation biofuels are made from the sugars and vegetable oils found in arable crops, there is some concern that expansion of these feedstock crops can have negative impacts on forests due to direct and indirect land use change.¹

Liquid biofuels have been promoted as a source of renewable energy that contributes to energy security, rural development and greenhouse gas (GHG) emissions reduction when compared to fossil-derived fuels. Many countries have now established targets for incorporating biofuels into the supply of transport fuel. For example, the European Union's Renewable Energy Directive (EU RED), adopted in 2009, mandates each member state to ensure that at least 10 percent of fuel consumed in its transport sector is derived from renewable sources – including biofuels – by 2020.²

- **Carbon debt:** Land use change for biofuel crop plantations can have many environmental and social implications. A recent CIFOR study showed that if the full lifecycle of GHG emissions is taken into consideration, carbon emissions generated from land conversion for biofuel feedstocks may take years or even centuries to reverse through substitution of fossil fuels with biofuels.³ Furthermore, biofuel feedstock cultivation can lead to a loss of land rights and labour opportunities for local communities, as well as threats to food security, which have deleterious impacts on customary land users.

To combat these impacts, some markets such as the European Commission (EC) have established a set of sustainability criteria to which producers must comply for biofuels to contribute towards the 2020 target. In July 2011, the EC approved the first seven 'voluntary schemes', which may be used by biofuel feedstock producers and processors to certify that their operations are in compliance with the EU RED sustainability criteria. These address environmental criteria, but have yet to incorporate social sustainability components.⁴

- **Second-generation biofuels:** As the global demand for energy increases in the future, different sources of forest biomass may play a vital role in providing a more stable energy future. Second-generation biofuels are those made from woody crops, agricultural residues or waste, which makes it harder to extract the required fuel compared to those produced from arable crops. However, scientists believe the development of second-generation bioenergy is on the horizon, even though a product is not yet on the market, and this could benefit the economic sustainability of forestry.⁵

Notes

- 1 Havlík, P., Schneider, U.A., Schmid, E., Böttcher, H., Fritz, S., Skalský, R., Aoko, K., de Cara, S., Kindermann, G. *et al.* 2010 Global land use implications of first and second generation biofuel targets. *Energy Policy*, <http://dx.doi.org/10.1016/j.enpol.2010.03.030>; Fischer, G., Hitznyik, E., Prieler, S., Shah, M. and van Velthuizen, H. 2009 Biofuels and food security. IIASA, OFID. Vienna, Austria.
- 2 http://ec.europa.eu/energy/renewables/index_en.htm
- 3 Achten, W. and Verchot, L. 2011 Implications of biodiesel-induced land-use changes for CO₂ emissions: case studies in tropical America, Africa, and Southeast Asia. *Ecology and Society* 16(4): 14, <http://dx.doi.org/10.5751/ES-04403-160414>.
- 4 German, L. and Schoneveld, G. 2011 EU sustainability schemes fall short of safeguarding rural livelihoods. <http://blog.cifor.org/4546/eu-sustainability-schemes-fall-short-of-safeguarding-rural-livelihoods/>.
- 5 Eisentraut, A. 2010 Sustainable production of second generation biofuels: potential and perspectives in major economies and developing countries. International Energy Agency, Paris, France.

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