European Commission

Science for Environment Policy

Limiting bioenergy crops to marginal land would not work, says study

Large-scale cultivation of bioenergy crops on marginal land is unfeasible, according to a recent study. While limiting bioenergy crops to less productive land could cut the sector's impact on food prices, the financial incentive to grow crops on more productive land may be too strong for landowners to ignore, the researchers suggest.

During recent decades, there has been a growing interest in the use of bioenergy as a means to mitigate climate change. However, significant increases in food prices have raised concerns that bioenergy crops are competing for land with food crops.

So far, research has tended to use highly detailed models to identify the impacts of bioenergy crop cultivation. These perform well for small predicted increases in bioenergy use in the near future, but are not appropriate to explore the large-scale introduction of bioenergy crops, this study suggests.

This research is the first to explore this issue using a conceptualised model focused on the main mechanisms that capture global impacts in terms of changes in land use, land rent and food prices. It considers three scenarios of biofuel cultivations: (i.) crops are distributed according to market forces, (ii.) bioenergy is not allowed on the two billion hectares that are most suitable for agriculture (productive land) and (iii.) all bioenergy is produced from food-type crops, such as maize or wheat. The modelling also investigated the impact of allowing and disallowing deforestation.

Introducing large-scale bioenergy crops (enough to produce 120 x 10^{18} Joules) was projected to have a clear impact on land rents, owing to increased competition for land, particularly if bioenergy is produced from food-type crops. In all cases, this increase in land rent causes an increase in food prices.

The long-term increase in food prices ranged from about 7% (scenario ii where bioenergy crops were grown intensively on less productive land) to about 115% (scenario iii where bioenergy crops were grown extensively on a wide range of land). Banning production of bioenergy on the most productive land reduced the price impact by half compared to the market forces scenario.

However, there are drawbacks and barriers. Firstly, landowners of more productive land would have strong financial incentives to 'cheat' and grow bioenergy crops. Secondly, it would result in an unfair transfer of wealth from countries with more productive land, to countries with less productive land. As such, it would require an enormous amount of bureaucracy to implement, and is not considered feasible by the researchers.

The study also showed large-scale bioenergy introduction would produce strong incentives for deforestation, in order to free up more land for growing crops. If deforestation were allowed, there would be a drop in food prices for every scenario except where food-type crops were grown for bioenergy.

The research does have limitations. The model is based on an idealised world in which all markets function perfectly, with no trade barriers or market distorting instruments, such as the agricultural policies in the EU and USA. In a more 'real' world, the impact of bioenergy crops could be higher, the researchers warn.

There is also uncertainty around demand factors, such as diet trends and technology developments. Nevertheless, according to its authors, the study provides a clear message of the potential impacts of large-scale introduction of bioenergy crops.

21 March 2013
Issue 322
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Source: Bryngelsson, D.K. & Lindgren, K. (2013) Why large-scale bioenergy production on marginal land is unfeasible: A conceptual partial equilibrium analysis. *Energy Policy.* 55:454-466. Doi: 10.1016/j.enpol.2012.12.036.

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