CONSULTATION RESPONSE FORM

PUBLIC CONSULTATION ON CARBON AND SUSTAINABILITY REPORTING UNDER THE RENEWABLE TRANSPORT FUEL OBLIGATION (RTFO)

PART 1 - Information about you

Name	Dr Andrew Boswell and Almuth Ernsting on behalf of biofuelwatch
Address	23 Havelock Road, Norwich
Postcode	NR2 3HQ
email	andrew.boswell@yahoo.co.uk, almuthbernstinguk@yahoo.co.uk
Company Name or Organisation (if applicable)	Biofuelwatch, independent NGO
Please tick one box from the list below that best describes you /your company or organisation.	
✓	Other – as above, independent NGO
If you are responding on behalf of an organisation or interest group how many members do you have and how did you obtain the views of your members: Biofuelwatch is a small NGO that does not receive any industry or government funding. The response has been reviewed by other core group members. This response in line with our policy statement at: http://www.biofuelwatch.org.uk/aboutus.php	
If you would like your response or personal details to be treated **confidentiall**y please explain why: n/a	

PART 2 - Your Comments

The structure of the questions given below do not reflect the full range of Biofuelwatch's concerns with the RTFO carbon and sustainability reporting and its place within current UK Government policy and EU policy drivers. We, therefore, need to insert this preliminary section to address these concerns, before answering the specific questions below.

Biofuelwatch supports the call for a moratorium on EU Agrofuel targets and incentives, and on Agroenergy from large-scale monocultures in the EU. A moratorium is required to enable full scientific scrutiny of agrofuel lifecycles and system impacts, and to facilitate the proper pre-implementation policy debate, that has been largely bypassed so far. The impacts in the world's poorest communities - accelerated climate change, deforestation, bio-diversity losses, human rights abuses, including the impoverishment and dispossession of local populations, water and soil degradation, loss of food sovereignty and food security – risk becoming completely unmanageable.

We believe that the RTFO scheme does little to limit and prevent this on-going damage. Its design is clearly focussed on rewarding suppliers for growing the agrofuel industry and meeting aggressive targets set by the EU.

Despite our position that the RTFO scheme is totally inadequate to the scale of the current agrofuel crisis, we have answered some of the specific questions below, as the proposed scheme contains many loopholes or backdoors for continued bad practice and it is essential that these should be highlighted.

The Carbon Reporting Methodology

Here we provide comments on the methodology document from E4tech as this forms the basis of the consultation proposals. First, we note that the advisory group has a clear bias towards industry. We are concerned that no NGOs who have raised concerns about agrofuels practice were on the advisory body for the methodology. Nor were any organisations asked who represent those who are most affected by rapidly expanding agrofuel use in the UK and Europe – communities from the Global south.

Section 2.1 <e4tech document>Boundaries. This describes how 'displacement' of emissions avoided due to co-products are included. However, displacements may both avoid and increase emissions. Whilst land use displacement is considered in section 2.1.2, emission increasing displacements caused by market effects – for example, increased need to import animal feed from outside UK creating more transport emissions as UK land is taken up with agrofuels, or the link between greater rapeseed oil imports and palm oil demand[1] – have not been included. This indicates a clear bias towards 'displacements' that reduce carbon intensity over those than increase it. Our paper "How meaningful are 'greenhouse gas standards' for biofuels in a global market?", which is submitted as part of our consultation response, sets out strong evidence of the large-scale indirect impacts, and shows how biofuels which, at the micro-level appear to have a positive greenhouse gas balance often cause land-use change on a scale which will significantly accelerate global warming.

Page 9 <e4tech document> says the land on which an agrofuel is grown could have an alternative use (eg food or feed production). However, the consultation does not recognise ecological restoration as an alternative to agrofuel land use. A recent scientific paper from Renton Righelato of the World Land Trust and Dominick Spracklen from Leeds University – shows that current production methods of agrofuels will release between two and nine times

[1] Europe is now a net importer of rapeseed oil, and the growth in rapeseed oil biodiesel has been identified by the UN Food and Agriculture Organisation is one of the main reasons why palm oil prices are rising fast.

more carbon gases over the next 30 years than if forests were allowed to regenerate[2],[3]. The methodology should include the positive effect of ecological regeneration/restoration of land on emission reductions as part of 'Alternative land use reference system', but instead decides to exclude them from the methodology making exception for deforestation.

Whilst this damaging acknowledgement is welcome, the methodology tries to account for new deforestation but not for the possibility of allowing already damaged or destroyed ecosystems to recover. However, the recommendation in the Consultation is that default values should not be applied to fuels for which no land use change information is provided, and notes that it should be noted that this will mean there is little incentive for companies to report on land use change since if they do it will only make the carbon intensity of their fuels worse. This effectively allows emissions from land use changes, that can be a massive contribution to greenhouse gases, to go unmonitored. This is a major omission.

The methodology includes a reference system for residues (page 13) and treats them as co-products. However, this is based solely on their GHG saving capacity. Such residues are known to be good for soil, and the methodology here risks incentivising the long-term degrading of soil. This is of great concern to long term sustainability - environmentalist Lester Brown calls soil "the foundation of civilization". Over long stretches of geological time, soil accumulated faster than it eroded, enabling agriculture and the rapid human development of the last few thousand years – yet now soil is degrading in many places. An estimated 75 billion tons of soil are eroded each year worldwide, with soil being lost at 13-40 times the rate at which it can regenerate[4].

Page 16 states "This creates the potential for double counting when the electricity is sold under a policy regime which recognises (explicitly or implicitly) and rewards low carbon intensity electricity, for example the UK Renewable (Electricity) Obligation." We believe that an even more serious issue is a disparity between the two systems (RTFCs and ROCs) – under question 6 below we describe a potential loophole by which suppliers may put agrofuels that do not conform to the RTFC/RTFO scheme into the renewable energy system (for example, the burning of Palm Oil for power generation) and gain ROCs for agrofuel that would not qualify for RTFCs.

The recommendations under section 2.4.2 "Encouraging reporting" provide the basis for many further loopholes for existing bad practice. The proposed mechanisms provide much support for suppliers in adapting ("allowing industry time to adapt", noting that "biofuel companies have established (or are establishing) their production processes and the supply chains on the basis of what is currently the most economically rational approach." Whilst economic concerns are paramount, no concern is given to biodiversity, climate, social and human impacts from allowing bad practice to continue. With a very fast developing industry, this is also encouraging supply chains based on bad practice to be developed to make quick returns.

Key loopholes that discredit the system are:

- Allowing 'difficult' upstream sources of GHG emissions to be defaulted to a 'typical' magnitude for the first phase of the RTFO.
- The report notes that N2O emissions from soils are notoriously 'difficult' to measure, and yet is prepared to set these at a 'typical' value. According to the Stern Review, agriculture and deforestation contribute 14% and 18% respectively of the greenhouse gases associated with global warming. Nitrous oxide (N2O) is the third most important human induced greenhouse gas. Its global warming potential is 296 times that of CO2 and it has a long atmospheric lifetime of around 120 years. Chemical fertilizer

[2] Carbon Mitigation by Biofuels or by Saving and Restoring Forests?, Science August 17th 2007, supporting online material, http://tinyurl.com/2pmww5

[3] In this context, we concur with the findings of the World Rainforest Movement, the Global Forest Coalition and many other NGOs that plantations are not forests., and that the establishment of plantations, often wrongly called 'reforestation' is a major threat to natural forests and other ecosystems and to the livelihoods of communities

[4] http://www.springerlink.com/content/tc6206ax3gfld314/

application in the tropics has 10 -100 times the impact on global warming compared to temperate soil applications[5]. Conversion of forests to cropland, use of nitrate fertilisers, large scale planting of legumes (such as soyabean) and decomposition of organic residues have been identified as major causes of N2O emissions from agriculture.[6] Allowing value for these climate dangerous emissions to set at 'typical' because it is too' difficult' to establish better verification undermines any credibility of the idea that the RTFO is seriously addressing climate change. This also applies to section 2.5 "N2O emissions from soils".

- Section 2.5 says that "the RTFO administrator may wish to consider developing correlations between nitrogen fertiliser and N2O emissions which vary by other factors such as crop type and country of origin." The system actually lacks any viability until this is done.

We also append at the end of this response a fully referenced biofuelwatch paper by Almuth Ernsting "HOW MEANINGFUL ARE 'GREENHOUSE GAS STANDARDS' FOR BIOFUELS IN A GLOBAL MARKET?" that provides a more in-depth analysis of the limitation of schemes such as RTFO (and its assumed schemes via the meta standard) to provide any credible environmental of social safeguards in the current crisis massive agrofuel expansion.

1. Is the general scope of the reporting requirement set out in chapter 2 appropriate?	Yes	No ✓

If your answer is no please explain your reasons and add any additional comments you wish to make:

A key sentence *"Maintaining public confidence in biofuels requires Government and the biofuels industry to find effective ways to manage potential negative impacts of their increased demand."* This indicates that a key policy driver is maintaining public confidence – however, the key policy driver for agrofuels should be the complete protection of people and the planet from the environment and social impacts of agrofuels. Large-scale development of monocultures and massive growth of the industry has the potential to create large-scale problems – and is already doing so around the world. These are well documented in [7] and [8]. '***Managing potential negative'*** impacts is not sufficient to the scale of the problem.

Real public confidence can only be based on knowledge by the consumer that the product which they are purchasing has minimal or no negative impacts in its environmental, human or social aspects. The consultation does not address the fact that the consumer purchases blended biofuel at the pump that may come from multiple sources – the exact blending proportions dependent on current market forces. The RTFC methodology is based upon units or batches of pure biofuel types (with "homogenous sustainability characteristics" in the consultation jargon) – however, the consumer will purchase arbitrary blended combinations of these. For example, if a biodiesel component of the fuel at the pump comprises 90% biodiesel from reported sources, but 10% unreported and from Palm Oil grown on peat soils, any 'virtuousness' of the reported fuel would be

[5] Intergovernmental Panel on Climate Change, Climate Change 2001: The Scientific Basis, Chapter 4, 4.2.1.2., http://www.grida.no/climate/ipcc_tar/wg1/136.htm

[6] Emission of nitrous oxide from soils used for agriculture, JR Freney, http://www.springerlink.com/content/1573-0867/, Nutrient Cycling in Agroecosystems, http://www.springerlink.com/content/c f2cpyh40qtw/ Volume 49, Numbers 1-3 / July, 1997, http://www.springerlink.com/content/p252k307q445l582/

[7] Agrofuels - Towards a reality check in nine key areas - Biofuelwatch, Carbon Trade Watch/TNI, Corporate Europe Observatory, Econexus, Ecoropa,Grupo de Reflexión Rural, Munlochy Vigil, NOAH (Friends of the Earth Denmark), Rettet Den Regenwald and Watch Indonesia http://tinyurl.com/233x7n

[8] Stop the agrofuel craze!, GRAIN http://tinyurl.com/2hkkzp

totally undermined by the Palm Oil component that contributes to massive climate damage[9].

"Competition with food and indirect land use changes can be managed by national governments and international bodies through other policy mechanisms." This sentence gives no indication of what the other policy mechanisms are, and what level of maturity and legislation these 'mechanisms' are. We are not aware of any policy mechanisms or bodies which are set up to manage 'competition with food and indirect land use changes'. Although we do not agree with all of the conclusions of the Dutch Cramer Commission Report, we agree with the following statement contained in that report: "Some of the impacts of biomass production are difficult to assess on the individual company level, and only become apparent on the regional, national and sometimes even on the supranational level. This is true in particular for the impacts caused by indirect changes in land use and is especially important in the themes Greenhouse gas emissions, Biodiversity and Competition between food and other biomass uses. In determining the sustainability of biomass it is crucial to take these macro-impacts into consideration"

"Accordingly, the Government proposes that the Administrator of the RTFO should require fuel suppliers to submit reports on the carbon and sustainability characteristics of the fuels they have supplied in order to receive Renewable Transport Fuel Certificates (RTFCs)." No policy context to certification is elaborated here. Certification appears to be more a mechanism to promote growth of the industry rather than to ensure that no environmentally and socially damaging agrofuels reach UK pumps. Concerns can be drawn from the European carbon trading system that gave large 'windfalls' to companies that were actually damaging the environment[10].

2. Is the meta standard approach suggested in chapter 3 appropriate?	Yes	No ✓

If your answer is no please explain your reasons and add any additional comments you wish to make:

The meta standard does not act to prevent catastropic environmental and social damage. It accepts qualitative 'good' practice, but agrofuels not qualifying to the meta-standard can still enter the UK and reach consumers. A ban on the import of biofuel feedstocks linked to large-scale deforestation, peat drainage, human rights abuses, etc. has previously been rejected by the UK government as not being compatible with the World Trade Organisation'. There is a debate whether regulations aimed at preventing major environmental and social harm are excluded under WTO rules. There is no example of voluntary certification or mandatory reporting (such as RTFCs) having been successful as a policy instrument in regulating any commodity market or improving practices in a whole industry. Timber certification, for example, has failed to reduce deforestation rates or improve timber industry practices at the global level. According to a 2006 report by the International Tropical Timber Organisation, only 5% of tropical forests are 'sustainably managed'[11] The ITTO's definition of 'sustainable forestry' covers the Malaysian forestry sector – despite the fact that Malaysia's deforestation rate increased by more than 85% between 2000 and 2005, and that old growth forest logging and violation of the rights of indigenous peoples are common. There is no evidence from existing certification schemes to suggest that RTFCs can be a successful policy instrument and will change company practices.

[9] Peat CO2, Wetlands International http://tinyurl.com/3cqjhr
[10] Reference – carbon trading
[11] http://www.itto.or.jp/live/PageDisplayHandler?pageId=270

- Destroy or damage carbon sinks (eg Palm Oil from Peat Soils) (Principle 1)
- Are linked to abuses workers rights and land rights (Principle 6 and 7) – for example, the documented cases of Palm Oil from Colombia – that is causing a massive internal refugee problems and deaths at the hands of militias.

Even if a small proportion of fuels come sources which destroy or damage carbon sinks (eg palm oil from South-east Asia's peatlands) or are linked to the abuse of workers rights and land rights (eg in the documented cases of palm oil from Colombia, where palm oil plantations are linked to serious human rights abuses, murders and unlawful evictions). This taints any qualification for sustainability standards of the remaining agrofuel.

Principle 1 does not cover carbon sinks indirectly destroyed.

Principle 2 does not define 'high biodiversity areas'. Although governments like the Malaysian admit that palm plantations have led to cutting down large areas of forests, threatening rich biodiversity in their ecosystems[12], deforestation is often 'officially' hidden when state or commercially owned forest reserves, that are not "gazetted" or protected, are converted to palm oil plantations. In Malaysia, gazetted forest is only 10% of the total with many ecologically sensitive areas excluded from protection. The same is true in many countries, for example, the Ugandan government who may change laws to de-gazette protected forests without first having going through parliament.

The meta standard overarches a number of existing standards set out in Annex A. There is an important difference to be made between voluntary certification initiatives, such as the Forestry Stewardship Council (FSC), that depend on conscious consumers choosing to pay more for a certified product; and mandatory certification, which is based on setting legally enforced environmental and social standards. Existing initiatives like FSC, RSPO and RTRS (no criteria yet) have generated substantial criticism (or outright rejection in the case of RTRS[13]) from civil society in producer countries, or have suffered from failing participation.

The FSC case gives an example the lack of effectiveness of such schemes in the global South. FSC is a lot less effective in the South than in North America and Europe. Of all commercial forest area, 58% is certified (by FSC and all other labels together) in Europe, against 2% for Asia and Latin America, and 1% for Africa. This is very important as European agrofuels are increasingly being sourced from timber products – take recent developing agreements between Brazil and Nordic countries for wood pulp biodiesel[14]. A voluntary standard applying to only 2% of forestry offers no credible protection of crucial ecological resources.

The level of credibility failure is evidenced by the recent the Norwegian government declaration, following a ruling by the Norwegian Consumer Ombudsman, recently declared: "The government wants to stop all trade with unsustainably or illegally logged tropical forest products. Today there is no international or national certification that can guarantee in a reliable manner that imported wood is legally and sustainably logged"

We are surprised to see the RSPO listed as a benchmarked standard here, where Annex C, Table 10 says the standard is "currently being developed". RSPO is not a certification standard and verification procedures have not been agreed. There is no reason to believe it will work, and there is no evidence that the existence of the RSPO has led to an improvement in standards in the industry. There is also a further major omission -

[12] Malaysia calls for sustainable expansion of palm oil plantations, International Herald Tribune, 5/12/06, http://tinyurl.com/2trdr4
[13] http://www.lasojamata.org/?q=node/42
[14] http://www.iht.com/articles/ap/2007/09/10/europe/EU-GEN-Finland-Brazil-Silva.php
[15] http://www.foeeurope.org/publications/2007/Wilmar_Palm_Oil_Environmental_Social_Impact.pdf

carbon emissions from peat drainage are ignored by the RSPO and it therefore does nothing to protect the climate, or encourage sustainability. Given this, the credibility of the RTFO is undermined when the RSPO is used as a 'benchmarked standard' – monthly reporting for RTFCs such as Table 2, in chapter 3 are just misleading when the consultation define the RSPO as 'being developed'.

The Consultation proposes that there will be no 'system certification'. Any meaningful independent verification scheme must verfiy not only documents regarding the supply chain but independently audit conditions in the regions where the feedstocks are grown. The document states: "Evidence of the effectiveness of controls can come from internal sources, such as management reviews and internal audits, as well as external audits, forexample, of the chain of custody.". In this context we would point to the recent report by Milieudefensie, Lembaga Gemawan and Kontak Rakyat Borneo which looks at the legal, environmental and social practices of the Wilmar Group in Sambas District, Indonesia[15].

The Wilmar Group are one of the largest palm oil companies worldwide and a supplier of bioenergy feedstock. The report reveals that company reporting about their practices bears little resemblance to the reality on the ground, and that, contrary to the company's declarations, illegal land acquisition, burning of land (associated with massive greenhouse gas emissions) and deforestation for new plantations are common procedures. We cannot see how the proposed RTFC verification scheme would do anything to prevent such open abuse of the system, particular where imports from outside Europe are concerned.

The Basel criteria for soy suffer similar lack of credibility and are widely opposed of civil society groups.

The RSPO, RTRS or the Better Sugarcane Initiative do not certify any produce, and none of those stakeholder forums have adopted verification standards. We cannot see how a scheme can be adopted as a benchmark when it has not even been fully agreed and set up. The RTFO credibility is undermined by the proposal that mere membership, together with auditing against principles and criteria should qualify. Membership does not imply adherence to the priniciples and criteria, and no process for independent auditing exists.

We have stated above that the communities in the global South who will be directly affected by the RTFO have not been consulted. Many of those communities and civil society organisations, however, have spoken out very strongly against some of the standards proposed as benchmark standards for the RTFO. The RSPO, for example, has been rejected by the leading NGOs of Papua New Guinea, whilst the RTRS (Basel Criteria) has been strongly opposed by many civil society organisations in South America, who do not agree with the concepts of voluntary sustainability certification of a monoculture industry which is linked not just to deforestation and biodiversity losses, but also to the dispossession of tens of thousands of small farmers, the poisoning of communities, water and soil with pesticides, to soil erosion, water over-extraction, and the loss of food sovereignty, leading to widespread malnutrition in countries such as Argentina and Brazil. Only one organisation which represented small farmers ever joined the RTRS, and they left the Organising Committee in summer 2005, feeling that they could not influence the process. We strongly reject the suggestion that those existing schemes could be used as benchmark standards. Please refer to our comments above for some of our concerns about using the FSC as a benchmark standard.

3. Are the Environmental and Social principles set out in chapter 3 the right ones?	Yes	No ✓

We have described above how the meta standard mehod undermines any credibility of the RTFO, partially where partial compliance with social and environmental criteria is deemed to be acceptable for meeting the standards. According to this suggestion, ignoring the land rights of communities or planting feedstocks without the free, prior and informed consent of the local communities would not always be a reason for not being certified as sustainable. This is unacceptable. It is also unacceptable that it appears that no reporting on labour conditions on sugar cane, soya and other plantations is required - particularly in view of the strong evidence of extremely poor working conditions, people dying from overwork, lack of healthcare and, in some cases, even slavery on some plantations, including on some plantations in Brazil.

Under environmental standards, it is stated that conversion of high carbon soils, including peatlands, would not be acceptable. However, this is not one of the principles and criteria of the RSPO. If the RSPO is accepted as a benchmark standard, then biofuels such as palm oil biodiesel from Indonesian and Malaysian peatlands can still be classed as 'sustainable', in contradiction of the standards.

4. Do the proposals for the content of monthly reports set out in chapter 3 provide enough detail - is there other information we should require?	Yes	No ✓

Please explain your answer:

Feedstock areas need to be much more specific. For example, ethanol from Brazil or Palm Oil from Malaysia can mean many things. Location of origin needs to be much more specific.

5. Is there other information that should be required in the annual reporting requirements set out in chapter 4?	Yes	No ✓

If yes, please give details

Chapter 1 of the suggested annual report needs to contain (from the second year):

a) QUANTIFIED details of the supplier's policies and plans for improving its sourcing of sustainable biofuels with a lower carbon intensity AND THE SOCIAL AND SUSTAINABILITY qualification made in last year's report WITH a breakdown of achievement against the plan.
b) QUANTIFIED details of the supplier's policies and plans for improving its sourcing of sustainable biofuels with a lower carbon intensity AND THE SOCIAL AND SUSTAINABILITY qualification made for the next year.

The consultation suggestion does not gain any rolling view of achievement against aspiration. It would be possible for companies to write similar aspirations year-on-year without any audit trail of them achieving them. There will be no audit trail without verifiable quantification.

Under chapter 4 of the suggested annual report, verification involves the opinion of an '*auditor'* – what standards are there for this sort of auditing. The term auditor in this context does not appear to be defined.

Section 4.5, second bullet points. We do not think that the RTFIis viable as previously stated, but if the system is implemented, then it should mandatory for Annual Reports from all suppliers should be published on the RTFO administrator website in the public domain where they may be subject to scrutiny for watch groups and others. The system will not be credible to consumers unless full company disclosure in the public domain is mandated.

Similarly in the 4th bullet point, supplier performance against targets should be published in the pubic domain.

6. Are the targets for reporting in chapter 4 appropriate - should they be higher / lower?	Right	Higher	Lower

Please explain your answer:

We have not ticked any box because we have provided ample evidence above that the RTFO scheme is flawed and lack credibility – higher reporting on a discredited scheme does not remove the fundamental flaws.

The voluntary targets for the percentage of feedstock meeting standards are totally inadequate and provide a major loophole for extremely damaging agrofuels to penetrate the UK fuel supply. For example, the 2009-2010 figure of 50% voluntary reporting would allow a supplier to report on the 'best' 50% of their feedstock and receive lucrative RTFCs, whilst still importing agrofuels with major impacts in the other 50%. We believe that the system has no credibility without the feedstock percentage being set at 100% from the outset.

The argument about encouraging growth of the industry by a stepped reporting percentage is weighted against all those who suffer from the environmental, social and human impacts of massive large-scale monoculture agrofuel development[16] – often the poorest communities on earth. Suppliers have had all the benefits of no controls on their activities so far – it is time for meaningful and credible controls to be imposed.

A further loophole exists in the disparity between the RTFC scheme and the ROCs scheme for renewable energy. The opportunity exists for suppliers to put agrofuels that do not conform to their RTFC/RTFO scheme into the renewable energy system (for example, the burning of Palm Oil for power generation) and gain ROCs for agrofuel that would not qualify for RTFCs. **This disparity between RTFCs and ROCs needed to be urgently addressedby DEFRA and (DTI/)BERR.**

[16] See DECLARATIONS FROM THE SOUTH, http://www.biofuelwatch.org.uk/declarations.php

Questions 7 – 15	Yes	No
These are not answered due to lack of available time. We believe that detailed scrutiny of the setting of default values is required and regret that we can not provide feedback on these currently. One area of particular concern is how default values are set for Palm Oil from mineral and organic soils – we believe that further investigation into these is required to ensure that the carbon intensity of Palm Oil for organic peat soils is not underestimated by assumptions in setting default values, based on 'typical' mineral and organic values.		

If you have any other general comment that you would like to make concerning this consultation, please give them here:

We call for an immediate moratorium[17] on EU incentives for agrofuels and agroenergy from large-scale monocultures including tree plantations and a moratorium on EU imports of such agrofuels. This includes the immediate suspension of all targets, incentives such as tax breaks and subsidies which benefit agrofuels from large-scale monocultures, including financing through carbon trading mechanisms, international development aid or loans from international finance organisations such as the World Bank. This call also responds to the growing number of calls from the global south against agrofuel monocultures, which EU targets and the RTFO scheme are helping to promote.

HOW MEANINGFUL ARE 'GREENHOUSE GAS STANDARDS' FOR BIOFUELS IN A GLOBAL MARKET?

This background paper discusses the usefulness of 'greenhouse gas standards', based on life-cycle greenhouse gas assessment in ensuring that biofuels mitigate rather than accelerate global warming. It looks at the importance of non-linear feedbacks which could result from deforestation, which could significantly accelerate ecosystem collapse and climate change; at the importance of indirect or 'displacement' impacts from agrofuel production; and at the remit and limitations of life-cycle greenhouse gas assessments. Finally, we briefly look at the wider debate about the amount of agrofuels which could theoretically be used without accelerating climate change and/or further destroying biodiversity, depleting freshwater supplies and soil.

The term 'biofuels' includes both fuels from true waste and fuels from 'energy crops' which in most cases are grown on monocultures, such as sugar cane, corn, oilseed rape, palm oil and soya. Biofuels from true waste, such as biogas

[17] http://www.econexus.info/agrofuel_moratorium_call.html

from landfill or manure or waste vegetable oil, are clearly 'climate-friendly', although their role in climate mitigation will be limited. We refer to fuels from 'energy crops' as agrofuels – a term which would also include fuels from organic soil and forest residue, which are essential for maintaining soil fertility and biodiversity. This paper looks at the role of agrofuels only.

Rainforest and peatland destruction and accelerated climate feedbacks:

According to the Stern Review, deforestation is responsible for 18% of global anthropogenic greenhouse gas emissions, however that report does not give estimates for peat and other soil emissions. Figures contained in the in the IPCC's Assessment Report Four suggest that carbon dioxide emissions from global peatland degradation exceed those from deforestation[1] . The destruction of South-east Asia's peatlands for oil palm and timber plantations is the biggest single cause of peatland emissions worldwide.

Rainforest and peatland destruction is thus a major contributor to greenhouse gas emissions, and it also threatens the stability of the global climate in ways not reflected in emissions statistics. One direct impact is the loss carbon sinks: At present, around 25% of anthropogenic carbon emissions are absorbed by the terrestrial biosphere, i.e. by soils and vegetation, and a similar amount is absorbed by the oceans. There is strong evidence that old-growth forests and peatlands continue to sequester large amounts of carbon dioxide from the atmosphere. If those carbon sinks are destroyed, more of our emissions will remain in the atmosphere.

Climate scientists are increasingly concerned that, beyond a certain level of warming, carbon locked up in soils, vegetation and methane hydrates will become increasingly unstable and enter the atmosphere, thus making climate stabilization impossible beyond 1.8 to 2^{o}C global warming from pre-industrial levels. Staying within this level of warming will require very fast and steep emission cuts – even whilst carbon sinks absorb half of our emissions. If we destroy our carbon sinks in the meantime, then we will be faced with the need to cut global carbon emissions by more than half, possibly in less than a decade – something which will be virtually impossible. Climate stabilization and ecosystem protection must go hand in hand.

When fossil fuels are burnt, the emissions are directly proportional to the amount of fossil fuel we burn. This is not the case for deforestation. Natural forests and peatlands are complex ecosystems. The Millennium Ecosystem Assessment, published by the UN in 2005, warned that ecosystem degradation is leading to an increased risk of non-linear, i.e. accelerating, abrupt changes[2]. There are increasing fears that the Amazon forest could be vulnerable to such abrupt changes, namely to large-scale die-back:

The Amazon rainforest 'recycles' 50-80% of the rainfall on which it depends, through a process of evapo-transpiration. Deforestation reduces the amount of evapo-transpiration and therefore has a strong drying effect. Recent

scientific evidence shows that conversion to cropland, such as soya, has an even stronger drying effect that conversion for other land-use[3]. There is strong evidence that, beyond a certain threshold of deforestation, the rainfall cycle over the Amazon may well break down. The Woods Hole Research Institute which has been at the forefront of studying the Amazon carbon cycle, hydrological cycle, and vulnerability to logging and climate change, warns:

"The risk of fire and drought is enhanced by logging, which opens the forests, and by farmers and ranchers who use fire to replace rainforests with crops and pastures. A brutal downward spiral of drought, forest fire, and further drought could expand across much of the Amazon, replacing the species-rich rainforest with savanna like vegetation."[4]

Concerns about a possibly rapid large-scale die-back are supported by evidence that the current Hadley cell airflow, which brings rain to much of South America and as far north as the US Midwest, itself depends on evapo-transpiration in the Amazon[5]: As much as 75% of the water picked up by the trade-winds from the Atlantic Ocean is pumped back into the atmosphere by the forest and finally leaves the Basin and brings rain to the Andes, Central America and the southern US. Rainfall changes over the Amazon have already been observed, which are in line with those models that suggest that deforestation could indeed alter the Hadley cell circulation. This includes strong signs of savannization in a large region from Para to Guyana. There is no evidence that the Amazon has already crossed a threshold and entered into irreversible die-back, but the droughts of 2005 and 2006, unprecedented in living memory, suggest that it may be close to such a threshold, and there are signs that drought may be returning to the southern Amazon in 2007, for the third year running. Forest die-back and conversion into savannah has already been observed in some areas around the drier margins of the rainforest. Some climate models suggest that Amazon die-back could be rapid[6], comparable perhaps to the sudden die-back of vegetation in today's Sahara. Between around 8,000 AD and 3,000 AD, most of the Sahara was covered in forests, grasslands and lakes. Temporary cooling of the North Atlantic reduced vegetation cover at different times, however, the complete vegetation die-back and desertification are understood to have happened abruptly and can only be explained by models which show that vegetation losses eventually disrupted the rainfall on which the region depended. This illustrates the strong links between vegetation and rainfall and the danger of dramatic, non-linear changes once vegetation cover can no longer maintain essential rainfall cycles.

There is a high risk of non-linear events, such as Amazon die-back which could be rapid, irreversible and lead to catastrophic acceleration of global warming as well as major changes in rainfall patterns, which could very rapidly cause global food shortages and large numbers of refugees. Those risks cannot be represented in 'life-cycle' studies done for agrofuels. Given the strong evidence that biofuel targets in the EU, US and elsewhere will threaten to accelerate Amazon

destruction, a precautionary climate strategy implies opposing such a high-risk policy.

Indirect impacts of agrofuel production are a major threat to rainforests and other 'carbon sinks' and there are no proposals to address those in 'certification' or 'standards'

Different kinds of 'sustainability standards' are being developed at present: The LowCarbon Vehicle Partnership suggest a mandatory reporting requirement to encourage the biofuel industry to self-regulate, and proposals contained in the recent UK Department for Transport consultation on the Renewable Transport Fuels Obligation.

The Dutch Cramer Commission submitted a detailed report on 'certification' using a variety of criteria, however we have been informed that this is now being translated into policy proposals for 'reporting requirements' only, not into any mandatory standards. The Cramer Commission's 'assessment framework', sets out different criteria, indicators and reports, but it does not look at which policy mechanisms might provide safeguards to ensure that the proposed criteria are met. It acknowledges that "Some of the impacts of biomass production are difficult to assess on the individual company level, and only become apparent on the regional, national and sometimes even on the supranational level. This is true in particular for the impacts caused by indirect changes in land use and is especially important in the themes Greenhouse gas emissions, Biodiversity and Competition between food and other biomass uses. In determining the sustainability of biomass it is crucial to take these macro-impacts into consideration". The recommendations made in the report are currently being translated into policy proposals for 'reporting requirements' only, not into any mandatory certification or standards.

Finally, the European Commission has recently consulted on proposals to certify biofuels according to life-cycle greenhouse and their direct impact on high-conservation value ecosystems only. Biofuels which do not meet those criteria would not qualify under a new Biofuel Directive; however, the consultation document acknowledges that indirect impacts on land-use cannot be accounted for. There are no social criteria, meaning that feedstock from plantations where people have been evicted, poisoned by pesticides or even murdered could be certified as 'sustainable'.

This paper, however, focusses on the indirect 'macro' impacts from use and production of agrofuels.

1) A 2006 peer-reviewed study by Morton et al.[3],which was press-released by NASA found: "Area deforested for cropland and mean annual soybean price in the year of forest clearing were directly correlated (R^2 = 0.72), suggesting that deforestation rates could return to higher levels seen in 2003-2004 with a rebound of crop prices in international markets." According to this study, Amazon deforestation rates are coupled to the world market price for soya,

rather than to changes in government or private sector policies or practices. If agrofuel expansion pushes up the price of soya, then an increase in deforestation rates in the Amazon can be expected.

2) According to a peer-reviewed study by Ricardo Grau et al.[7], published in 2005, soya expansion is the main cause of the high deforestation rates in tropical and subtropical seasonally-dry forests in South America, and that global factors (technological development and international prices) are the main drivers of soybean expansion and thus deforestation in those areas, including the semi-arid Chaco in Argentina. The study suggests that in Argentina government incentives for soybean production have cushioned industry from fluctuations in prices, suggesting that government optimism in the economic benefits of soybean production may be more important in that country.

3) According to the US Foreign Agricultural Service, world soybean prices rose by 13% between December 2006 and April 2007, despite 8% growth in production in Argentina, Brazil and Paraguay combined[8]. According to a report by the Woods Hole Research Institute published during the same month, soy prices are currently rising as a result of increased demand for corn ethanol in the US, sugar cane expansion for ethanol in Brazil, and the growing use of soy oil for biodiesel[9] . Recent figures from the US Department of Agriculture confirm that US farmers are indeed switching from soya to corn as a result of the demand for ethanol[10] – one of the reasons identified elsewhere why soya prices are now rising.

The impact of both soy biodiesel and corn ethanol on soybean prices has been confirmed by various sources, including the US Department of Agriculture[11], and various media sources[12] . The article by Gargi Shah quotes Mr Pradip Desai, Managing Director, Palmtrade Services Pvt Ltd. Saying “edible oil prices were expected to be driven mainly by the movement in prices of crude oil, demand from the consumption markets (India, China and EU) and the bio-diesel economics (sic)”. A recent study by the International Food Policy Research Institute predicts that the rapid increase in global agrofuel production increase the prices of oilseeds, including soybeans, rapeseeds, and sunflower seeds by 26 percent by 2010 and 76 percent by 2020[13]

A recent study by the International Food Policy Research Institute predicts that the rapid increase in global agrofuel production pushes up the prices of oilseeds, including soybeans, rapeseeds, and sunflower seeds by 26 percent by 2010 and 76 percent by 2020[13].

4) It is widely accepted that palm oil expansion, and in particular the increase in concessions granted for palm oil, is the leading cause of deforestation in Indonesia and Malaysia. The Indonesian government has acknowledged that new palm oil investment correlates with the price of palm oil. A report by the Food and Agriculture Organisation in late 2006[14] concluded: “The new demand for vegetable oil for biodiesel production has had a major influence on the

recent strengthening of prices; and the agrofuel driven surge in the price of rapeseed and its oil has lifted vegetable oil prices in general". The increasing use of European rapeseed oil for biodiesel was identified as a more important cause for rising palm oil prices than imports of palm oil for biodiesel up to 2996. Since late 2005, coinciding with the rapid increase in agrofuel demand, the EU has been a net importer of both rapeseed oil and soy oil, having been an exporter of both until then[15]. This suggests that, so far, the indirect, or displacement, effects of agrofuel use in the EU have had a considerably greater impact on palm oil prices and thus deforestation in South-east Asia than the use of palm oil biodiesel in Europe, let alone the use of palm oil biodiesel from recently deforested land.

5) According to recent findings by Daniel Nepstad of the Woods Hole Research Institute[9], only a relatively small proportion of soya expansion currently happens inside the Amazon rainforest. Far more important is the displacement of other agricultural activities due to soya expansion in neighbouring areas, such as the Cerrado. Dr Philip Fearnside of the Brazilian National Institute for Research in the Amazon confirms in the same article: "Soybean farms cause some forest clearing directly…but they have a much greater impact on deforestation by consuming cleared land, savanna, and transitional forests, thereby pushing ranchers and slash-and-burn farmers ever deeper into the forest frontier. Soybean farming also provides a key economic and political impetus for new highways and infrastructure projects, which accelerate deforestation by other actors." Brazil's National Agro-energy Plan has qualified 200 million hectares of Brazilian territory as 'degraded' and thus suitable for the expansion of agrofuel monocultures. Most of this is biodiverse dry forest or savannah, on which indigenous people and other local communities depend for their livelihoods, or lands used for cattle ranching or small-scale subsistence farming. This will seriously worsen the situation described by Nepstad and Fearnside above.

6) Government support for agrofuels, including agrofuel targets in the EU, affects deforestation not just by pushing up prices. Many companies and Southern governments are drawing up economic development plans and investment strategies based on optimism about future world demand and prices for agrofuels, which is boosted by Northern governments' long-term commitments to create and support a growing agrofuel market. In June 2006, for example, the CEO of Cargill described agrofuels as a 'a bit of a gold rush' in a New York Times article[16] and the President of the Inter-American Development Bank (IDB), Luis Alberto Moreno, has called agrofuels a "transformative opportunity" for Latin America and the Caribbean[17].

This 'market optimism' is being translated into concessions and investment decisions that economic strategies which create 'favourable conditions' for the expansion of monocultures which produce feedstocks for agrofuels. Those decisions, once made, will be difficult to reverse. In Indonesia, for example, palm oil expansion for the global biodiesel market is one of the priorities in the 5-year economic plan, with government plans for the conversion of around 20 million more hectares over the next 20 years[18] . The Asian Development Bank

(ADB) has recently committed itself to large-scale investment in agrofuel expansion, including from palm oil, and, in April this year, the Inter-American Development Bank (IDB) announced plans to invest $3 billion in private sector agrofuel projects. The Argentinean government are committed to meeting 10% of Europe's agrofuel demand by 2010, as well as increasing domestic biodiesel use[19], and they have put economic incentives, such as tax breaks and mandatory targets in place to achieve this.

According to an article in the Latin Business Chronicle, the meeting between President Lula and George Bush in March this year encouraged US, European and Japanese investors to draw up new investment plans for sugar cane plantations, mills, road, railway and port projects[20] .

7) The investment decisions and strategies described above are likely to accelerate deforestation and peat drainage not just by encouraging land conversion to agrofuel plantations. Large numbers of refineries are being built and planned, particularly in South-east Asia and Latin America, which require large plantations to remain economically viable. The Indonesian NGO Sawit Watch estimate that a palm oil mill requires 20,000 hectares of land to be viable, yet a biodiesel refinery needs 50,000 hectares[21]. Ecotropica and the Global Nature Fund have warned that ethanol refineries for which the Mato Grosso state government has recently granted planning permission will make large-scale deforestation and drainage in the Pantanal inevitable [22].

Much of the 'strategic' investment by governments and international finance organization, however, will include infrastructure projects, which will fragment and open up many of the world's remaining rainforests, semi-arid forests and natural grasslands to development. The link between road building and forest degradation and destruction is well-established[23]. The Initiative for the Integration of Regional Infrastructure in South America (IIRSA), for example, is a plan by South American governments to greatly increase roads, waterways and ports, partly in order to facilitate imports of soybeans and grains. A total of 335 projects have been identified, and 31 are currently being implemented at a cost of $4.3 billion, co-financed by the Inter-American Development Bank, Fonplata and the United Nations Development Programme. The largest IIRSA project is the Madeira- Mamoré -Beni-Madre de Dios hydroelectric and channelization complex, which would allow for soybean expansion in the Bolivian Amazon and savannah and the Brazilian rainforest, according to the International Rivers Network[24]. The IIRSA is a far-reaching investment programme which will serve a variety of economic interests, not just agrofuel expansion. Paraguayan farmers organizations have, however, pointed out that national agrofuel strategies in countries like Paraguay, the Ethanol Alliance between the US and Brazil, which other Latin American governments are expected to join, proposals made at the First American Congress on Biofuels in May 2007, as well as bilateral agrofuel co-operation between Latin American states and the US and EU depend on many of the large-scale infrastructure projects planned under the IIRSA[25]. Agrofuel expansion thus provides a very strong incentive for road, port, canal developments which are a major threat to Latin America's largest natural ecosystems.

This is reflected in the Brazilian government's Plan for Growth Acceleration (PAC), which was published in January 2007. This includes ambitious infrastructure projects in the Amazon forest. Many of the projects will be financed by Brazilian National Bank for Economic and Social Development (BNDES), and there is a commitment to build 1,150 kilometres of ethanol and biodiesel pipelines for export. Expansion of monoculture plantations for agrofuels, particularly in the Cerrado, forms an important part of the PAC. There are further proposals to devolve environmental protection to states and municipalities which many environmental organsiations fear could water down existing standards[26].

Guyana is another country where rainforests are threatened both directly and indirectly by agrofuel expansion: In April 2007, plans for the first ethanol plants were announced, and there are plans to improve transport links across the border with Brazil and along the Atlantic seabord linked, at least partly, to plans to grow and transport sugar cane for ethanol. It is feared that this could increase settlements, agricultural expansion and port development[27].

8) Another likely 'indirect impact' of agrofuel expansion is the strengthening of political power of corporate interests representing large agri-businesses and biotech companies. This may well be reflected in Brazil's Plan for Growth Acceleration or the Paraguayan and other investment policies and strategies, including those discussed above. In Indonesia, high palm oil prices and government support for biodiesel expansion has greatly strengthened the economic power of companies such as Raja Garuda Mas, Sinar Mas or the Bakrie Group[28]. Many of those business groups have got strong links to government and have increased their political dominance, particularly in Kalimantan and Sumatra, by taking advantage of decentralization. Raja Garuda Mas and Sinar Mas own the logging/timber companies APRIL and APP, notorious for their destruction of most of Sumatra's rainforests. The biodiesel boom is thus strengthening business groups also responsible for rainforest destruction for timber, pulp and paper. It is therefore impossible to distinguish between rainforest destruction for palm oil or for timber in Indonesia: The government's strategy of granting more concessions to companies for palm oil plantations, together with a virtual lack of law enforcement against those companies is encouraging both rainforest conversion to plantations and illegal logging.

The indirect impacts from agrofuel expansion are in many cases a greater threat to rainforests and other vital carbon sinks than the conversion of those ecosystems to agrofuel plantations. Indirect impacts include the displacement of other forms of agriculture into natural ecosystems as agrofuel plantations are expanded elsewhere, the wider effects of infrastructure projects linked to agrofuel expansion, the strengthening of corporate elites already responsible for deforestation and forest degradation in many Southern countries,

and the encouragement of national development strategies and public-private investment decisions which favour monoculture expansion and large-scale infrastructure projects at the expense of rainforests and small-scale sustainable farming. Deforestation rates in many areas are linked to commodity prices, for example for soya and palm oil, which are now being boosted by agrofuel expansion. Furthermore, the 'market optimism' created by biofuel targets in the EU, US and elsewhere is serving as a strong incentive for private investors and governments to provide both the infrastructure and long-term institutional framework for monoculture expansion.

How useful are life-cycle greenhouse gas assessments?

All of the certification/standards/reporting proposals for agrofuels which being discussed at present look at encouraging the use of agrofuels with a 'positive greenhouse gas balance'. Many European NGOs are now calling to restrict public support, granting it only to those agrofuels that achieve at least 50% greenhouse gas reductions. The 'greenhouse gas balance' of agrofuels is established through life-cycle greenhouse gas assessments that should ideally be peer-reviewed though, in reality, very few of them are.

There are no peer-reviewed life-cycle greenhouse gas studies for biodiesel from palm oil, jatropha or soya, and peer-reviewed studies on sugar cane ethanol are limited to those looking at energy gains and fossil fuel displacement, rather than total greenhouse gas balances. One study by Macedo et al, which appears not to be peer-reviewed, looks at the greenhouse gas balance of Brazilian sugar cane, but excludes deforestation and land-use change, despite the fact that sugar cane expansion is linked to land conversion in the Cerrado, the Atlantic Forest and the Pantanal[30].

There are further problems with using the results of life-cycle greenhouse gas assessments as 'benchmark' for agrofuel sustainability. One European study, for example, suggests that scientific uncertainties make it impossible to say whether greenhouse gas savings from rapeseed methyl esther (REM) are 7% or 58%. Neither of those figure includes organic soil carbon losses, nor do the studies consider the indirect impacts of greater use of REM in Europe in pushing up vegetable oil prices, and in particular palm oil prices, globally and thus triggering further palm oil expansion linked to deforestation in countries like Indonesia and Colombia [31].

- Many assessments point to significant uncertainties, particularly with regard to the attribution of by-products, and soil nitrous oxide emissions.
- The largest number of peer-reviewed life-cycle greenhouse gas assessments has been done for US corn ethanol. An evaluation of six different analyses by Alexander Farrell et al, published in Science in January 2006[32] reveals a wide range of methods used and different

results reached. The authors conclude that corn ethanol brings small greenhouse gas savings of 13% compared to petrol, but only if soil erosion and land conversion are ignored. This study, in turn has been criticized some scientists[33]. Alexander Farrell and his colleagues said in response to this criticism: "Including incommensurable quantities such as soil erosion and climate change into a single metric requires an arbitrary determination of their relative value." Yet soil erosion implies the loss of soil organic carbon and a need to use further energy and fertilizer input (with more nitrous oxide emissions) to be able to farm the land. Soil organic carbon losses and climate change are ignored in virtually all life-cycle assessments, further undermining their usefulness as a benchmark for 'sustainability'.

- As mentioned above, soil organic carbon losses are ignored in virtually all life-cycle assessments, even though they can be substantial. One of the regions where soil organic carbon changes linked to agriculture (though not to agrofuel production in particular) has been studied extensively is Argentina's Pampas region. Here, different studies reach very different results for the same climate zone and farming methods, some indicating minor accumulation of soil organic carbon with non-till farming, whilst others show substantial carbon losses. This is likely due to variations in soil composition and different methodologies.

Although there is no universally agreed methodology for life-cycle assessments, few independent researchers working in this field, and very few peer-reviewed studies, agrofuel companies are increasingly commissioning their own assessments. They use a range of methodologies, often ignoring important sources of emissions, or even all greenhouse gas emissions other than those of carbon dioxide. If governments introduce a reporting requirement or standards based on life-cycle greenhouse gas assessment, then they will have to rely on industry-commissioned, non-peer-reviewed studies that by their nature will not provide independent scientific evidence. The only alternative, not proposed or considered by anybody, would be to delay such a requirement, possibly by several years, and to provide government finance to build the capacity for independent scientific research in this field.

Here are two examples of company-commissioned life-cycle assessments:

- Greenergy Biofuels Ltd claim to have been the first UK company to publish figures on carbon savings from the biodiesel they sell. Like other companies, they ignore greenhouse-gas emissions other than carbon dioxide, even though nitrous oxide emissions account for a large proportion of life-cycle emissions from biodiesel. Greenergy commissions the Edinburgh Centre for Carbon Management (ECCM) for studies. Greenergy Biofuels Ltd's office is at the same address as ECCM and Greenergy previously owned a lot of the ECCM shares.

- In June 2006, Neste Oil published a report on life-cycle greenhouse gas savings from their NExBTL biodiesel from rapeseed oil and palm oil, which was undertaken by the German Institute for Energy and Environmental Research (IFEU)[34]. The surprising conclusion of this study was that the best greenhouse gas balance comes from converting natural rainforest to palm oil for biodiesel. Biofuelwatch spoke to the IFEU team responsible for the study and were advised verbally that the result was derived by excluding soil carbon emissions, all emissions linked to peat destruction, all emissions linked to forest fires, and dividing deforestation emissions by 100 (i.e. spreading them over a century), even though the maximum life-time of an oil palm plantation is around 25 years. Calculations for nitrous oxide emissions ignored the IPCC observation, contained in the Third Assessment report, that the application of nitrate fertilisers to one hectare of tropical and phosphorous-limited soil resulted in N2O emissions 10-100 times higher than those from applying the same amount to a hectare of temperate soils.

As discussed above, no methodologies exist which could account for indirect impacts, let alone non-linear feedbacks, when establishing 'greenhouse gas balances'. Accounting for those would indeed be extremely difficult:

a) If Amazon rainforest is converted to soya plantations, a good life-cycle study should calculate how much carbon is lost from each hectare of the new plantation as a result of deforestation. Those figures would be based on the presumption that carbon emissions correlate directly to the area deforested, i.e. that there will be no non-linear feedbacks. As we have seen above, there is a high risk of non-linear feedbacks, yet it is impossible, to predict exactly where the 'tipping point' for a large-scale die-back of the Amazon might lie. No life-cycle study can account for or attribute the release of perhaps 120 billion tonnes of carbon which could result from land-clearance beyond that unknown 'tipping point.'.

b) In South-east Asia, satellite images have confirmed that most of the annual peat and forest fire hotspots are on plantations, many of them oil palm plantations. The spread and intensity of the fires, however, depends on weather conditions. In theory, a life-cycle assessment could account for carbon emissions from forest fires set to clear land for a agrofuel plantation, though no such assessments have been done as yet. In practice, this will be almost impossible to police or prove, and it would also yield vastly different emission figures linked to chance weather conditions rather than company practice. In reality, vegetation burning and, in most cases, land-conversion and deforestation, are ignored completely in life-cycle assessments.

c) Life-cycle assessments are done on a field basis, and thus cannot account for any of the indirect 'displacement' effects described above. Those effects

are difficult to quantify and prove and no methodology for including them exists.

Life-cycle assessments are micro-studies, which look at greenhouse gas balances on a field-basis. They cannot account for the wider impacts of agrofuel production, such as displacement of other agricultural activities or accelerated deforestation linked to infrastructure for the transport of agrofuels. Neither can they account for non-linear feedbacks. There are very few peer-reviewed studies, and methodologies vary widely. Most studies ignore some types of greenhouse gases or sources of emissions, such as soil organic carbon losses and deforestation/land-use change emissions. Scientific uncertainty means that some of the better studies reveal a very wide margin of error, which makes it difficult to use them for any 'certification' or 'reporting' requirements. There is no capacity for independent research to carry out the large number of assessments required by any reporting or certification scheme. This is likely to result in a large number of company-sponsored 'research' projects that will not be independently verified. Most importantly, however, even the best life-cycle greenhouse gas assessment cannot help to prevent agrofuels from accelerating global warming, because it cannot account for indirect impacts/displacement, nor for non-linear climate feedbacks from deforestation, which are amongst the most serious risks to our carbon sinks and thus to the stability of the global climate.

Could sustainable agrofuels play a significant role in future energy supply?

Any major shift from fossil fuel energy to bioenergy will significantly increase human demands on the planet's photosynthetic capacity, and on the biosphere in general. Perhaps the most fundamental question in the agrofuel debate is whether, or in how far, increased use of bioenergy could be possible without further destabilizing ecosystems, depleting the soil and water on which agriculture as well as ecosystems rely, or further disrupting the carbon cycle and thus accelerating climate change. A number of studies suggest that sustainable bioenergy, and agrofuels in particular, could meet a significant proportion of our primary energy demand. All of those studies are based on the assumption that there will be no climate change impacts on agriculture in coming decades – the report by E Smeets et al even states that it is assumed that the climate will not change between now and 2050. All of the studies assume that substantial increases in per hectare yields are feasible, and that further intensification of agriculture is possible without being limited by depletion of water and soil, despite the fact that global grain production has, so far, peaked in 2004 and that per hectare yields of key agrofuel crops are declining in different parts of the world. European oilseed rape per hectare

yields, for example, have been falling for four years, with a significant fall in overall output in 2007.

Various studies, including the UN Millennium Ecosystem Assessment Report, show that human pressures on the biosphere and resource use are already highly unsustainable, even without large-scale modern agroenergy. According to that report, 60% of ecosystem services are degraded and there is an increasing likelihood of non-linear changes in ecosystems which could have severe impacts on human society.

Contrary to the widespread presumption that agrofuels are a source of 'renewable energy', the International Panel on Climate Change states that stable ecosystems must approach zero 'net primary productivity'[36]. This means that, in a stable environment and climate, the amount of carbon fixed by plants is equal to the amount of carbon put back into the atmosphere, partly by the plants themselves and partly by symbiotic soil organism. It means that, over the human time-scale, healthy ecosystems do create energy. This is why scientists such as Tad Patzek, geoengineer at UC Berkley warn that agrofuels will require intensive 'mining' of the biosphere, in which ecosystems, including soils, continue to be stripped off their organic materials, which will have to be continuously replaced by fossil fuels (in the form of fertilizers) to prevent or even delay agricultural collapse[37].

The difference between carbon emissions on the one hand and increases in atmospheric carbon dioxide on the other suggests that, at the global level, net primary productivity has been increasing in recent decades, allowing ecosystems to absorb about 25% of anthropogenic carbon dioxide emissions. Many scientists assume that this is a temporary response to higher carbon dioxide levels ('carbon fertilisation'), which may soon be overwhelmed by increasing stress from heat, drought and extreme weather events. It is not a trend on which we can rely in future.

A recent paper by Helmut Haberl et al[38] finds that humans already use 23.8% of the net primary productivity of the terrestrial biosphere resulting in severe ecosystem degradation and bio-geochemical changes, and that large-scale biomass expansion would greatly increase those pressures. NASA satellite images reveal that most net primary productivity in the more densely populated parts of the world is appropriated by humans[39]. Another paper, by Renton Righelato and Dominick Spracklen[40], finds that meeting the EU and US agrofuel targets will require clearance of natural forests and grasslands, and that "clearance results in the rapid oxidation of carbon stores in the vegetation and soil, creating a large up-front emissions cost that would, in all cases examined here, outweigh the avoided emissions". Ecological restoration, rather than land conversion for agrofuels, would offer a significant potential for reducing global carbon emissions, according to the authors.

A presentation by G Huppes and E van der Voet of the University of Leiden[41], links increases in bioenergy use to reduction in land available for ecosystems and finds that large-scale bioenergy expansion will first reduce and eventually

eliminate the space available for ecosystems, and thus for most species on earth.

Scientists at a recent conference of the Stockholm International Water Institute warned that agrofuel production would double the amount of water used by agriculture and lead to land clearance and significant carbon dioxide emissions[42]. Water scarcity is a major threat to human society, to agriculture, and to ecosystems.

Second-generation agrofuels, if they were to become commercially available, would allow humans to turn different types of biomass into liquid transport fuels. This could greatly increase human pressure on the biosphere.

It is important to consider natural limits to the use of bioenergy, which are the negligible amount of 'new energy' created by plants, the scale of human appropriation of the planet's photosynthetic capacity and 'ecosystem services', and the fact that demand for agrofuels is increasing at a time when all of the world's ecosystems are already under strain from resource over-exploitation and climate change. There are intrinsic natural limits to 'sustainable agrofuels', which cannot be overcome by more effective regulation, sustainability safeguards or by new technology. Going beyond those limits will greatly increase the chances of ecosystem collapse and non-linear events, as highlighted in the UN Millennium Assessment.

References:

1) Global climate body: Peatland degradation more significant than deforestation, Wetlands International, 17th May 2007, http://www.wetlands.org/news.aspx?id=a7cf1f40-2c52-4727-81ed-2ac36dd3ba26

2) Overview of the Millennium Ecosystem Assessment, 2005, http://www.millenniumassessment.org/en/About.aspx

3) Cropland expansion changes deforestation dynamics in the southern Brazilian Amazon, Douglas Morton et al, 14th September 2006, 10.1073/pnas.0606377103, http://www.pnas.org/cgi/content/abstract/0606377103v1?ck=nck

4) Amazon Scenarios, Woods Hold Research Center, www.whrc.org/southamerica/amaz_scen.htm

5) Gaia, Climate and the Amazon, Peter Bunyard, 15th July 2005, http://www.indsp.org/SWPeterBunyard.php

6) For example: Climatic variability and vegetation vulnerability in Amazonia,L. R. Hutyra et al, Geophysical Research Letters, Vol. 32, L24712, doi:10.1029/2005GL024981, 2005 , http://eebweb.arizona.edu/faculty/saleska/docs/Hutyra05_Var.Vuln_GRL.pdf , and also A new climate-vegetation equilibrium state for Tropical South America, Marcos Daisuke Oyama and Carlos Alfonso Nobre, Geophysical Research Letters, Vol. 30, No. 23, 2199, doi:10.1029/2003GL018600, 2003 , http://www.agu.org/pubs/crossref/2003/2003GL018600.shtml

7) Agricultural expansion and deforestation in seasonally-dry forests of north-west Argentina, Ricardo Grau et al., Environmental Conservation (2005), 32: 140-148 Cambridge University Press, http://journals.cambridge.org/action/displayAbstract;jsessionid=84FC9267B01B24CBBD6D3FB59AC062C8.tomcat1?fromPage=online&aid=337739

8) USDA FAS, http://www.fas.usda.gov/Newsroom/currwmt,asp
9) US ethanol may drive Amazon deforestation, Mongabay, 17th May 2007, http://news.mongabay.com/2007/0516-ethanol_amazon.html
10) Corn acres expected to soar in 2007, USDA says, United States Department of Agriculture, 30th March 2007, http://www.nass.usda.gov/Newsroom/2007/03_30_2007.asp
11) International trade, biofuel initiatives reshaping the soybean sector, United States Department of Agriculture, September 2006, http://www.ers.usda.gov/AmberWaves/September06/PDF/InternationalFindingSeptember06.pdf
12) See for example: Brazil's ethanol: big potential, Thomas Rideg and Michael Smith, Latin Business Chronicle, 14th May 2007, http://www.latinbusinesschronicle.com/app/article.aspx?id=1214
Edible oils track rise in food oil prices, Gargi Shah, Hindu Business Line, 30th March 2007, http://www.blonnet.com/2007/03/30/stories/2007033000191400.htm
How biofuels could starve the poor, C Ford Runge and Benjamin Senauer, Foreign Affairs, May/June 2007, http://www.foreignaffairs.org/20070501faessay86305-p20/c-ford-runge-benjamin-senauer/how-biofuels-could-starve-the-poor.html
and (9)
13) Bioenergy and Agriculture: Promises and Challenges, Mark Rosengrant et al, International Food Policy Research Institute, December 2006, http://www.ifpri.org/2020/focus/focus14/focus14_03.pdf
14) Biofuels and Commodity Markets – Palm Oil Focus, P Thoenes, Food and Agriculture Organisation, 2006, http://www.fao.org/es/ESC/common/ecg/110542_en_full_paper_English.pdf
15) USDA FAS, http://www.fas.usda.gov/gainfiles/200603/146187250.pdf
16) Boom in ethanol reshapes economy of heartland, Alexei Barrionuevo, New York Times, 25th June 2006, http://www.nytimes.com/2006/06/25/business/25ethanol.html?ei=5088&en=3db79885d5ce7f34&ex=1308888000&partner=rssnyt&emc=rss&pagewanted=print
17) IDB targets $3billion in private sector biofuel projects Inter-American Development Bank, 2nd April 2007, http://www.iadb.org/NEWS/articledetail.cfm?artid=3779&language=En
18) Green Gold Biodiesel: Players in Indonesia, Marianne Klute, January 2007, http://www.biofuelwatch.org.uk/Green_Gold_Biodiesel_%20Players_in_Indonesia.doc
19) Argentina podría producir 1,2 millones de toneladas de biodiesel en 2010, Biodiesel Uruguay, http://www.biodiesel-uruguay.com/noticias_de_biodiesel/argentina-podria-producir-1_2-millones-de-tonelada-413.php
20) Brazil's ethanol: big potential, Thomas Rideg and Michael Smith, Latin Business Chronicle, 14th May 2007, http://www.latinbusinesschronicle.com/app/article.aspx?id=1214
21) Palm oil for biofuels increases social conflicts and undermines land reform in Indonesia, Sawit Watch, January 2007, http://tech.groups.yahoo.com/group/biofuelwatch/message/245
22) Pantanal declared 'Threatened lake of the year 2007', Global Nature Fund and Ecotropia, 2nd February 2007, http://www.ramsar.org/wwd/7/wwd2007_rpts_germany_gnf.htm
23) See for example http://rainforests.mongabay.com/amazon/amazon_destruction.html
24) Initiative for the Integration of regional Infrastructure in South America, International Rivers Network, http://www.irn.org/programs/iirsa/
25) Official Declaration of Chake Ñuhá on the Agro-fuels and Environmental Services Traps Asunción, Paraguay, 24 April 2007, http://www.wrm.org.uy/countries/Paraguay/Chake_Nuha.html
26) http://www.brazzil.com/content/view/9875/80/
27) Biofuels, logging may spur deforestation in Guyana, Mongabay, 15th February 2007, http://news.mongabay.com/2007/0215-guyana.html
29) A who's who of Indonesian, Bill Guerin, Asia Times, 22nd May 2007, http://www.atimes.com/atimes/Southeast_Asia/IE22Ae01.html
30) Macedo, Copersucar Technological Centre, Greenhouse Gas Emissions and Avoided Emissions in the Production and Utilization of Sugar Cane, Sugar and Ethanol in Brazil: 1990-1994, http://ftp.mct.gov.br/clima/ingles/comunic_old/coperal.htm

31) Energy and greenhouse gas balance of biofuels for Europe: an update, Concawe Ad-hoc Group on Alternative Fuels, 2/02, http://www.senternovem.nl/mmfiles/26601_tcm24-124161.pdf
32) Ethanol can contribute to energy and environmental goals, Alexander Farrell et al, Science Vol 311, 27.1.2006. Source: http://rael.berkeley.edu/EBAMM/FarrellEthanolScience012706.pdf

33) LETTERS: Energy Returns on Ethanol Production , Cutler J Cleveland et al, , 23rd June 2006 Science 312 (5781), 1746. [DOI: 10.1126/science.312.5781.1746
34) IFEU Report: An Assessment of Energy and Greenhouse Gases of NExBTL , http://www.nesteoil.com/default.asp?path=1,41,539,7516,7522,7525,7528
35) See for example "A Quickscan of global bio-energy potentials to 2050", E. Smeets et al. , March 2004 AND
"Biomass as feedstock for a bioenergy and bioproducts industry: The technical feasibility of a billion-ton annual supply", RD Perlack et al, US DoE and USDA, 2005 AND
"Biofuels for Transportation: Global Potential and Implications for Sustainable Agriculture and Energy in the 21st Century", World Watch Institute, August 2007
36) Third Assessment Report: "Climate Change 2001: The Scientific Basis", Chapter 3.2.2 , http://www.grida.no/climate/ipcc_tar/wg1/099.htm
37) "First Comment on the UCB–UIUC Proposal to BP", Tad Patzek, March 2007, http://www.stopbp-berkeley.org/CellulosicBiofuels.pdf
38) "Quantifying and mapping the human appropriation of net primary production in earth's terrestrial ecosystems", Helmut Haberl et al, PNAS, July 2007, 10.1073/pnas.0704243104, http://www.pnas.org/cgi/content/abstract/0704243104v1
39) See "Can we outlive our way of life?", Tad Patzek, August 2007, http://www.hubbertpeak.com/Patzek/CanWeOutliveOurWayOfLife20070809.pdf
40) "Carbon Mitigation by Biofuels or by Saving and Restoring Forests", Renton Righelato and Dominick Spracklen, Science, Vol 316, 17th August 2007, p.902
41) http://www.leidenuniv.nl/cml/symposium/download/huppes.pdf
42) http://www.iwapublishing.com/template.cfm?name=news115

Almuth Ernsting, August 2007

Please send this response to:

rtfo.consultation@dft.gsi.gov.uk

For further information contact Rupert Furness on 0207 944 4899 or Rupert.furness@dft.gsi.gov.uk

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