

Comments on the Gallagher Review of the indirect effects of biofuels production

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Background

In March the Government invited the Renewable Fuels Agency (RFA) to lead a review of the fast-emerging new evidence of displacement effects of biofuels on land-use and impacts upon greenhouse gas emissions. The study is led by Professor Ed Gallagher, Chairman of the RFA, and former Chief Executive of the Environment Agency. Alongside the review of work on the environmental sustainability of international biofuels production and use, the review is expected to inform the development of future biofuel policies and targets, including in particular proposed EU targets for future biofuel consumption.

The scope of the review was to evaluate:

- The extent to which the production of biofuel feedstocks leads to land conversion and
- GHG emissions arising from changes in land use and cultivation practices.

It was furthermore expected to make an “objective, evidence-based assessment of the risks and uncertainty around these impacts and how this can be quantified”.

The review is due to be submitted to Ruth Kelly and Hilary Benn on 26 June 2008.

Overall assessment of the Gallagher review

The Gallagher review has made a valuable contribution as one of the first attempts to analyse the indirect impacts of biofuels on land use. To assess the sustainability of different biofuel options, examining these indirect displacement effects is necessary. However, while a step in the right direction, the Gallagher review has failed to adequately address a number of questions of vital importance. This note focuses on three in particular:

- the insufficient means to deal with the considerable uncertainties in the evidence base,

- overemphasis on macro level modelling as a source of evidence, and
- inadequate attention to the dynamics of innovation – in particular the interaction between the currently available ‘first generation’ biofuel technologies and the more advanced ‘next generation’ options.

Dealing with uncertainties

The primary function of a review exercise of the kind undertaken in the Gallagher report is to provide a basis for policies capable of taking account of the pervasive and often irreducible uncertainties. To do so, the review should help to better understand the drivers and causal forces involved in biofuel developments, and point out main areas of risk and uncertainty involved. The policy utility of the review therefore lies particularly in systematic examination of the key assumptions and conditions under which different interpretations of the evidence look most robust.

However, there is a discrepancy in the Gallagher review between the accuracy of some of the recommendations on the one hand, and the considerable uncertainties on the other. The review pointed out a number of gaps in the evidence base, on issues such as the availability of land for biofuel production and life-cycle GHG emissions from different biofuel options, N₂O emissions from the cultivation of biofuel crops, and the environmental and social impacts of using ‘idle’ or ‘marginal’ land for the production of biofuels. While more research will be useful to obtain better data, many of the key uncertainties stem not from the lack of data, but from uncertainties concerning the underlying assumptions, which in turn reflect the varying value positions, interests, and worldviews of the multitude of actors involved. Most notably, uncertainties concern the importance accorded to conflicting objectives of sustainability: no amount of data can solve the question of how to prioritise between, for instance, the objectives to reduce greenhouse gas emissions, protect local or global biodiversity, energy security, and protection of farm workers’ rights. Better data and sensitivity analyses are therefore not alone enough to reduce the uncertainties to an ‘acceptable’ level; instead, the focus should be in a systematic presentation of such uncertainties and assumptions, rather than on seeking to provide an ostensibly definitive recommendation. To facilitate subsequent decision-making on biofuels, the recommendations might usefully have been formulated as “conditional”, or “what if...” options, clearly specifying the associated assumptions.

The review could have, for instance, start by simply listing the causal factors that in the light of evidence are the most important determinants of indirect land use change. It could then have sought to systematically analyse the underlying assumptions that explain why assessments vary so widely. The review could help us understand under which conditions and assumptions biofuels can be ‘sustainable’, clearly spelling out the relevant trade-offs and choices involved in determining sustainability. In particular, it could indicate the conditions that need to be fulfilled to minimise indirect land use change.

Micro vs. macro; politics vs. ‘hard evidence’

The material produced as evidence for the review contained highly valuable case studies, yet the report itself draws its conclusions very much on the basis of macro scale modelling. While being a useful starting point, macro level analysis has a

number of shortcomings. In relying on average estimates of variables such as productivity and crop yields, such a macro level assessment of the impacts of biofuels disregards the importance of the rich variety of production systems, sites and socio-politic and institutional contexts in which biofuels are produced. These local and regional differences introduce to the modelling uncertainties, which mean that small changes in the underlying assumptions may suffice to tip the balance between positive and negative impacts. Furthermore, an analysis seeking to quantify along a one-dimensional yardstick misses the many dimensions of issues such as poverty. Gallagher report has concluded that biofuels have only small negative impacts on what it calls 'the poor' – poverty being defined in terms of consumption possibilities. This overlooks a number of other social variables, which are often difficult to quantify, such as land ownership, land rights, and equity.

Instead, a case-by-case assessment of the impacts of biofuel supply chains will be needed. This type of analysis would help to understand the causal processes underlying change, and the interaction of political processes at different geographical and administrative levels. It would lay emphasis on what the evidence produced for the Gallagher report rightly recognises key socio-economic factors affecting the potential of biofuels to provide benefits to the poor in the developing countries, such as social cohesion, sense of equity, entrepreneurship, conflicts between sub-national and national policies, and the political will to compensate those who lose out in biofuel development. Further analysis will be needed to help develop methods of biofuel sustainability assessment that are sufficiently robust yet flexible enough to take account of the local and regional variation. Without such micro level analysis, any attempts to govern biofuel developments through e.g. certification are bound to fail.

Innovation dynamics and 'old' vs. new technologies

The report is relatively weak in illustrating the dynamics of possible technological change, which is arguably a crucial factor in determining the future of biofuels. It treats "new technologies" very briefly and superficially. Experience in other areas of innovation shows the repeated importance of detailed dependencies between viabilities of earlier and later technologies. Before decisions on policies to support and regulate biofuel development can be made on a rational basis, further analysis is needed to establish the extent to which and under which conditions the current 1st generation technologies provide a bridge as opposed to being an obstacle to the more sustainable next generation technologies (e.g. cellulosic or algae based biofuels). This would involve analysing a range of potential transition pathways from 1st to 2nd generation technologies and the associated processes of path dependence and dangers of technological "lock-in". Careful analysis will likewise be needed to assess the trade-offs between different uses of biomass: as the evidence produced as background for the Gallagher review demonstrates, competition may arise between the use of biomass waste (e.g. crop and forest residues) for next generation cellulosic biofuel and other uses such as the generation of heat and power. Trade-offs are likely to arise. Overall, the next generation technologies remain very much a promise for the future – they certainly should be given a chance to prove their viability, but care should be taken to avoid betting on one single option, which might lock future development onto an unsustainable pathway.