

Discussion Group: Biofuels and energy development

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Four questions were suggested for discussion:

- 1) Will an expansion of biofuels harm the poor by pushing up the price of food?
- 2) Will it lead to removal of tropical forest and other environmental damage?
- 3) Will it save on GHG emissions? And,
- 4) Do biofuels represent an opportunity for poor farmers in developing countries?

A **background paper**, on the website —

http://climateanddevelopment.nri.org/background_papers/wiggins_biofuels.pdf — provides some material, in part derived from the findings of studies carried out in the first half of 2008 as part of the Gallagher Review of the indirect effects of biofuels.

Issues raised in the two discussion sessions:

Biofuels, prices, hunger and poverty

All models agree that an expansion of biofuels will drive up world prices of the main feedstocks for biofuels — maize, sugar cane and beet, rapeseed, and palm oil. Impacts may be much smaller on the prices of crops not currently considered for feedstock, including rice, one of the most important grains for food security.

Simple calculations of the effects of price rises on the real incomes of the poor in the developing world suggest that biofuels may indeed exacerbate poverty, but by a small margin, 1 or 2 percentage points in most countries — and one that countervailing compensation could feasibly offset.

Concerns were raised about the effects on the poor in Indonesia, where NGOs are struggling and are predicting food shortages within the next 10 years, regarding the destruction of the rainforest in Borneo and Sumatra.

An important uncertainty is the availability of second generation conversion of feedstock to biofuels which produce ethanol from cellulose and ligneous matter. This holds potential in the use of grasses, shrubs, and residues as feedstock. However, as yet it is uncertain when these technologies may become commercially viable. At present these are not cost effective. It was noted that the use of fertiliser would need to be taken into account.

Biofuels, environmental impact and saving on greenhouse gases (GHG)

Much concern arises from the direct and indirect effects of expanded biofuels production on land use, and on the extent to which production of biofuels results in lower emissions than the use of fossil fuels. Releases of nitrous oxides from soils cultivated for biofuels, emissions in distilling ethanol, and above all release of carbon when forests and grasslands are converted to arable fields can easily offset all the GHG savings that biofuels potentially offer.

Searchinger and colleagues (2008)¹, argue that the switch to maize production for biofuels instead of soy will result in the USA import of soy from Brazil. The change in land use in Brazil to account for the expansion of the soy export market will, it is claimed, result in no net savings on GHG emissions.

For example, if savanna in Brazil is replaced with soy, it would require a 5,500 year payback period to negate the effect of carbon released to the atmosphere from conversion, before a saving from biodiesel compared to fossil fuels of 30% could be realised.

Pimental and colleagues from Cornell wonder whether there are any net energy savings in producing biofuels, given the amount of energy used in maize cultivation in the USA.

There was much discussion on Indonesia and concerns were raised regarding the destruction of the tropical rainforests in Borneo (especially Malaysian Borneo) to make way for oil palm plantations. It was agreed that economics were the driving force behind the increase in plantations — simple calculations of the returns to oil palm show how attractive it is convert the forest. Concerns were also raised regarding Sumatra's tropical forest and peat swamp.

Additional environmental concerns include the Borneo Orang-utan population which inhabits the rainforest.

General concern was agreed over the clearing of forests to make way for oil palm plantations and large scale illegal logging in the region and the resultant effect of GHG emissions.

Much depends on the type of feedstock used and processing. Sugar cane (ethanol) in Brazil probably saves in emissions. Feed wheat distilled into ethanol by a NE England company could also have low net emissions, since the by-product of distilled grains from feed wheat can replace soybean meal. The company involved thus claims GHG credits from avoided soy cultivation in Brazil.

Human rights are affected as well: currently more than 40 court cases over land rights between local people and oil palm companies, regarding local people right of land use, have been filed in Indonesia. Similar cases of people displaced by oil palm plantations have been reported for Colombia.

On the other hand, in Brazil it is claimed that producing cane for ethanol creates more jobs than most alternative crops would.

Biofuels and the opportunities for poor farmers in the developing world

Simple calculations of gross margins per hectare that smallholders could achieve show substantial returns for growing sugar cane for ethanol. There were implicit returns of over \$10 per day worked on cane which has the potential to be good for the poor. Oil palm cultivation looks similarly attractive, although in this case it may be the value of the oil in current uses equals or exceeds its value as biodiesel feedstock.

For countries with potential but as yet unused arable land, there may be the ability to develop biofuels and save foreign exchange currently spent on importing oil. This might apply to land-locked Malawi. Currently it blends ethanol 10% from molasses into its fuel. If it replaced 50% of fuel with ethanol from cane, this might require no more than a further 9,000 hectares of cane, a crop that Malawi currently produces at very low cost. FAO data suggest the spare land exists, although whether this would be irrigable or otherwise suitable for cane remains to be proved. To suggest devoting land to producing biofuel feedstock in Malawi would be sensitive in a country where food insecurity affects so many, even if the economic benefits of

¹ Searchinger T, Heimlich R., Houghton R. A., Dong F, Elobeid A, Fabiosa J, Tokgoz S, Hayes D & Yu T H. 2008. 'Use of U.S. croplands for biofuels increases greenhouse gases through emissions from land use change' Science Express 319, 1238-1240 (2008). With supporting on-line material at: www.sciencemag.org/cgi/content/full/1151861/DC1

the saved foreign exchange potentially could generate additional jobs and incomes to reduce poverty and hunger.

It is one thing to have the potential for biofuels, another that this benefits the poor. How the benefits of crop production are distributed is important. Displacement of population from land being converted to biofuels would again be an issue — see the discussion in the previous section.

In Mozambique, a country with large reserves of unused agricultural land, there may be the possibility to use coconut oil to make biodiesel, using the large areas under palm trees on the coastal strip.