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European Commission
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SUBMISSION FOR PUBLIC CONSULTATION ON INDIRECT LAND-USE CHANGE

Hereby, Wetlands International submits comments to the Commission public consultation on indirect land-use change. After an introduction, we will structure our submission according to the four questions posed by the Commission.

Introduction

Wetlands International stresses that the land use impacts of European Union (EU) biofuel policies have far reaching implications for climate, biodiversity, food and human populations worldwide.

The impacts of the energy and climate policies of the EU on the promotion of the use of renewable energies and on land use can and should be positive. For this, clear safeguards and policies supporting synergies for biodiversity and livelihood issues are requested. Without these, we fear that the negative impacts will override the potential positive impacts.

Wetlands International is an authority on the land use impacts for peatlands. This is especially – but not exclusively – relevant with respect to the increasing production of palm oil in Southeast Asia caused by the increasing demand for vegetable oils due to the EU policy on renewable energy. In our submission we will focus on what the increased demand for biodiesel will directly and indirectly mean for increased production of palm oil on peatlands.

Relevance of emissions from peatlands
While the Renewable Energy Directive (RED) has safeguards for conversion of carbon rich areas like wetlands and continuously forested areas, thus preventing loss of carbon in vegetation, a serious threat is caused if areas with organic peatsoils continue to be used. Many peatsoil areas were converted before 2008, meaning that their ongoing emissions are not prevented by the RED safeguards focusing on conversion only. The table below shows the importance of peatsoil carbon stocks, illustrating that the carbon stocks and potential emissions due to peatland degradation are much higher than other ecosystems.

In the EU, annually almost 175 Mton carbon dioxide is emitted from just peatlands[1]. These are often areas that have been under agricultural use for decades. Globally, this figure is 2000 Mton (6% of all global emissions).

Examples of carbon content (in C/ha) for ecosystems[2]

	Vegetation	Litter	Soils	Peat	Total
Peatsoils (average)	25	0	50	1375	**1450**
Tropical rainforest	210	10	100		**325**
Cool Temperate forest	160	25	140		**371**
Taiga	82	15	219		**320**
Tropical Savanna	35	0	55	No data available	**90**

Emissions from drained peatlands are most alarming in Southeast Asia, where tropical conditions lead to rapid decomposition. This, in combination with deep drainage for crops like palm oil, leads to emissions that are highly significant: generally between 40 and 75 ton CO2 per hectare per year, lasting for decades.

While the problem is most striking for palm oil in Southeast Asia, production of crops on peatlands in Europe is greatly contributing to emissions. Peatlands often have poor soils. As a result, agricultural production and associated drainage has been stopped on many peatlands in Europe, thus reducing emissions from peatsoil decomposition. This trend will be reversed due to increasing land pressure in Europe for biofuel feedstocks.

As we will explain below, the issue of peatsoils is often overlooked and underestimated.

[1] Joosten, H. 2009. The Global Peat CO2 Picture
[2] Parish, F. et al. 2008, Global Peatland Assessment

1) Do you consider that the analytical work referred to above, and/or other analytical work in this field, provides a good basis for determining how significant indirect land use change resulting from the production of biofuels is?

Overall, the answer is yes. The studies conducted and published by the Commission provide very strong evidence of the relevance of indirect land use change (ILUC) emissions and the need to address these. Focusing on the relevance of peatlands: the overall impacts of the 2020 target, including impacts on drainage and loss of peatlands, is investigated by IFPRI, as illustrated in Table 4 of their report. This provides an indication of the magnitude of the impacts, but at the same time is an underestimation.

Table 4: IFPRI Study Marginal ILUC Factors

Table 12 Marginal Indirect Land Use emissions, gCO2/MJ per annum. 20 years life cycle.

	MEU_BAU		MEU_FT	
	Without Peatland effects	With Peatland effect	Without Peatland effect	With Peatland effect
Ethanol	*17.74*	*17.74*	*19.16*	*19.18*
Ethanol SugarBeet	16.07	16.08	65.48	65.47
Ethanol SugarCane	17.78	17.78	18.86	18.86
Ethanol Maize	54.11	54.12	79.10	79.15
Ethanol Wheat	37.26	37.27	16.04	16.12
Biodiesel	*58.67*	*59.78*	*54.69*	*55.76*
Palm Oil	46.40	50.13	44.63	48.31
Rapeseed Oil	53.01	53.68	50.60	51.24
Soybean Oil	74.51	75.40	67.01	67.86
Sunflower Oil	59.87	60.53	56.27	56.89

Source: Authors' calculations

Note:The marginal coefficient is computed in 2020 after the implementation of the 5.6% mandate.

The table could serve as a preliminary basis for the first set of ILUC factors, but needs correction regarding the emissions caused by the use of peatlands. The emission figures for peatlands used by IFPRI are incorrect and a serious underestimation. This is supported by other recent studies which all indicate higher emission figures for peatlands. These include recent publications on Southeast Asian peatlands[3] [4] and the comprehensive summary completed by the Indonesian government [5]. Similar conclusions are also noted in Annex III about peatlands of the JRC study [6].

These emissions are not yet incorporated in the IPCC guidance of 1996 as currently used by contracting Parties of UNFCCC in their accounting. The IPCC figures are from an era before these studies were conducted and published and are eight times lower than the real figures. This has been acknowledged by the UNFCCC SBSTA and led to the decision of SBSTA meeting in June 2010 (FCCC/SBSTA/2010/L.12) to review the

[3] Couwenberg J, Domman R, Joosten H (2010) Greenhouse gas fluxes from tropical peatlands in south-east Asia. Global Change Biology, 16, 1715-1732.
[4] Hooijer, A. et al. May 2010, Current and future CO2 emissions from drained peatlands in Southeast Asia. Biogeosciences 7, 1505–1514, 2010
[5] Indonesian Climate Council, 2009. Indonesia's greenhouse gas abatement curve.
[6] Robert Edwards, Declan Mulligan and Luisa Marelli, Joint Research Centre 2010 Indirect Land Use Change from increased biofuels demand

current figures. In the IPCC meeting from 19-21 October in Geneva, it was decided that there is an urgent need to revise the figures being used by IPCC in its guidance to Contracting Parties[7].

While the SBSTA has decided to look at the IPCC emissions and IPCC acknowledged the need to revise these, IFPRI has used an average between the lowest, most conservative recently peer reviewed published figures by Couwenberg[8] and the eight times lower, outdated IPCC default values. Communication between Couwenberg, Wetands International and IFPRI has taken place and resulted in IFPRI's acknowledgement that indeed, impacts from the use of peatlands are underestimated in their study (see Annex 1).

A more reliable set of figures is provided in a published article by the University of Greifswald. The table below illustrates emissions for different crop / country combinations.

CO2 emissions from biofuel production on peatland[9]

Table 1: *Energy yield and emission factor of typical biomass fuel crops on peat soil*

Crop	Net yield [GJ ha^{-1} a^{-1}]	Emission factor (without peat) [t CO_2/TJ]	Emissions from peat [t CO_2-eq ha^{-1} a^{-1}]	Emission factor (with peat) [t CO_2/TJ]
Palm oil (SE Asia)	-	22 [a)]	86 [b)]	600 [c)]
Maize, net energy (Germany)	165 [d)]	-	40	240
Maize, biogas (Germany)	45 [e)]	-	40	880
Miscanthus, net energy (Germany)	213 [d)]	3 [g)]	25	115
Miscanthus, hydrogen (Germany)	4 [f) g)]	-	25	625
Sugar cane, ethanol (Brasil)	140 [h)]	9 [h)]	80	570
Sugar cane, net energy (Florida)	155 [i)]	-	55 [j)]	350
Coniferous wood, net energy (Scandinavia)	15 [k)]	-	3.4 [l)]	225

To compare: emissions for conventionals

Fuel	Emission factor [t CO_2/TJ] [a)]	Emission factor incl. fugitive [t CO_2/TJ] [b)]
Peat	106	-
Coal (anthracite)	98,3	-
Fuel oil	73,3	81,1
Natural gas	52,2	53,9

Notes:
[a)] IPCC
[b)] Elsayed et al. 2003, Essent 2007.

[7] See notes from the IPCC Expert Meeting on HWP, Wetlands and Soil N2O, Geneva, 19-21 October 2010
[8] Couwenberg J, Domman R, Joosten H (2010) Greenhouse gas fluxes from tropical peatlands in south-east Asia. Global Change Biology, 16, 1715-1732.
[9] Couwenberg, J. 2007, Biomass energy crops on peatlands: on emissions and perversions. c-3 p.12-15

2) On the basis of the available evidence, do you think that EU action is needed to address indirect land use change?

Yes.

1) The Commission's analytical work shows that the expected land-use conversion resulting from the policy is very significant. Importantly, none of the studies comes out with zero or negative ILUC emissions for any land-using biofuel feedstock. Nor does any study show that moving from today's levels of biofuels use to levels expected by 2020 would, without additional safeguards, result in net greenhouse gas (GHG) emission reductions. As a result, there is a clear need for corrective action.

Besides the work of the European Commission, the need to look at the indirect land use impacts of biofuels is also recognised and named in the decision on biofuels taken at the global level at the Convention on Biological Diversity COP 10 in October 2010 (see the article 11a of the decision[10]).

Despite some variation in the assumptions underlying the studies and differences between models, similar conclusions can be drawn. The Commission studies give enough indication to be able to draw conclusions on two issues relevant for policy makers:

- the aggregate impact of the policy by 2020 based on Member States' predicted use of biofuels in their NREAPs (which will lead to an upfront "carbon debt" that is currently unaccounted for); and
- the marginal GHG emissions for different biofuel feedstocks under different studies that indicate those biofuels leading to GHG emissions increases and those that still meet the GHG-savings threshold (the basis for differentiated "ILUC factors").

2) Indirect Land Use emissions are in and of them self not a problem that needs additional action. If there was an ambitious climate protocol in place requiring accounting of all emissions, including emissions or sequestration in the land use sector and emissions of the use of biofuels, the problem would be addressed. The current situation is, however, that a Contracting Party under the Kyoto Protocol may leave all emissions due to biomass combustion unaccounted (with the argument that it does not contribute to more emissions thanks to sequestration in feedstock production). Net carbon stock losses in the land use sector in Annex 1 countries are subject to a cherry picking system embodied in articles 3.3 and 3.4 of the Protocol and remain unaccounted. In non-Annex 1 countries, no system is in place to address or even account emissions from the land use sector.
A real solution to solve the problem for the unaccounted, unaddressed emissions due to Indirect Land Use Change is a global climate deal that does introduce full accounting for those countries with a target. Accounting should also include emissions caused by combustion of biofuels, as well as sequestration in crops including feedstocks for biofuels.

[10] Decision on AGRICULTURAL BIODIVERSITY – BIOFUELS AND BIODIVERSITY: CONFERENCE OF THE PARTIES TO THECONVENTION ON BIOLOGICAL DIVERSITY, Tenth meeting

No change can be expected on this. The EU itself is in favour of maintaining the current voluntarily activity based system for the land use sector under a new commitment period. If any Reducing Emissions from Deforestation and Forest Degradation (REDD) system with reliable baselines is agreed for developing countries, this would just deal with forest areas, and would not cover the carbon stocks in unforested or deforested areas such as peatlands under agricultural use or degraded former forest areas.

The unaddressed land use emissions from wetlands

The RED does not (fully) account for the emissions from direct land use and land use change. Instead, it includes safeguards that are supposed to prevent conversion of 'continuously forested areas', 'wetlands' and other areas for the purpose of producing biofuels.[11] These safeguards are based on the – incorrect – assumption that land use carbon losses just take place at the moment of conversion, not after. These safeguards thus ignore the ongoing emissions from (peat-)soil carbon in the decades after conversion.

Unaddressed emissions

When public policies increase biofuel consumption, additional demand for agricultural commodities is created, which impacts land conversion around the world, resulting in significant GHG emissions that are - in the current UNFCCC system – not addressed via, for instance, accounting within the context of an emissions reduction target. With such a policy comes the responsibility to ensure climate objectives are achieved. Indeed, unless ILUC is addressed through legislative action, RED and the Fuel Quality Directive (FQD) will not achieve their primary objective to reduce GHG emissions from the transport sector.

Indirect land use and wetlands

Even if safeguards against direct land use change were proven effective, the pressure on land arising from the 10% target, which artificially supports biofuel consumption, would still indirectly drive land conversion. Biofuel production would take place on existing agricultural croplands using the current production of, for example, rapeseed for biodiesel. Those agricultural croplands and crops 'lost' to biofuel production will cause additional production to take place in other locations, such as new palm oil plantations on peatlands and in forests, to serve the food sector.

Numerous scientific publications and research from the European Commission's Joint Research Center (JRC 2008, 2010), the Food and Agricultural Organization of the United Nations (FAO 2008), the Renewable Fuels Agency (RFA 2008) and the United Nations Environmental Programme (UNEP 2009), to name a few, indicate that GHG emissions caused by ILUC are substantial and will most likely outweigh any savings from biofuel usage.[12]

Prices of vegetable oils strongly follow the prices of bio- and conventional diesel[13]. This indicates the very strong correlation between growing biodiesel demands and global

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[11] This is the theory. Unfortunately, the evidence to date indicates that the 'sustainability criteria' and GHG saving threshold that were agreed in the final Directive will not provide the environmental protection that is needed, both due to inadequacy of the criteria and/or of the implementation.

[12] For a complete list of studies saying that ILUC should be accounted, WI refers to the *T&E Briefing: The Science of Biofuels and Indirect land use change* (September 2010).

[13] International Energy Association 2008 in CIFOR 2010 CIFOR Sheil, D: The impacts and opportunities of palm oil in Southeast Asia

incentives to increase vegetable oil production. Palm oil is one of the most productive feedstocks, and production is rapidly increasing, especially in Southeast Asia. The 2020 target will only accelerate this trend. As the JRC highlights, at least 33% of this production takes place on peatlands[14].

[14] Robert Edwards, Declan Mulligan and Luisa Marelli, Joint Research Centre 2010 Indirect Land Use Change from increased biofuels demand

3) If action is to be taken, and if it is to have the effect of encouraging greater use of
some categories of biofuel and/or less use of other categories of biofuel than would
otherwise be the case, it would be necessary to identify these categories of biofuel on the basis of the analytical work. As such, do you think it is possible to draw sufficiently reliable conclusions on whether indirect land use change impacts of biofuels vary according to:

- feedstock type?
- geographical location?
- land management?

Regardless of the importance of looking at all crop – country combinations in order to fully understanding the impact of biofuel demand, major and often overlooked indirect land use emissions will be caused due to the use of peatlands. Preventing these with selective crop – country – land management options is difficult due to the global impact of increased feedstock demands. This can, however, be achieved by using feedstocks that do not lead to ILUC. The following options are available:

Biofuels produced from genuine waste and residues. The ILUC factor may be zero when the raw material used as feedstock are derived from real waste and residues, i.e. with no alternative economic purpose. “Waste” and “residues” must be defined to only include substances without any economically viable functions or useful purposes.

Advanced biofuels with minimal land requirements. When the raw material used as a feedstock does not require agricultural or productive land for production there is little prospect for the conversion of forests and other natural areas. Some feedstocks, such as algae, may be produced on non-agricultural lands, such as industrial or contaminated areas, and would therefore have no significant ILUC emissions.

Additional yield increases. ILUC could also – partly and potentially even wholly – be avoided by ensuring that farmers meet additional biofuel demand by increasing productivity on existing land instead of increasing land use. Yield increases should be proven to happen without environmental and social costs using environmentally and socially responsible methods and practices, which do not pose a threat to public health and safety, the environment, including water quality and quantity impacts on nearby areas, as well as social cohesion and local communities’ rights and welfare.

Appropriate use of degraded and marginal lands. Biofuel production on degraded and marginal lands could be considered when those lands have no current productive function, no value for biodiversity, including for declining or rare species, and no ecosystem services or value to local communities and when the production in these areas would not lead to substantial loss of remaining (soil-) carbon stocks. The actual value and sustainability for production on degraded and marginal lands would need to be assessed on a case-by-case basis, again to ensure that the potential is fulfilled in reality.

4) Based on your responses to the above questions, what course of action do you think appropriate?

In all cases in which the actual values of GHG emissions cannot be reduced or eliminated via the production methods noted under point three above, the legislation must include feedstock specific ILUC factors that are updated every five years or so to take into account the best available scientific evidence. This will provide the incentives for feedstocks of low or even zero ILUC impacts.

Introducing ILUC factors

ILUC factors will provide incentives to reduce the impacts of biofuels. It is a matter of repairing a policy that in and of itself has some fundamental weaknesses.

A fundamental objective of the RED is to combat climate change and increase use of energy from renewable sources. The primary objective of the FQD is to decrease the carbon intensity of transport fuels used in the EU. Both pieces of legislation constitute an important part of the climate package aimed at reducing GHG emissions and complying with international GHG reduction commitments.[15] Yet without accounting for ILUC, GHG reductions on paper will not correspond to the reality, which is that under current policies, increased demand for biofuels will increase, not reduce, GHG emissions. This erodes the EU's political credibility on climate, biodiversity and development issues.

Real solution: GHG target and full accounting, not a biofuel target

The objectives of reducing GHG emissions are best achieved by a GHG-reduction target for transport fuels as contained in the FQD, not a 10% target for renewables or biofuels in the transport sector as contained in the RED. Setting a GHG-reduction target for transport fuels is a better approach to decarbonising the sector, as it allows fuel suppliers a wide range of reduction options—reducing flaring, reducing or applying best practices in tar sand winning, employing low-carbon alternative fuels and electricity, to name a few—and hence offers the best potential for significant carbon cuts. Many of these also have co-benefits for people in the areas of production and for biodiversity. The approach taken in RED simply requires Member States to achieve a predetermined volume of renewable energy or biofuels in the transport sector with no requirement to reduce overall GHG emissions in the sector. The EU should therefore abandon the 10% target and move towards the FQD-based approach to transport fuels.

A real solution to solve the problem for the unaccounted, unaddressed emissions due to Indirect Land Use Change is a global climate deal that does introduce full accounting for those countries with a target, This accounting should also include emissions caused by combustion of biofuels, as well as sequestration in crops including feedstocks for biofuels.

[15] RED, Recital 1.

Annex 1: Letter Couwenberg and Silvius to IFPRI and reaction of IFPRI.

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Ede, Netherlands, 17 June 2010

Subject: Impact study EU biofuels Mandate

Dear mr Perrihan Al-Riffai, Betina Dimaranan and David Laborde,

We are writing to you regarding your study: Global Trade and Environmental Impact Study of the EU Biofuels Mandate from March 2010 (IFPRI, No Trade /07/02) that was commissioned by your services to the IFPRI. We noticed that we have been quoted in this study regarding the GHG emissions from peatlands (Couwenberg, University of Greifswald and Wetlands International). However, we have also noticed that our data and scientific assessments regarding emissions from biofuels planted on peatlands have been misinterpreted and used incorrectly, resulting in significant errors and a substantial underestimation of emissions from peat degradation. We believe that this has seriously impacted the results, underestimating the level of indirect emissions from palm plantations. On this basis we believe that your conclusion that palm oil is the most efficient biodiesel feedstock (page 64) - even when peat land emissions are considered - can not be maintained.

Couwenberg: a conservative estimate
The publication of Couwenberg. (2009)[1] as quoted in your report derives from the peer-reviewed study of Couwenberg et al. (2010)[2] Couwenberg (2009) has identified an amount of 40 tonne CO_2 emissions per ha/yr as a <u>conservative</u> best estimate for emissions from drained peatlands under oil palm cultivation (incl. shallow drained, unprofitable areas). Couwenberg et al. (2010) more explicitly address emissions from peat soil degradation currently under oil palm cultivation and arrive at a conservative best estimate of 50 tonne CO_2 per ha/year. The values are to be considered conservative because:

i) Based on a lack of robust data for deeper drained tropical peat soils Couwenberg et al. (2010) prudently assume that emissions do not increase

[1] Couwenberg J. Emission factors for managed peat soils. Wetlands International, Ede. 14 pp (2009).
[2] Couwenberg J, Domman R, Joosten H (2010) Greenhouse gas fluxes from tropical peatlands in south-east Asia. Global Change Biology, 16, 1715-1732.

beyond drainage depths of 50 cm. However, recent data suggest emissions increase with drainage depth well below this cut-off value. Oil palm plantations require a minimum drainage of 60 cm and are generally drained deeper. The recent peer-reviewed paper by Hooijer et al. (2010)[3] assumes 0.95 meter as average drainage depth for oil palm plantations in Indonesia and Malaysia, with an estimated emission of 86 t CO_2 per ha and year.

ii) Couwenberg et al. (2010) assume that oxidative peat losses contribute only 40% to peat subsidence rates, which is at the lower end of the range of values cited in literature. Wösten et al. (1997)[4] use a value of 60% based on depth profiles drained tropical peat soils and consequently arrive at substantially higher emissions.

iii) Carbon content of peat layers near the surface is likely higher than assumed by Couwenberg et al. (2010) who used values derived from deep peat profiles. Emissions are calculated as the product of oxidative subsidence and carbon content of the peat. Higher carbon content results in higher emissions.

Use of outdated AFOLU figures
Also within IPCC there is now a widespread consensus that IPCC AFOLU has underestimated emissions from peatlands by almost a factor of 10. Although this is acknowledged in your report on page 38, the AFOLU figures are still used and averaged (page 64 of your report) with the minimal estimates provided by Couwenberg (2009), i.e. giving both sources equal weight, and thus resulting in a very low figure that is untenable on the basis of current peer reviewed scientific information.

Incorrect calculations
Palm oil on peat has an average yield of 3000 kg/ha/yr. With 40 MJ/kg, the energy value of the annual palm oil production on one hectare of peatland constitutes approximately 3000 x 40 = 120.000 MJ/ha/yr. Even if the conservative emissions estimate of 40 tonne CO2/ha/yr is applied (i.e. 40,000,000 g CO2/ha/yr) it results in an additional 333 g/CO2/MJ/yr for palm oil production on peatlands. As roughly one-fifth of all current oil palm concessions in South-east Asia are on peat, it is clear that the total emissions of this industry completely alters the picture of sustainability of palm oil if the 'peatland effect' is included.
The above calculation by far exceeds the figures used in table 12, page 65 of your report. Table 12 in which palm oil production without peatland effect is compared to production with peatland effect depicts a difference of 46.40 gCO2/MJ/yr without versus 50.13 gCO2/MJ/yr with peat as marginal ILUC emissions, or 3.73 gCO2/MJ/yr. It thus appears that your table presents an underestimation of peat emissions by almost a factor 100!. The figures on ILUC emissions for different feedstocks and their source (author's calculations) are impossible to verify as the assumptions regarding yields and ILUC factors are not explicit. However, the conclusion suggested by this table that the impact of peat is hardly relevant appears unsubstantiated and derived from the incorrect use of data.

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[3] Hooijer A, Page S, Canadell JG, Silvius M, Kwadijk J, Wösten H, Jauhiainen J (2010) Current and future CO2 emissions from drained peatlands in Southeast Asia. Biogeosciences, 7, 1505-1514

[4] Wösten JHM, Ismail AB, van Wijk ALM (1997) Peat subsidence and its practical implications: a case study in Malaysia. Geoderma, 78, 25–36.

Serious policy implications

We would like to point out that the above described misinterpretation, incorrect use of data and improper calculations and presentation of peat emissions can seriously mislead current policy developments in Europe, the RSPO and the palm oil producing countries aiming to limit impacts of palm oil production on greenhouse gas emissions. We also question the figures produced for other crops on peatlands. We urgently ask you to rectify the figures and conclusions in your report and issue a public clarification.

Yours sincerely,

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University of Greifswald

Marcel Silvius
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Subject: IFPRI study on environmental impact of EC mandate on biofuels - Answer to the letter sent on June 16th.

Dear Mr Silvius and Couwenberg,

Thanks for the attention you have devoted to our report. I just get your letter this week, so I apologize for the delay of our answer.
First I would like to clarify your statement about the fact that your data has been "misinterpreted and used incorrectly". As you see in the report (p 37), we use your figures for two things:

1) The share of palm tree plantations on peatlands
2) The CO2 emissons related to peatlands

Precisely, we write:
"We assume a marginal coefficient of extension of palm tree plantations on peatlands of 10% for Malaysia and 27% for Indonesia, based on statistics provided by Wetlands International[9]. We use two sets of emissions coefficients for peatlands, from IPCC – AFOLU and from Couwenberg (2009), since the literature displays a wide range of coefficients (from 5 to 40 tonne of CO2 by hectare). Recent trends emphasize the underestimation of past values."
Based on our letter, we do not feel that your you contest the first assumption (share of peatlands) and we believe to have respected the quantitative information displayed on the Wetlands.org website.
Concerning the emission factors, we also quote Couwenberg (2009) and use the value of 40 tonne CO2. For us it was interesting that this "conservative" estimates were already a 8 times multiplication of IPCC coefficient and that uncertainties is great. Last, if we do not use more recent estimates/references (as the 2010 references you quote) due to the time frame of this study but we also emphasize that we have an upward trend in the estimates.
Therefore, we believe that we have accurately use the information at our disposal in the context of this study. However, it does not imply at all that we are satisfied with the current treatment of peat emissions of the report. Indeed, we share with you the vision that the report estimates are largely underestimated.

Let's me give you a few information that will help to understand the choices make.

1) Considering peatland emissions in the report was not an absolute requisite of this study. However, it was important for us to have some figures about them to raise the awareness of the readers about this issue and feed discussions.
2) All emission factors used in the report should have followed IPCC standards. However, based on the AFOLU figures limitations we have decided to look for some alternatives, even conservatives, to illustrate the magnitude of the problem. Here also, our goal was to raise awareness of the readers and the fact that overall emissions may be multiplied by 2 for South East Asia if we consider peatlands (and the peatland effects is multiplied by 8 if we use Couwenberg(2009) value instead of IPCC).
3) Due to the strong "Ethanol" flavor of the policy scenario studied, the palm oil/biodiesel effects were of more limited importance (small incremental demand of biodiesel) . In addition, our main conclusion is that Biodiesel is worst than Ethanol and adding peatland effects will just reinforce this.

Now, the study also provides a lot of information on the baseline and the scenarios (production, land use, etc) in the appendix (excel workbooks available from the EC website). Therefore, it is easy for any "user" to recomputed the emissions level based on alternative assumptions on emissions for the mandate scenarios. By the way, we are surprised that your assertion on the fact that "assumptions regarding Yield and ILUC factors are not explicit". Based on the Excel workbooks, nearly all computations on emissions can be reproduced as it has been done by other stakeholders.
Another important misunderstanding of our work discussed in your paragraph on "incorrect calculations" is the way that the table 12 is built. You have proposed marginal computations showing that additional biodiesel produced from palm oil will come from additional production. This is very far from our approach. We work in a general equilibrium model where a marginal increased demand of one commodity will drive a lot of direct and indirect effects. In particular, the marginal and incremental demand of biodiesel made from palm oil in the EU will lead to a displacement of palm oil previously used by other consumers (final consumption and/or industries) and not a additional production. This kind of effect depends on the market. In the case of palm oil, this effect is very important since the palm oil market for biodiesel is very small (in our scenario) compared to the overall palm oil market. On the opposite, for rapeseed, the market is already "saturated" and any demand increase from the EU biodiesel will lead to additional production of rapeseed leading to land use effects. An intermediate case is the soya oil case where relatively poor oil yield of soybeans combined to the marginal extension of soybean in Brazilian forest leads to very adverse land use emissions. Last, it seems that this table is also misunderstood when you refer in your conclusion to "other crops on peatlands". There is no really such things in our results. When we have "peatland effects" for sugar cane, it does not mean that Sugar Cane is produced on peatlands. It is only through indirect effects and how even more ethanol produced from Sugar Cane in Brazil will at the end having an impact on South East Asia. We believe that the notions of marginal ILUC and average ILUC are quite complex and that there is not straightforward way to compute them and that finding the right concept for policy recommendations still need to be fine tuned. However, once again we agree with you that current peatland emissions are underestimated, but we are still uncertain about the order of magnitude (we are not experts on this topic). The choice of the simple average between ILUC-AFOLU and Couwenberg conservative estimates (2009) for table 12 is clearly unsatisfactory but as discussed before, we felt that it was better than just using IPCC values.

Concerning your legitimate questions about a quick interpretation our results for policy makers, we have raised this issue with the EC experts and I believe that they are fully aware of the current limitation of the study on the topic of peatlands. I also cc Robert Edwards from the JRC that has provided important feedbacks for the EC working group on the topic.

In the incoming weeks and to support the public consultation process, we plan to release a Q&A webpage on the study where we will discuss explicitly the assumptions made on palm oil and their limitations, and the needs to revise these figures based on more recent estimates.

Regards,

David Laborde