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Sustainability of Biofuels in the EU Fuel Quality Directive:

Hedging the Risks through Standards, and Avoid GHG Double Counting

– Summary -

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1 Introduction

The proposed revision of the EU Fuel Quality Directive (98/70/EC)[1] is thought to contribute to reducing greenhouse gas (GHG) emissions from transport fuel use, helping to implement the Community strategy on climate change.

As regards biofuels, the draft Directive will allow higher volumes of biofuels to be blended into diesel and gasoline, and it will implicitly limit GHG emissions from the production of biofuels as well.

Key elements of the proposed revision of the Fuel Quality Directive are

- a mandatory **monitoring** of life-cycle GHG emissions up from 2009, and
- the requirement to **reduce** GHG from all transport fuel production and use by 1% per year, starting in 2011, resulting in a 10% reduction by 2020, as compared to the 2010 level.

In combination with the parallel mandatory target of 10% biofuel share in all transport fuels by 2020 in all EU Member States which is thought to introduce sustainability standards for biofuels as well, the directive **could** create a comprehensive regulatory framework for sustainable biofuels in the European Union.

This paper briefly reflects upon the requirements for such standards, and also discusses issues of consistency as regards GHG accounting.

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1 Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EC.

2 Sustainability of Biofuels

Biofuels offer substantial opportunities, but biofuel development could also pose severe sustainability risks:

- Displacement effects from biofuel production on land which has been used before – these effects can occur across borders
- **No individual project or certificate/label** can **fully avoid** land-use shifts from biofuels
- GHG impact from indirect land-use changes **could offset** GHG benefits of biofuels, and biodiversity impacts could be severe

As there is no short- to medium-term option to fully avoid these risks, there is a clear need to ”hedge“ risks through national, EU, and global standards.

The domestic EU bioenergy potential is still high, even if ambitious sustainability standards are assumed (EEA 2006).

3 Sustainability Standards

Sustainability standards have been suggested by various parties (see OEKO 2006). The core elements of sustainability standard for biofuels are as follows:

- **Priority land-use:** biocrops on „unused“ land
- biomass from **non-food** crops + **residues/wastes**
- **Maximum** standards for **GHG emissions** from cropping + biofuel conversion, incl. CO_2 from **direct** land-use change **and** CO_2 **„risk adder“** for displacement potential (0 for „unused“ land + residues/wastes)
- Protection of **biodiversity** (**exclusion** maps)

As biodiversity impacts result not only from biofuels, but also from fossil fuels (extraction, oil spills…), exclusion maps should be part of Directive for **all** fuels.

4 GHG from Land-Use and Land-Use Changes

Growing feedstocks for biofuels needs land, which might cause land-use changes **both** regarding

- **direct** effects on the site of farming (or other form of biomass production), and
- **indirectly** through "leakage", i.e. shifts of previous land use to another location where **additional** land-use changes could occur.

Both effects could have significant impacts on the overall GHG balance of biofuels, so that a methodology is needed to include both in GHG accounting.

4.1 Direct Effects

As regards GHG emissions of biocrops stemming from **direct** land-use changes, the carbon balances of the previous (pre-project) land-use and the land-use for biocrops must be established regarding

- **above**-ground carbon content of existing vegetation (if any), as well as the
- **below**-ground (soil) carbon[2].

Each balance might be negative or positive, so that the **total direct** C balance could also be negative or positive.

To derive the respective balances, **IPCC 2006 default data** for direct land-use changes, and soil-carbon changes should be used. To allocate net CO_2 balances to annual bioenergy production, a time horizon of 20 years should be used, i.e. the total net CO_2 emissions from direct land-use changes is distributed over the total energy yield from biocrops for a 20 year time frame.

4.2 Indirect Effects

The GHG emissions related to **indirect** land-use changes (e.g., deforestation) which could result from shifting pre-project land-uses (e.g. food/feed cropping) to other areas **cannot** be determined with respect to a given biocrop project;

This "leakage" could occur in other areas (even outside of a country), with significant time lags, and could be caused by non-project-related actors.

Still, the potential magnitude of GHG from leakage could offset any GHG reductions from biofuels, so that the **risk** of leakage should be factored in.

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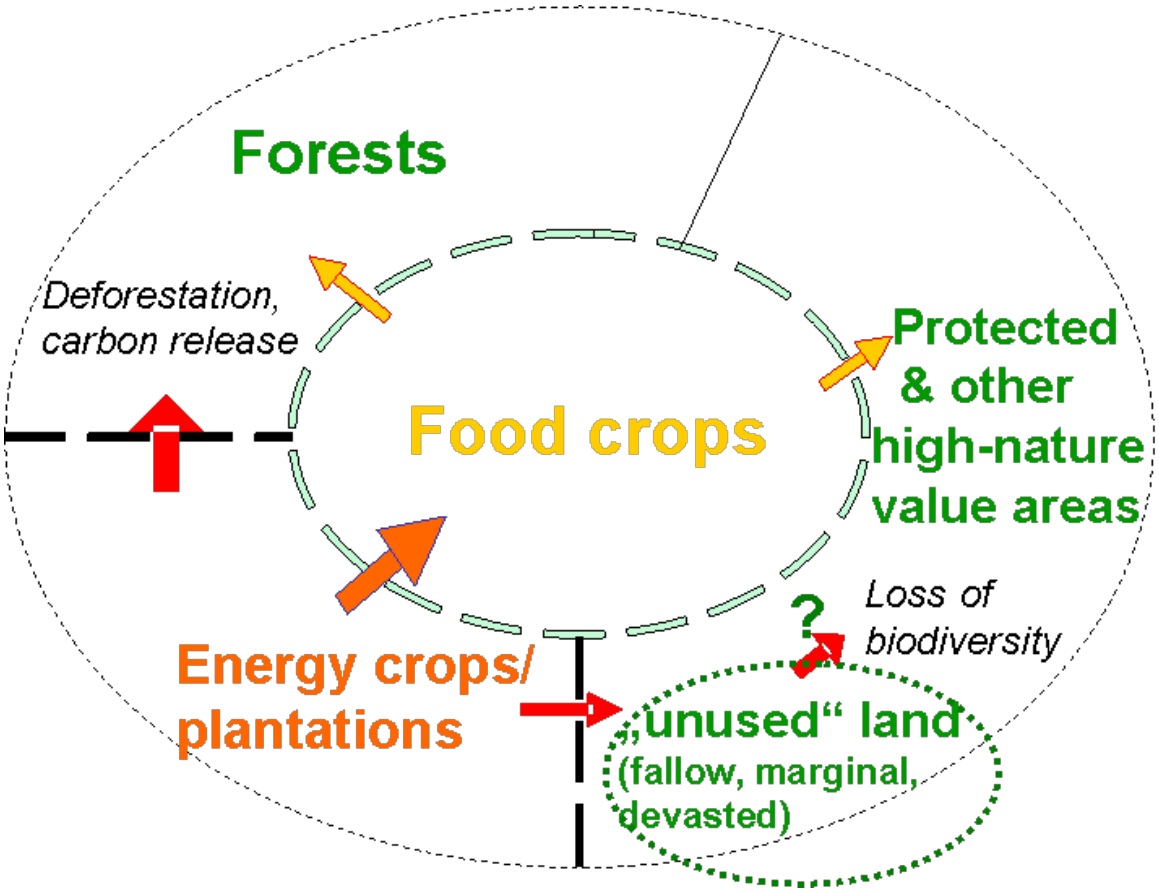
2 It should be noted that direct land-use changes not only affect the C balance, but could also change emissions of CH_4, and N_2O. For reasons of simplicity and data availability, only CO_2 from the net C balance is considered for the direct and indirect GHG emissions from land-use changes.



Source: based on Girard (GEF-STAP Biofuels Workshop, New Delhi 2005)

4.3 Biomass from Residues/Wastes, and from "Unused" Land

Biofuel feedstock production can also come from "unused" (e.g. idle, fallow, marginal or degraded) land, or from collecting unused residues and wastes. In this case, GHG emissions from **direct** land-use change usually are **zero or even negative**[3], and **indirect** effects (leakage) can reasonably **assumed to be zero** as well[4].

For all other cases, avoidance of net GHG emissions from leakage **cannot** be assured even if a strict certification scheme for each hectare of biofuel feedstock production is assumed.

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3 Biocrops which can be grown on marginal and degraded land - such as Jatropha, some perennial grasses, and short-rotation coppice - *increase* the soil carbon through carbon fixation in roots. Biogenic residues and wastes usually have to be disposed. If landfilling is the pre-project alternative, GHG emission savings might occur due to offsets of CH_4 from landfills.

4 For biocrops grown on „unused" - i.e., idle/fallow, marginal, or degraded - land, potential negative impacts on **biodiversity** have to be considered, as these lands might have high-nature value. On the other hand, growing biofuel feedstocks on degraded land has **positive** effects on (agro)biodiversity. Careful consideration must be given to the reality of residues and wastes being "unused", as these materials might be used as **non-marketed** fertilizers or animal feed by poor neighbors, and reduced availability might result in reduced organic soil carbon with C leakage from soil degradation, or social impacts such as increased food insecurity.

5 Considering CO_2 from Biofuel-related Leakage

Given this, the GHG accounting for biofuels must

- either **require conditions of zero leakage** (i.e. by "allowing" only residues and wastes as feedstocks, and restricting biocrop production to "unused" land, or considering only yield increases[5]),
- or add a **risk component** for CO_2 from potential leakage to the overall GHG balance.

As currently no realistic means of implementing of the first option is foreseeable, the latter option should be pursued, i.e. the inclusion of a **CO_2 risk adder** for all biocrops from agricultural land to capture the potential for carbon releases from leakage. The quantification rules for the risk adder has been proposed (Fritsche 2007), and is still under development.

6 GHG Reduction: Avoid Double-Counting

The Draft EU Fuel Quality Directive calls for a mandatory GHG reporting requirement for all fuels – this is useful and possible.

Still, the overall reduction target needs further clarification:

- **Avoid „double counting"** of GHG reduction along fuel cycle (e.g. refineries „capped" under CO2 Emission Trading; oil/gas JI projects in Annex I countries; CDM projects in biofuel exporting countries)
- „Alignment" and cohesion needed with **EU Renewable Energy Directive** (minimum GHG reduction from biofuels; accounting methodology, biodiversity requirements)
- **Clear concept** and language on separating from **other** GHG **policy instruments (**ETS; JI/CDM…)

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[5] This concept is proposed by Ecofys to hedge the leakage risks. From the author's point of view, there are both severe practical limitations to this concept (e.g. data availability and reliability), and potential negative trade-offs for biodiversity (e.g. intensified agrochemical use, GMO crops).