WWF response on the EU consultation on indirect land use change

1. The sustainability gap of the RED

The Renewable Energy Directive (RED) sets out an overall 20% renewable energy target for the European Union by 2020[1]. For the transport sector the RED contains a 10% renewable energy target by 2020 mandatory for each Member State. Biofuels are expected to provide the majority of the renewable energy in the transport sector. Based on the analysis of the National Renewable Energy Plans, first generation biofuels will contribute with around 90% of the 10% transport target in 2020 (ECN 2010).

In response to concerns about the sustainability of biofuel production and use, the RED contains a set of sustainability criteria. Only biofuels that meet the sustainability criteria will count towards the target of the RED. The key sustainability criteria in the RED aim to prevent conversion of areas with high biodiversity values or carbon stocks for energy crop production. The current sustainability criteria in the RED only include criteria for the prevention of unwanted direct land use change (LUC). They do not address the so-called indirect effects of biofuel production. The key indirect effect is indirect land use change (ILUC) - with resulting consequences for biodiversity, carbon stocks, land rights and rising food prices.

Such indirect effects can occur when bioenergy feedstock production displaces other land uses or provisioning services such as food production. From WWF's point of view this is a major sustainability gap in the RED, and a policy solution as proposed below needs to be implemented to ensure that biofuels deliver what they are expected to deliver: greenhouse gas savings in comparison to fossil fuels, without harm to people and nature.

The RED clearly states the importance of sustainability for biofuel production (e.g. in Preamble 9, 65, 69, 78 and 85.) Thereby the RED also explicitly stresses the importance of indirect effects (e.g. in Preamble 9, 78 and 85 and Article 19.6 and 23.5). Article 19.6 states:

> *The Commission shall, by 31 December 2010, submit a report to the European Parliament and to the Council reviewing the impact of indirect land use change on greenhouse gas emissions and addressing ways to minimise that impact. The report shall, if appropriate, be accompanied, by a proposal, based on the best available scientific evidence, containing a concrete methodology for emissions from carbon stock changes caused by indirect land use changes, ensuring compliance with this Directive, in particular Article 17(2).*

It is important to note that the RED also recognises that the potential indirect effects from biofuel production that should be considered go beyond GHG emissions from indirect land use change (ILUC). Article 23.8.b of the RED addresses indirect impacts on the availability of foodstuffs at affordable prices. The fact that increasing worldwide

[1] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

demand for biofuels and the incentives in the RED should not have the effect of encouraging destruction of biodiverse lands is mentioned in Preamble 69 of the RED. Again addressing the potential indirect impacts of biofuel production on biodiversity, Preamble 85 of the RED states the need to incentivise sustainable biofuels which minimise the impacts of land use change and improve biofuel sustainability with respect to indirect land use change, which goes beyond GHG emissions alone.

An ideal but long term solution

In the long run, unwanted ILUC from biofuels is best prevented through a better control over direct LUC in the food, feed and fibre sectors. The prevention of all unwanted direct LUC on all land would eliminate unwanted ILUC altogether. Therefore mandatory international accounting rules on land use change for all countries and a cap on these emissions would provide the optimal long term solution for unwanted LUC.

WWF believes that until an international solution on effective land use accounting for all sectors and all countries is achieved, e. g under the UNFCCC, intermediary solutions will need to be implemented that acknowledge the lack of oversight and accounting of sustainability in other land consuming sectors such as the food and feed sectors.

In addition, certification of all biomass produced, including greenhouse gas calculation, would help in reducing unwanted indirect effects. Therefore WWF urges the Commission and the Member States to broaden their scope for the inclusion of other land-based sectors into mandatory sustainability standards as soon as possible.

While acknowledging that the optimal long term solution to unwanted LUC is a firm grip on the LUC caused by all sectors, and certification of all biomass produced would limit indirect effects, WWF believes, that short term actions to prevent indirect effects of biofuels needs to be introduced in the RED. The EU biofuels policy does carry a particular responsibility to make sure that they deliver greenhouse gas savings and contribute to the EU policy goals of GHG reductions.

2. The analytical work carried out for the EC – significant ILUC risk

This chapter provides answers to questions 1 and 2 of the public consultation document.[2]

WWF considers the modelling work of the EC and that of others (e.g. see Ecofys 2009b) as basis to confirm the risk and potential scale of unwanted indirect effects. The studies provide the best available scientific evidence for the assessment of indirect land use change now available.

WWF concludes that the five studies taken into account for this response broadly show biofuel production is likely to result in indirect effects, and that the size (see table 1) of these indirect effects is expected to be significant – even though the exact values vary per study. This holds true for GHG emissions from ILUC, but might also be the case for the loss of biodiverse areas due to ILUC and food price rises.

The following results refer to the four studies of the Commission and are compared to a reference study, carried out for VROM 2009.

The studies have the following references:

[1] JRC IPTS, 2010, Impacts of the EU biofuel target on agricultural markets and land use: a comparative modelling assessment, available at http://ec.europa.eu/energy/renewables/consultations/2010_10_31_iluc_and_biofuels_en.htm

[2] IFPRI, 2010, Global Trade and Environmental Impact Study of the EU Biofuels Mandate, available at http://ec.europa.eu/energy/renewables/consultations/2010_10_31_iluc_and_biofuels_en.htm

[3] DG-TREN, 2010, The Impact of Land Use Change on Greenhouse Gas Emissions from Biofuels and Bioliquids, available at http://ec.europa.eu/energy/renewables/consultations/2010_10_31_iluc_and_biofuels_en.htm

[4] JRC-IE, Indirect Land Use Change from increased biofuels demand, available at http://ec.europa.eu/energy/renewables/consultations/2010_10_31_iluc_and_biofuels_en.htm

[5] Ecofys, 2009, Summary of approaches to account for and monitor indirect impacts of biofuel production, commissioned by VROM

Table 1: Average total emissions of land use change associated with biofuels for the reviewed studies and an earlier review study by Ecofys ("VROM")[3]

	Unit	JRC-IPTS AGLINK	IFPRI	DG-TREN	VROM
Weighted average of emissions from (I)LUC (from energy crops)	gCO2eq/MJ fuel	Rough estimate: 50 – 160. [4]	18	8-270	30-103

[2] The consultation document is available under the following link: http://ec.europa.eu/energy/renewables/consultations/2010_10_31_iluc_and_biofuels_en.htm

[3] The IFPRI, the JRC-IE and the JRC – IPTS (Aglink) study do deliver quantitative results.

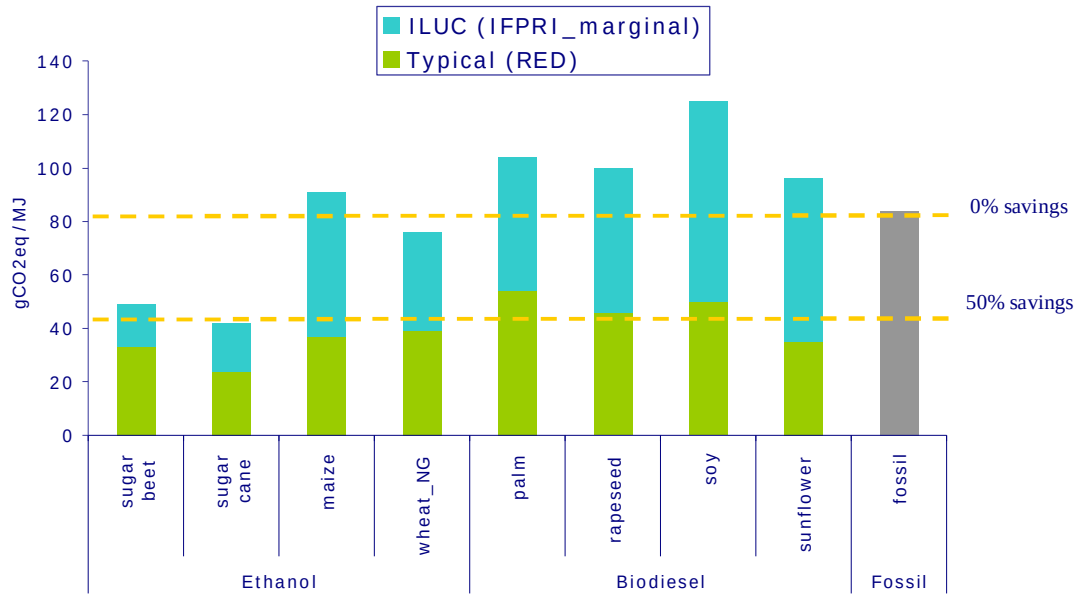
[4] AGLINK unfortunately does not include any analysis of the GHG effect of (I)LUC caused by additional demand for biofuels. We made a rough estimate using the cropland expansion numbers obtained from AGLINK together with ranges for the emissions associated with cropland expansion from the VROM study. This results in an indicative range and should be used as such.

The range of GHG effects of LUC associated with biofuels when indirect effects are not addressed is found to be large. The largest range is found in the DG TREN literature review: 8 – 270 gCO2eq/MJ fuel. This range is roughly equal to 10 – 350% of the total emissions associated with current fossil fuel references. However, the lowest values in this range are only found for studies that rely fully or mostly on sugarcane, sugar beet or second generation crops such as switch grass. For biodiesel, the lowest crop specific value found in the EC consultation documents is 50 gCO2eq/MJ. This equals 60% of the emissions of the fossil reference.

Furthermore it can be concluded that crop-specific values for emissions from ILUC would prevent most of today's energy crops to pass the GHG-savings threshold defined in the RED.

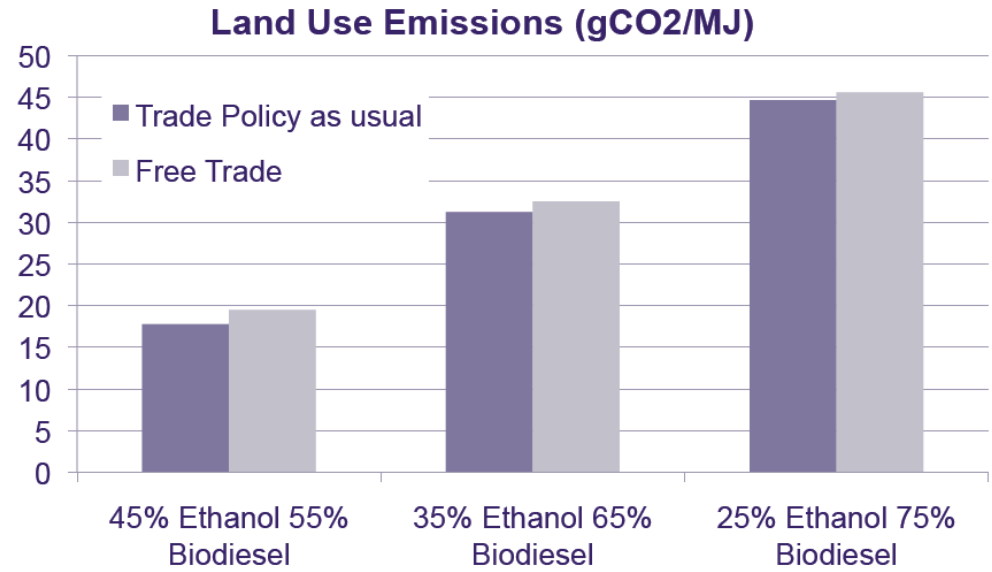
Without addressing the indirect land use change effects the 10% transport target of the RED risks undermining the GHG reduction target in the EU.

Figure 1: Comparison of the sum of RED typical emissions values and IFPRI (I)LUC values per feedstock to a fossil reference (0% savings) and the RED 50% savings threshold



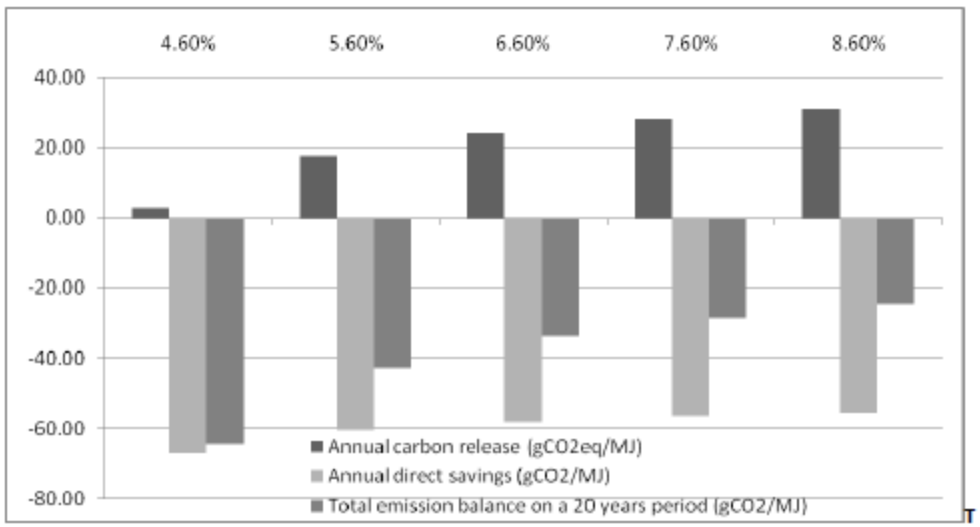
The feedstock specific modelling results show different values for different crops. In general, ethanol from sugar cane or beet scores significantly better than biodiesel from vegetable oils. Therefore, the IFPRI average GHG emission value is very sensitive to the assumption on the ratio of ethanol/biodiesel used to meet the RED target as well as to the actual feedstock mix. IFPRI has assumed this at 45%/55%, but an estimate based on ECN (2010) analysis of National Renewable Energy Action Plans shows this might very well be ~25%/75%. In this case IFPRI average values could be around 45 gCO_2eq/MJ fuel (figure 2): this would be significantly higher than the 18 gCO_2eq/MJ fuel as shown in table 1. The greenhouse gas threshold could not be reached by most of the crops.

<u>Figure 2:</u> From IFPRI sensitivity analysis showing the GHG emissions of (I)LUC of biofuels from energy crops for different ethanol/biodiesel ratios. The Trade Policy as Usual scenario is reviewed here.



The results of the IFPRI study are non-linear. This non-linearity can partially be explained by model mechanisms.[5] In their main scenario, the share of biofuels from energy crops in the total road transport fuel consumption in 2020 is 5.6%. In their sensitivity analysis, they vary this value from 4.6% to 8.6%. The GHG emissions caused by (I)LUC then vary from respectively ~3 to ~30 gCO_2eq/MJ fuel (see figure 3) An estimate based on ECN analysis of National Renewable Energy Action Plans shows the share of biofuels from energy crops might very well be ~90% of the 10% transport target or higher still if bioliquids for heat and electricity are included. In this case, IFPRI average values would be significantly higher, likely more than 30 gCO_2eq/MJ fuel. This number still assumes an ethanol/biodiesel ratio of 45%/55%. A higher share of biodiesel would have a significant effect, as biodiesel pathways score significantly worse on GHG emissions from (I)LUC in the IFPRI analysis (as per figure 2).

<u>Figure 3:</u> Figure from IFPRI sensitivity analysis showing the different GHG emissions from (I)LUC associated with different shares of biofuels from energy crops.



[5] Section 5.3.1 of the IFPRI report provides more details on this.

Combined, the above two observations imply that, when using the new insights from the NREAPs on the volume of biofuels and the mix of ethanol and biodiesel, the average GHG emissions from ILUC would be even higher than 45 gCO_2eq/MJ fuel.

Based on the analysis of the results of four commissioned studies and underlined by several other studies. WWF thinks that the EU needs to act in order to close the sustainability gap in the RED regarding indirect effects of biofuels, and to address the risks related to indirect effects (see figure 4). The indirect land use change effects question the use of biofuels as a sustainable source in future energy scenarios and as a suitable tool to contribute to the decarbonisation of European transport. In addition to the greenhouse gas effects of indirect land use change, the understanding of other potentially negative indirect effects of biofuels on food security and biodiversity is very limited. This lack of understanding has a risk, especially considering that a low risk of carbon emissions through indirect land use change does not imply that the other indirect effects might be of high risk.

3. WWF proposes to take the following actions to mitigate the risks of indirect land use change effects

Biofuels play an important role in most of the medium to long term energy scenarios, given the presumption that they reduce emissions compared to fossil fuels and thus contribute to mitigating climate change. But the following actions in the short to medium term need to be amended in the RED to ensure that biofuels could be considered as a sustainable energy source for the future.

1. Count emissions from ILUC within the greenhouse gas methodology of the RED
2. Prevent indirect effects through the implementation of mitigation options like those proposed in the "Responsible Cultivation Areas" project.
3. Incentivise sources with low ILUC effects like residues, waste and advanced biofuels.

This chapter responds to questions 3 and 4 of the consultation document.

3.1. Count the emissions from ILUC within the greenhouse gas emissions methodology of the RED

WWF is aiming for a policy solution that distinguishes among biofuels based on their risks of creating emissions from indirect land use change. A full accounting of the ILUC emissions is needed to complete the sustainability picture of biofuels.

An 'ILUC factor' can be assessed based on the estimated (modelled) land use change from a marginal extra quantity of crop production. IFPRI and JRC-IE studies do deliver this feedstock-specific data. They build a reasonable first basis to develop further the introduction of a feedstock-specific ILUC factor. An ILUC factor could be introduced in the RED methodology as a feedstock-specific disaggregated default value for ILUC emissions. This would comply with the Art 17 (2) of the RED.

The process for setting and reviewing pathway specific ILUC numbers

The process requires specific numbers for GHG emissions from ILUC for different feedstocks. Due to the implications of these numbers for different feedstocks, the process that defines these numbers must be credible and transparent. WWF believes the following components will be important:

- The institution that determines the ILUC values for various production pathways must be independent and knowledgeable on the subject.
- We recommend a thorough review of the various available models and their suitability to analyse ILUC values for biofuels. The focus should be on the structure of the models (e.g. are the relevant relationships incorporated at a sufficient level of detail?).
- The macro-economic assumptions around biofuels and food markets are changing quickly, so a review process of the ILUC default values should be set up every three years, in order to update and to improve the numbers.
- In parallel, further research should be undertaken to update and improve understanding of a number of issues for ILUC. This should at least include the components listed here. Note that the mechanisms and parameter values for these components can vary per region and the research should try to capture such regional differences:
    - Co-products and the products they displace and where these displaced products would have been produced.
    - Demand-induced yield increases

    - Type of land converted
    - Knock-on effects where energy crops displace pasture areas
    - Carbon stocks and biodiversity values on the types of land converted
    - Relation between food demand and commodity prices
    - Relative yield of new land taken into production
- Using the better insights into the values of the above components, an analysis of the default GHG emissions from ILUC for the various biofuel production pathways can be made. In doing so, the default value for GHG emissions from ILUC should be set conservatively (i.e. at a high level of emissions) by making conservative assumptions on uncertain parameters.[6]

It should be recognized from the start that the models will always remain an imperfect representation of the real world. This is both for structural reasons and because ILUC numbers will depend on uncertain future developments such as in trade rules and yield developments. Nonetheless, considering the potential significant size of ILUC suggested by the modelling work included in the EC's consultation and the VROM-review, the issue can not be ignored, and the best available scientific evidence will have to be used in setting ILUC numbers for policy which is based on disaggregated ILUC default values.

3.2 Preventing indirect effects – Mitigation options in the RED

It is important to note that the inclusion of the GHG emissions from ILUC in the GHG methodology of the RED only focuses on one out of the three main indirect effects. The three main potential unwanted indirect effects of biofuel production from energy crops are:

- GHG emissions from ILUC
- Conversion of areas with a high biodiversity value due to ILUC
- Reduced food security due to increase in food commodity prices

Inclusion of the GHG emissions from ILUC in the GHG methodology of the RED will ensure that biofuels meet the GHG-savings threshold, including GHG emissions from ILUC. However, in such a policy ILUC could still lead to the conversion of areas with high biodiversity values – which in case of a direct LUC would be in violation with RED Article 17(3). In addition, competition with food production may also still occur.

Introducing mitigation options like the concept of Responsible Cultivation Areas in EU ILUC policy

WWF supports actions on project based level which aim to prevent or minimize indirect effects including losses of carbon stocks, biodiversity impacts and competition with food production. A specific, field tested approach has been developed under the the "Responsible Cultivation Areas" project. The development of this methodology has been coordinated by Ecofys, WWF International and Conservation International.

Measures accompanying the feedstock specific ILUC factor approach would be crucial in order to enable biofuels producer to deliver low risk ILUC biofuels toward the European target. Aside from the effect of feedstock choice on indirect land use change, the RCA approach provides a practical solution for companies to mitigate the ILUC risk. This allows even high risk ILUC biofuels, which are discouraged from the market by the ILUC factor, to deliver the European market if they apply the mitigation options outlined in the RCA concept, and could verify a zero or low risk of indirect land use.

[6] Note that this manner of setting conservative default values differs from the manner in which default values are calculated for the direct GHG emissions in the RED. The latter adds 40% to the typical value for the cultivation phase only. This is particularly unsuitable for indirect effects because these continue both positive and negative (e.g. from co-products) emissions that partly cancel each other out.

Accordingly, WWF proposes that all biofuels applying the mitigation options outlined in RCA methodology should be treated as ILUC-free.

The first criterion for energy crop cultivation with a low risk of indirect effects therefore is:

1. Additional[7] production has been realised without displacing other provisioning services[8] of the land Or, where existing provisioning services are displaced, alternatives shall be implemented that comply with the sustainability criteria set out in RED Article 17 as well as the mitigation criteria for unwanted indirect effects9.

In addition there is a risk of unwanted indirect effects if remote areas are opened up that contain high conservation values. Therefore, the second criterion for a low risk of unwanted indirect effects is:

2. In remote areas with one or more High Conservation Values, where the nearest road or settlement is more than 25 km removed from the High Conservation Value Areas, new plantations and infrastructure should remain at least 25 km from the High Conservation Value Areas[10]. This criterion is waived if the High Conservation Value Areas in a 25 km radius of the project area and its infrastructure all lay within the project area and it can be assured that the High Conservation Values are maintained or improved.

For the RCA concept to be used as part of a policy in the RED to minimise unwanted indirect effects from biofuel production a number of conditions will have to be met:

- There must be a sufficient potential for RCA-compliant biofuel feedstock;
- The additionality concept must be effective in preventing unwanted indirect effects;
- It must be practical for companies to demonstrate compliance with the mitigation criteria.

Analysis of concrete opportunities for RCA-compliant production has focussed on the following three solution types:

- The use of land without provisioning services.
    - For example oil palm on “unused” Imperata grassland.
- Increasing land productivity through integration with non-bioenergy-feedstock systems.
    - For example increasing cattle density through integration with sugarcane.
- Increasing the land productivity of existing bioenergy feedstock systems.
    - For example increasing the yields of existing sugarcane plantations.

Additional information on the RCA production potential and their economic viability, as well as concrete examples of these solution types can be found in the following reports:

- Mitigating indirect impacts of biofuel production - Case studies and Methodology. Report prepared for the UK Renewable Fuels Agency (Ecofys 2009a);

---

[7] The term “additional” means additional to a BAU baseline scenario, not only additional to current production.

8 Note that the requirement for additional production, that would not have occurred in the absence of the RCA bioenergy demand, is consistent with the need for “additional carbon” for biofuels to save GHG emissions as set out in the paper by Searchinger (2010).

[9] This conditional exception is meant to allow for the use of land that does already provide limited provisioning services as long as sustainable alternatives for these provisioning services are implemented. An example would be the collection of grass for roof thatching in areas where ample grass is available also after the implementation of the bioenergy project.

[10] In line with empirical data from the report “Amazon Cattle Footprint” (Greenpeace 2010).

- RCA pilot report for oil palm on land without provisioning services in West Kalimantan, Indonesia (WWF 2010);
- RCA pilot report for oil palm on land without provisioning services in Para, Brazil (CI 2010a);
- RCA pilot report for sugarcane-cattle integration in Sao Paolo, Brazil (CI 2010b).

While not comprehensive globally, these studies demonstrate the significant technical and economic potential for RCA production, both within and outside the EU. Most likely the potential far exceeds the amount of biofuels needed for the 10% RED renewable energy in transport target. Furthermore these studies find that many of these production models, with a low risk of unwanted indirect effects, are not more costly than their business-as-usual alternatives [11].

3.3 Develop a consistent policy approach for waste and residues and advanced biofuels under RED

WWF recommends reassessing the approach for waste and residues and advanced biofuels in the light of the current ILUC policy debate. This means that the indirect effects of these biomass sources and conversion pathways have to be examined for their indirect effects, and for double accounting under the RED.

Waste and residues as defined under the RED do not perform equally in regards to their risk of creating indirect effects. A careful analysis of waste and residue streams needs to be carried out by an independent research institution in order to find out which ones are low ILUC waste and residues streams. The current incentive for double counting of waste and residues under RED should be applied only for those which do not create indirect effects, or which are assessed to carry a low risk. All other wastes and residues should not be double–counted, and should be part of the ILUC factor approach.

Advanced biofuels may have varied potential indirect effects, and a thorough research analysis should be made in order to assess them. For those which do not create ILUC or carry a low risk of indirect effects, they should continue to be double counted under RED. The others should be part of the ILUC factor approach and the mitigation options like the (RCA concept).

Advanced biofuels offers a very large potential in line with RCA (e.g. woody or herbaceous energy crops that have a larger tolerance for e.g. lower rainfall and soils with lower nutrient levels) because of which the land would otherwise not be developed for food or fodder crops.

The NREAPs show that the share of advanced biofuels, although double counted, is estimated to remain low in 2020. In order to increase the amount of advanced biofuels to deliver the EU 2020 target, WWF proposes to assess to what degree a sub-target for advanced biofuels with low ILUC risk would provide an additional effective ILUC mitigation option.

For further information:
Imke Luebbeke
EU Bioenergy Policy Officer
WWF European Policy Office
Tel: +32 2 743 88 18
iluebbeke@wwfepo.org

[11] It should be noted here that because no detailed guidelines exist yet for how to demonstrate additionality, it is not certain whether all the studied cases could indeed demonstrate such additionality. Nonetheless, especially the RFA's report (Ecofys 2009a) demonstrates good opportunities for demonstrating additionality for most case studies. See indivdual reports for more details.

References:

Conservation International, 2010a. Identification of Responsible Cultivation Areas in Pará Brazil – pilot report. A report prepared by CI with support from Ecofys.

Conservation International, 2010b. Identification of Responsible Cultivation Areas in São Paolo Brazil – pilot report. A report prepared by CI with support from Ecofys.

Casson, A. Tacconi, L. and Deddy, K. 2007. Strategies to reduce carbon emissions from the oil palm sector in Indonesia. Paper prepared for the Indonesian Forest Climate Alliance, Jakarta. 2007.

Ecofys, 2009a. Mitigating indirect impacts of biofuel production - Case studies and Methodology. Report prepared for the UK Renewable Fuels Agency.

Ecofys, 2009b. Summary of approaches to accounting for indirect impacts. Report prepared for VROM.

Öko-Institut e.V., 2010. The "ILUC Factor" as a Means to Hedge Risks of GHG Emissions from Indirect Land Use Change.

Greenpeace, 2010. Amazon Cattle Footprint. http://www.greenpeace.org/raw/content/international/press/reports/amazon-cattle-footprint-mato.pdf

Hertel T W, Golub A A, Jones A D, O'Hare M, Plevin R J, and Kammen DM, 2010. Effects of US Maize Ethanol on Global Land Use and Greenhouse Gas Emissions: Estimating Market-mediated Responses.

Searchinger T D. 2010. Biofuels and the need for additional carbon. Environmental research letters 5 (2010) 024007.

Sparovek G, Berndes G, Egeskog A, Mazzaro de Freitas F L, Gustafsson S, Hansson J, 2007. Sugarcane ethanol production in Brazil: an expansion model sensitive to socioeconomic and environmental concern. September 2007.

ECN, 2010, Renewable Energy Projections as Published in the National Renewable Energy Action Plans of the European Member States, version 1 October 2010, available at http://www.ecn.nl/docs/library/report/2010/e10069.pdf

WWF, 2010. RCA pilot reports, consisting of three parts:

- Budiman, A.; Smit, H. (2010). Identification of Responsible Cultivation Areas in West Kalimantan Indonesia - Phase I: Preliminary Assessment. A report prepared by WWW with support by Ecofys
- Smit, H.; Budiman, A.; Yaya, A.(2010). Identification of Responsible Cultivation Areas in West Kalimantan Indonesia - Phase II: Desk-based analysis. A report prepared by WWW with support by Ecofys
- Smit, H.; Budiman, A.; Yaya, A. (2010). Identification of Responsible Cultivation Areas in West Kalimantan Indonesia - Phase III: Field verification. A report prepared by WWW with support by Ecofys