**Comments on V0 of HLPE report on Biofuels and Food Security**

**Energy Team, NRC**

**Overall comments**

*HLPE received a request from CSF in October 2011* to “conduct a science-based comparative literature analysis taking into consideration the work produced by the FAO and Global Bioenergy Partnership (GBEP) of the positive and negative effects of biofuels on food security”

The current draft of this document fails to provide such a structured analysis based on clear definitions and objectives. Further, there is a lack of coherence throughout the document between the Executive Summary, the more balanced views presented in the Recommendations and the fragmented analysis of the five technical chapters that are generally much more negative. By reading the executive summary the reader would conclude that liquid biofuels are one option but careful assessment to ensure that their development does not compete with food security is required. On the other hand the technical chapters present a very negative outlook inferring that countries should not consider bioenergy/biofuels/liquid biofuels options.

Furthermore, there is very limited reference and understanding of key FAO documentation especially throughout the five “technical” chapters. For example, no reference to:

SOFA 2008 which contains central analysis of the issues discussed as for example definitions of food security, linkages and the BEFS Tanzania analysis: this is an example of how the debate then impacts at the country level and presents of the steps of analysis required to understand if the development of a bioenergy (more broadly) sector is viable in a developing country and what the impacts could be both at country level and household level both in the long run and in the short run.

Reference: The State of Food and Agriculture . Biofuels: prospects, risks and opportunities. FAO 2000 and Bioenergy and Food Security. The BEFS Analysis for Tanzania. Environment and Natural Resources Management Working Paper 35. FAO 2010

It seems that the sections of the report have all been written by different people with little cohesion across the document on scope and perspectives. There is the need to give proper numbering to the document too. The number of the pages is not final, nor the numbering of table and figures. These are not adequately referred to throughout the text. The language is very complicated and difficult to understand in many instances.

The document should:

1. Set out a clear objective and scope. What is the exact scope of the review presented here? Is it limited to liquid biofuels for transport as most of the material in chapters 1 and 5 seem to be? Or even further limited solely to corn based ethanol? This should be clearly stated.

In 2004 FAO did substantive work on defining a common language for bioenergy in order to facilitate communication and statistical information. This paper can benefit from these definitions so that there is a clear consensus given the diversity of interpretations that exists worldwide. The document can be found here: <http://www.fao.org/docrep/007/j4504E/j4504e01.htm>

1. If the scope of the paper is not solely on liquid biofuels for transport then more attention should be given to other forms of bioenergy. Also note that a fuel can be solid, liquid or gaseous and so the term biofuel in the report is not used correctly as it applies to all fuels derived from biomass. The glossary in the GBEP/FAO report “The GBEP Sustainability Indicators for Bioenergy” could help in this regard.
2. If the scope of the paper is to analyze the implications of liquid biofuels namely ethanol and biodiesel on food security, the presentation of the material does not reflect this as it heavily focuses on the ethanol with little analysis of biodiesel. These are two different systems that warrant the same level of attention if the paper is to be comprehensive.
3. Who is the main target audience of this document? The document is currently very difficult to follow, especially if a more general layman audience is being considered.
4. Which exact linkages to food security does the document aim to analyze? Solely an exact definition/calculation of the contribution of additional crop demand for biofuels for transport on food prices? Which food prices exactly?
5. With reference to food security:
	1. The document does not give a clear definition of food security. The four dimensions are more or less stated but much clearer definitions are available in FAO, please see <http://www.fao.org/docrep/015/i2763e/I2763E09.pdf> and elearning FAO tool on Food Security definition.
	2. The document fails to link biofuels for transport (if this is the scope of the report) to all dimensions of food security namely availability, access, utilization and stability. Please see for example the short Annex 2 of the BEFS Analytical Framework <http://www.fao.org/docrep/013/i1968e/i1968e00.htm>

Here the linkages are clearly explained

* 1. With reference to linkages to nutrition, there are three key issues with reference to nutrition: quantity, quality and intrahousehold allocation of food. As prices increase the poor consume less quantity and/or lower quality With reference to income distribution and nutrition distribution the key literature is

Submaramanian, S. and Deaton, A., 1996, “The Demand for Food and Calories”,

*Journal of Political Economy*, Vol. 104, (February), pp. 133-162

Behrman and Deolalikar, 1987, “Will Developing Countries Nutrition Improve with

Income? A Case Study for Rural South India”, *Journal of Political Economy*,

Vol. 95, (June), pp. 108-138

Deaton A., 1997, “The Analysis of Household Survey-A Microeconometric Approach to

Development Policy”, Pubblished for the World Bank, The John Hopkins, University Press

with reference to intrahousehold allocation, food allocation between household members can shift as prices increase, for example from mothers to children or from girls to boys. Some references to this cited in the annex referred to above: Block et al 2004, Torlesse 2003.

1. The exact contribution of biofuels for transport to food price increases is hotly debated by key world experts. If the review is to be a “science-based comparative literature analysis” then the results of these key pieces of analysis should be presented. Key difference in assumptions/convictions should also be stated and potentially counter-argued. If so, and if this is the scope of the paper, this should be based on sound evidence. The contribution of biofuels for transport to food price increases should be then presented as a range as is generally agreed by all experts. The discussion should not focus on details of model assumptions as is currently the case, this is very confusing and generally dismissive of current economic analysis techniques.
2. Secondly, on the food price side, once discussing possible contributions of biofuels for transport to the food price increases, the discussion fails to then define what the impacts of these higher prices might be? How at the country level, countries can be net exporters or importers while households can be either net food sellers or buyers. This is a central point in the discussion. If the price of maize increases not all will be hurt. It is essential to understand who is hurt, who loses and if overall the losses are larger than the gains. What are potential impacts of liquid biofuel development in food security in Africa, in LAC or in Asia? The BEFS project at FAO has done extensive work in Tanzania, Peru, and Cambodia to capture these effects particularly at the household levels, this type of work merits inclusion in the report to ground the global impacts.
3. Thirdly, crop production for biofuels for transport is currently undergoing very stringent scrutiny. A key recommendation is that this should not only be the case for crops for biofuels. Recent discussions have remphasized the key role of agriculture as an engine for growth and poverty reduction. This hinges on smallholder inclusions and opportunities for the poor. This close scrutiny should apply to all agriculture and all crops. Are tobacco or cotton for example so much better than sugar cane for ethanol production? In what way? Are they more smallholder inclusive? Is more human and physical capital created with cotton and tobacco? The evidence for this at country level would be essential so that countries can make informed decisions.
4. Overall the discussion is very confusing and difficult to follow
5. **Recommendation 11**: *On the other hand, the wealth of biofuels case-studies reviewed in our Report shows the importance of shifting from a narrow biofuels to a more comprehensive bioenergy policy approach. In developing countries with vast hinterlands, the mobilization of biomass for different forms of bioenergy can be the most effective development strategy to provide electricity and alternative power for cooking, water management, and local productive facilities in addition to transport fuel.*

In order to provide a balanced view this should be the overall thrust of the document. But again scope and structure need to be defined so as to lead the reader to this conclusion and recommendation. Recommendations could also be repeated as a conclusion to the document.

1. Smallholder inclusion should play a central role in this report and there is little discussion of it if any. The point is to understand if this can be a profitable option for farmers, which type of farmers and to what extent. And also, can countries produce liquid biofuels for transport profitably? With smallholder inclusion? Is it an additional market for smallholders?
2. The recent EU biofuel policy developments are presented several times throughout the report as final decisions. It should be noted that the European Commission has only issued a proposal that has not been adopted by the Parliament and the Council yet and thus could still be modified.
3. Other potential benefits for food security are barely touched upon. For instance, the potential income effects through additional employment are not analyzed and the potential contribution of biofuels/bioenergy to sustainable rural development is discussed only in section 5.4 and not in sufficient detail. In particular, the potential contribution of domestically produced bioenergy/biofuels to a reduction in the energy import bill of developing countries is not mentioned at all. The majority of least developed countries is heavily dependent on fossil fuel imports and is extremely vulnerable to supply/price shocks in energy markets.
4. Most of the environmental and social issues discussed in chapters 4 and 5 are not specific to biofuels and apply to any type of agricultural production. While for biofuels compliance with environmental and social standards is often required (e.g. for imports into the EU), any other agricultural product is subject only to phytosanitary requirements. Notwithstanding the limitations of biofuel certification discussed in section 5.3, biofuel production is subject to much more scrutiny than agricultural production in general and is less likely to lead to negative environmental and social impacts compared to the latter. While this is acknowledged in the recommendations section, where the need for sustainability standards for the agricultural sector as a whole is voiced, the report seems to focus only on the limitations of biofuel certification. Plus, in the report there is no mention of good environmental and socio-economic practices that producers can implement to minimize the risk of negative impacts. FAO’s BEFS project has compiled a number of these practices: <http://www.fao.org/energy/befs/78917/en/>

As for many other sectors, the impacts of biofuels will depend on how production is managed.

1. There is strong focus on second generation liquid biofuels but generally the understanding is that Second-generation biofuels are not yet produced commercially and the report seems misleading in this. A report on second generation biofuel technologies from IEA on this: <http://www.iea.org/publications/freepublications/publication/second_generation_biofuels.pdf>

*Status as quoted in the report:* Second-generation biofuels are not yet produced commercially, but a considerable number of pilot and demonstration plants have been announced or set up in recent years, with research activities taking place mainly in North America, Europe and a few emerging countries (*e.g.* Brazil, China, India and Thailand).

1. Overall the HLPE team writing this report should dedicate a lot more attention to evidence based policy formulation. The goal should be to base future sector development decisions on country level evidence so that each country can understand its potential and tradeoffs.

FAO has done a lot of work on this and this is covered in the FAO packages on sustainable bioenergy development

<http://www.fao.org/bioenergy/28392-0a61de8f511d0a4d08b2137bc929214a7.pdf>

**DETAILED COMMENTS BY SECTION:**

**Executive Summary**

The first paragraph refers to very specific figures which are based on a specific scenario and analysis of the IEA regarding a hypothetical long term scenario that has a number of very strong policy assumptions underlying it. This paragraph should be removed from the Executive summary and rather be placed in the technical chapters as deemed suitable and should be adequately referenced and explained. There could be a section in the technical analysis on outlook where current status of biofuels and potential outlooks are presented. That would also help the reader understand what role biofuels for transport currently play and what role they might play in the future.

Page 2:

There is confusion in the use of words ‘fuel crops’ and defining the generations of biofuels. Again this goes back to the need for a clear definition. For example first generation can use non-edible crops, and second generation refers to the use lignocellulosic biomass. If this is not clear, then there is confusion on how to classify crops such as Jatropha . Second generation feedstocks are usually sourced and consumed locally.

The GBEP work on indicators should be mentioned after the first (partial) paragraph on page 2, since this work is mentioned in the HLPE’s commission and is an important example of an internationally agreed tool that requires adaptation to national circumstances in its implementation. Suggested text: “The Global Bioenergy Partnership (GBEP) developed and agreed in 2011 a common set of 24 voluntary sustainability indicators for bioenergy intended to inform national decision-making; the indicators are being piloted in various countries in Africa, Asia, Europe and Latin America and their application entails methodological adaptation to suit national circumstances.”

In paragraph 6, the scenario of a ‘division of labour’ outlined in the sixth paragraph seems rather extreme and hypothetical. This should be clarified and referenced. What is the source for this potential conclusion? On the other hand, might this even be favourable for developing countries? Further, the chemical industry should be mentioned as consumer of agricultural products (additionally to food and energy) but it should be noted that there is only partial competition. With reference to residues, it is true that there can be competition in uses but the sustainable use of residues should be encouraged, not discouraged.

The last paragraph of page 2 reflects a lack of historical (and current developing country) context: the use of crops for both food and “energy” (for transport or mechanical power, as well as cooking and heating) did not start with the liquid transport biofuel mandates, but rather for millennia crops have been used as fuel for draught animals and human labour. Indeed, the proposition that multipurpose crops are the problem is not only inaccurate but unhelpful to reaching an understanding of how to manage (the competing and synergistic uses of) natural resources for sustainable food security.

With regard to the comment at the bottom of page 2 that multipurpose crops and the biorefinery model foreclose a favoured avenue for agricultural value addition, this should be validated by evidence and detailed argumentation. Perhaps the cases being drawn upon rather reflect the fact that demand for liquid biofuels and in some cases other co-products through policies that do not differentiate between production models will tend to reinforce existing models for cash crops and the imbalances of power associated with them.

Page 3:

The reference should be to ‘other renewable energy alternatives’ as biofuel is the only alternative fuel.

Here biogas is discussed and it is stated that it can be used directly as transport fuel (normally this is not true) or in liquefied form (would this be BTL transformation, or rather transported in liquefied form?). As it stands it is unclear.

There is reference to a biomass conversion efficiency of 3%. Please double-check as it should be 6-7 %. Ad adequate reference should be inserted. If a comparison on a 1 ha basis is desired this should then consider all resources, technology and required investment. This is complex and should not be underestimated otherwise you risk comparing apples with oranges.

The second paragraph on page 3 is central to the discussion and should be more broadly emphasized and discussed.

Paragraph 3 of page 3 seems to forget all the positive effects that could derive by the development of a bioenergy industry, e.g. the increase of market value of agricultural produce, attraction of investments for catalyzing agriculture modernization, spill-over effects in terms of adoption of innovative agriculture practices. This is particularly true in developing countries where land is very much under used.

Paragraph 4 is questionable, as it refers specifically to the US and appears not to account for yield response.

Page 4:

Paragraph 3 presents an unrealistic scenario by extrapolating today’s technology and conditions and applying them to the future. Also the text does not reflect the fact that second generation can make use of less productive land or no land at all, if sustainable residues are used.

The considerations in paragraph 4 are true, but it should be made very clear that at present in Africa a bioenergy production industry did not take off and there is no (or very little) biofuel production for export.

The issue of energy access is mentioned here but this topic is barely covered, if at all, throughout the paper. For example the discussion could cover ethanol gel for cooking and lighting, examples of this exist in Mozambique and other African countries.

Page 5:

In general when discussing the negative impacts of liquid biofuels, for example on women, it should be made clear that they are speaking about large-scale monocrop plantations and that this applies to agriculture in general.

On page 5 it is stated that the issue of gender and biofuels was initially neglected. The FAO (Rossi and Yambrou) paper on this topic of 2008 seems to have been overlooked, as does the UN Energy report “Sustainable Bioenergy: A Framework for Decision Makers” of 2006, which also addresses this issue. To name but two reports addressing this topic written or co-written by FAO.

**Page 5 – edit suggestion:**

[Central to the initiatives to confront the varied critiques of currently designed biofuels mandates has been the development of voluntary, public/private, forms of governance of the supply chain in the form of certification systems. These have been primarily promoted within the EU and have now assumed virtually regulatory status to the extent that non-certified biofuels cannot count as contributing to fulfilling mandated targets (EASAC, 2012). The criteria governing the very varied range of certification schemes are heavily oriented to energy efficiency, carbon emissions and environmental factors. Indeed, the inclusion of social factors can incur retaliation within the terms of the WTO. The Roundtable on Sustainable Biofuels (RSB) also includes social criteria and we examine whether such criteria are present in other certifications and review the literature on their effectiveness in promoting and/or defending food security. At the level of voluntary national-level decision-support tools, the GBEP sustainability indicators for bioenergy, agreed by 23 countries and 13 international organizations in 2011, include 8 social indicators alongside 8 environmental and 8 economic indicators for measuring the impacts of bioenergy production and use

Exact reference for the GBEP Report on indicators:

[FAO (GBEP), 2011. The Global Bioenergy Partnership Sustainability Indicators for Bioenergy](http://www.fao.org/docrep/016/ap506e/ap506e.pdf)

**RECOMMENDATIONS**

Recommendation 1:

This should be carefully worded and references should be provided to the various statements mentioned. It should be made clear that mandates and subsidies should be put in question in some countries and not all. Further ‘where these artificially stimulate biofuels production’ could be deleted, as this is exactly the purpose of subsidies.

The first policy recommendation ends by suggesting that a global biofuels market could emerge without specific biofuel targets or mandates, and that policies should be directed at preventing this, rather than merely removing mandates and subsidies. Perhaps a better message is that public policies should reflect all externalities (environmental, social and economic; positive and negative) of biofuel production and use and hence support them only where and when they bring net environmental, social and economic benefits or at least help achieve specific public policy goals in a more cost-effective manner than alternative options and without inacceptable unintended consequences.

Recommendation 2:

It is important not to implement undifferentiated public policies promoting biofuels that reinforce existing imbalances in power vis-à-vis tenure of natural resources and access to food, income and employment. Indeed, biofuel policies should seek to do the reverse by favouring pro-poor, nutrition- and gender-sensitive production models. And this should be true for all agriculture.

Recommendation 3:

This is a general recommendation is general that should not single out jatropha

Recommendation 4:

It should be specified that we are speaking about large-scale plantations

Recommendation 6:

The sixth recommendation advocates the required use of recognized certification schemes. However, such a recommendation should always be accompanied by the need to support this through capacity development to ensure participation in such schemes of smallholders and poorer countries.

Recommendation 7:

In my opinion this is not a proper recommendation. I would rather turn it into a finding for the Exec Summary

Recommendation 8:

The eight recommendation suggests adopting typologies of production models to identify trade-offs of different production systems: it would be helpful to highlight in these recommendations the need for further evidence both to understand the impacts and the viability of a domestic bioenergy sector. FAO has developed a number of tools for this. Please see [www.fao.org/energy/bioenergy](http://www.fao.org/energy/bioenergy)

And also there is currently enough knowledge on ways to get biofuel development right, including:

* good practices (see BEFSCI compilation here <http://www.fao.org/docrep/015/i2596e/i2596e00.pdf> and here <http://www.fao.org/docrep/015/i2507e/i2507e00.pdf> )
* guidelines such as the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (2012) - [www.fao.org/fileadmin/user\_upload/nr/land\_tenure/pdf/VG\_en\_Final\_March\_2012.pdf](http://www.fao.org/fileadmin/user_upload/nr/land_tenure/pdf/VG_en_Final_March_2012.pdf), and the Voluntary Guidelines on Responsible Management of Planted Forests (2006)- [www.fao.org/docrep/009/j9256e/j9256e00.htm](http://www.fao.org/docrep/009/j9256e/j9256e00.htm),
* tools to get even large scale biofuel development right. One set of tool is FAO’s sustainable bioenergy support package – summarized here <http://www.fao.org/bioenergy/28392-0a61de8f511d0a4d08b2137bc929214a7.pdf>

**Introduction**

1. The introduction refers to the potential positives outcomes from liquid biofuel development i.e. income generation, yet this is never explored in the paper. Even in the context of the US or Brazil, how have farmers benefited by price increases? This is important because there is a tradeoff that needs to be understood, i.e. was this worth it?
2. **Page 5 – insert new para in blue between the current last and second last paragraphs.**

 [….In this light we will consider to what extent regulation and voluntary forms of governance, in the form of certification systems take into account food security related criteria.

In particular, in light of the 2011 CFS request, we will consider the set of 24 sustainability indicators developed by the Global Bioenergy Partnership (GBEP) with the significant contribution of FAO, as founding partner and hosting organization of its Secretariat. The 24 voluntary sustainability indicators for bioenergy provide a comprehensive yet practical mean of evaluating the impacts of bioenergy production and use in a country with a view to informing policy development. FAO led the GBEP work to develop indicators related to bioenergy and food security. These indicators permit an evaluation of the impacts of bioenergy on food security at the national, regional and household levels.

Much of the literature under review is primarily concerned with the energy, climate change, and biodiversity …]

1. Liquid biofuels are discussed based on:

1) feedstock, there are first generation and second generation

2) Technologies, there are first generation and second generation

Seems like there is a mix of the two here, providing a definition on what you are refereeing to will facilitate for the reader to understand your argument.

1. Algae may require large quantities of water not land so it could give way to competition with water rather than land. The National research council report found that to produce the amount of algal biofuel equivalent to 1 liter of gasoline, between 3.15 liters to 3,650 liters of freshwater is required, depending on the production pathway.
2. The report indicates at top of p.g. 5 that rural areas depend partially or primarly on food purchase then couple of paragraph below that access to market in rural areas is a significant problem, so how are food prices affected, is the transmission of food prices from global markets taking place even if markets are sort of close loop?
3. Last paragraph in pg. 5 should mention that the BEFS project in FAO focused on the link of bioenergy and food security, it could be one of the only ones to date to have that focus.

**CHAPTER 1**

1. What is CAFE? Was the biofuel integration in Carter Administration more in response to the energy situation at the time rather than agriculture?
2. Figure 1 on page 7: if the scope is liquid biofuels for transport what is the reason for a figure referring to wood pellets? And generally the reason for this figure? No discussion nor reference in the text
3. P.g. 7 , number 3 mentions 15.9 billion liters equivalent TO WHAT?
4. Section 1.4, I would say that a key reason for the widesrepad introduction of liquid biofuel or bioenergy policies as of lately in general in countries around the world has been energy security issues in response to recent higher energy prices. The FAO Legal Department carried out a review of global policies and defining the objectives of these policies.
5. The discussion on South Africa was the decision to leave maize out due to food security reason? If this is the case, it should be clearly stated.
6. The table on cassava should also indicate that cassava production in SSA is relatively low yield and in many instances is due lack of end markets and biofuel can be one among many alternative that can help provide an alternative market. This can make reference to a particular study done in BEFS Tanzania.
7. Section on SSA misleading states on investments on biodiesel only, these have been for biofuel in general for example large investments are taking place for ethanol i.e. SEKAB in Tanzania and Addax in Sierra Leone. Most African countries have significant energy security problems plus discussions with number of African governments pursuing policies for bioenergy have indicated that this polices are not soley based on export market but also for the need to supply their own energy needs.
8. I think even before considering Maltitz and Staffort process is considered, countries need to understand if they have the potential to develop a bioenergy sector, what are the risks and opportunities and potential tradeoffs this will bring to food security. Regardless of countries considering bioenery policies countries also need to understand how global liquid biofuel polices may affect them in terms of food security since this are out of their control this will ensure that they identify national mechanisms to confront them. This is precisely what FAO has been working on over the past 6 years i.e. developing a tool kit that helps countries understand this and it is not even mention here!
9. The sections in Latin America is very poor, Colombia and Argentina have well-developed liquid biofuel polices that merit a discussion. How would liquid biofuel impact food security in the LAC context? Or how at least the development in Brazil, Colombia and Argentina has affected food security?

Land-Use Change

1. Is the EU reduction in mandates been officially approved or is it still a proposal?
2. Argentina is a lead exporter of soybean biodiesel to the EU and likely to be affected by reduction in EU mandate. Once it seems like the Argentinan government recently increase its own national diesel blending mandate in order to absorb additional national demand. So the effect of reduction of global polices may be minor if countries decided to absorbed this at the national level.

Country-based Typologies

1. For the Land-scarce, low income countries. i.e. “Any additional investment is therefore likely to be prejudicial” wouldn’t some of the investment come from the private sector aiming to develop the bioenergy sector? Unless is assumed that 100% will come from public funding this doesn’t make sense.
2. Land scarce middle income countries, like Thailand may be close to reaching the yield gap so room for intensification may be relatively small if at all, so this needs to be carefully evaluated before making this type of generalizations.
3. The BEFS project allows to evaluate the different situations and make sure that local context are captured so the decision making process is based on evidenced-based. This sections should refer to the existing tools to help countries understand this.

**CHAPTER 2**

1. As mentioned before definitions are essential and clear understanding of what is meant by first and second generation in reference to feedstock or technologies need to be clearly stated.
2. Para 1 in p.g. 17, cost of biomass could also be a challenge for lignocellulosic i.e. the cost of collection and transport.
3. EROI is not clearlyl explained in the text i.e. not only fossil fuel included then what other fuels are included in the calculation?
4. The fossil fuel energy indicator should be explained.
5. Para 3 in p.g. 17 discuses a table but doesn’t provide a reference I am assuming is table 1.
6. You indicate that the energy balance for cellulosic ethanol varies from 2-36. If in the upper bound it could be 36, how can you then state that this is not enough to attain a desirable balance! So is best to say that in some cases is desirable and in other context is not desirable!
7. Some of the tables are not appropriately reference in the text.
8. Last para page 20 is out of context.
9. The discussion on biorefineries ( section 2.3.2. is very short and basically dismisses these as too complex. However, it does not consider simple biorefineries such as integrated food energy systems (IFES) – see FAO overview report here <http://www.fao.org/docrep/013/i2044e/i2044e.pdf>

**CHAPTER 3:**

**General comment:** too negative approach regarding impacts of bioenergy on food security, hunger and poverty.

1. **Page 21, 1st para – my edits in track change below**

[A wide variety of papers have found that biofuels have contributed to increase crop prices and played a role in triggering price increases but have disagreed about the magnitude and have less often directly addressed impacts on malnutrition. This part addresses the role of biofuels in four subsections.

1. **Page 23, para 3.2. The Role of Biofuels in Increased Food Prices and their Volatility since 2000-2004**

[In line with the HLPE report on this theme (2011), our analysis indicates that biofuels have played a predominant role in the increases in food prices and volatility since 2004. Two basic reasons can be identified. In the first place, with the rise of oil prices, it has been economically feasible for ethanol manufacturers to bid up the price of maize (and through it the price of other crops) from roughly $2.25 per bushel ($88.6 per metric ton) to levels 2.5 to 3 times higher for much of 2008 and since 2010 (prices ranging from $6-$8 per bushel, or roughly % per bushel, or roughly $235 to more than $300 per metric ton) for much of 2008, and since 2010. Secondly, the production and supply of grain, vegetable oil and sugar supplies since 2004 have not been growing as fast as the demand for them, which is due in large part to the rise in demand for biofuels. However, it is important to mention that FAO (SOFA 2008, pag. 85) has a more cautious position stating that “many factors are responsible for the recent sharp increases in agricultural commodity prices, including the growth in demand of liquid biofuels.” ]

***SOFA 2008*** *available at* *ftp://ftp.fao.org/docrep/fao/011/i0100e/i0100e.pdf*

1. When the price effects are discussed in chapter 3, the role of adverse weather conditions in key producing/exporting countries seems a bit overlooked and the impact of export restrictions in exacerbating these price increases on the international market is not acknowledged. With regard to the impacts on malnutrition of these price changes, it is not considered that, when the price of a staple food increases, to a certain extent consumers can adapt and change their consumption behaviour at least in part, by shifting to less costly substitutes. Even though the poor tend to have limited options, this should at least be mentioned as a possibility.
2. Potential relationship between liquid biofuels and nutrition that is not explored in your paper is how the lack of access to cooking fuel can lead to unsafe cooking techniques & domestic practices which can negatively impact nutritional intake. These negative impacts include for example substitution for easier-to-cook food items that have less nutritional value and undercooking food to save time/fuel (which can lead to foodborne disease and digestive problems) and reducing nutritional uptake.
3. The relationship with hunger is not clearly demonstrated. Perhaps using visual material can help present this better.
4. How do you arrive to the 9.5% reduced consumption para 4 and 40% in para 5 in p.g. 22?
5. Para 1 in p.g.23 perviously it was indicated that it was hard to determin the consumption i.e. demand impact, yet here a very strong argument is presented that is has significant impact.
6. From 2000 through 2004 was what were the global oil prices/energy prices, this will be more sound to compare to price average of maize during the same period. Assuming prices of oil between 2000-2004 were relatively low, this is a low price case scenario then it can compare to 2005-2008 when prices spike. How these two scenarios affect maize price? How does biofuel come into place? Without a comparison like this the effect on doubling or tripling on maize prices is not clearly made.
7. Check the figures as there is discrepancy between figures reference and discuss in text with the figure being referenced.
8. Does the displacement in sugar come from direct use of sugarcane for ethanol? Looking at some figures from OECD-FAO report seems like Brazil a major exported of sugar and ethanol producer, has kept production of sugar, sugar exports and biofuel production relatively constant. The other major global producers of sugar i.e. India and Thailand for example have promoted the use of molasses for ethanol. So how couldsuch a large displacement be happening? Is this difference mainly due to increase demand for sugar with relatively constant supply of it rather than displacement for biofuel?
9. This sections is heavily discussed in terms of ethanol, as the paper talks about liquid biofuels a through on biodiesel and its food security impacts should be included.
10. What about discussion on income effects from liquid biofuel development?
11. In the overstated factors areas one argument is that volatility is short term phenomena but isn’t food security also short term? How are these two different?

Section 3.1.

* The computations and forecasts on page 22 do not seem to take possible yield increase over time
* Some important ones rely on quite old data – e.g. FAOSAT 2000 see footnote 9

Section 3.2.

* This section only looks at international commodity markets and completely ignores how these impact on regional or national prices – i.e. price transmission to regional and/or national levels. However these are the levels where price changes matter for food security and poverty. Some recent interesting papers on this issue in relation to Africa can be found here PANGEA <http://www.pangealink.org/wp-content/uploads/2012/09/PANGEA_Whos-Fooling-Whom_SSA_Food-Crisis_report.pdf> . – IFPRI here  <http://www.ifpri.org/publication/food-price-volatility-africa> and here <http://www.ifpri.org/publication/transmission-world-food-price-changes-markets-sub-saharan-africa>
* The discussion on linkages between ethanol demand, grain prices and oil prices is primarily based on corn ethanol in the USA. It therefore completely ignores other important international feedstocks such as sugarcane, palm oil and rapeseed. Therefore it cannot claim to depict a global picture and this significantly weakens the conclusions.

***Chapter 4***

1. In chapter 4, the demand for agricultural products (and land) for fibre, biochemicals and bioplastics is not even mentioned.
2. The sustainable bioenergy tools Kit of FAO and in particular the BEFS approach has define a number of methodologies to help countries understand this issues, yet is not even mentioned in the text.
3. The bioenergy role to supply local energy to the poor is buried in the text, this is a positive impact that should be given more prominence, since energy security impacts food security as well.
4. Land is an issue widely faced in agriculture not only for biofuel but also for food production. Foreign investors looking also to produce food for export markets is a wide problem particularly in Africa. FAO’s work on land tenure voluntary guidelines aims to help address both of these issues.
5. The BEFSCI project looked at socioeconomic implications of large-scale investments in Africa, Asia and LAC, their work and results should be included in this work. Plus the BEFS work in Sierra Leone on developing investor guidelines merits some recognition!
6. Looking at the table on land deal, focusing on Tanzania and Sierra Leone countries the BEFS-FAO team is currently working on, the investments for palm oil are for food and not for fuel.
7. With regards to the importance of production typologies for identifying polices, this is the core work that FAO has been doing over the past 6 years and yet is not mention in this para. For example the analyzes in both Tanzania and Peru included the smallholder integration or outgrower schemes.
8. The discussion how much land would be available for biofuel does not account for the use of co-products. Yet this can lead to significant savings (10-30% dependent on GHG targets and feedstock type ) – Gallagher report 2009 <http://www.unido.org/fileadmin/user_media/UNIDO_Header_Site/Subsites/Green_Industry_Asia_Conference__Maanila_/GC13/Gallagher_Report.pdf>
9. The same Gallagher report undertook a major review of available information on available land and, on balance, says that there is enough land. Therefore the report should be consulted in order to present a more balanced view on this issue. It is not so much a question of how much land but much more what type of land and this is addressed in section 4.2.3.
10. The discussion on ILUC is limited to a discussion on an accounting issue (Box page 40) and does not explain where things currently stand, nor does it mention some known good practices to limit ILUC risk – see above point on good practices
11. The discussion on large-scale investments does not seem to consider the possibility that some of these investments may have been done in the right way. And this applies also to Table 3 ( page 45 and 46). This simply does not reflect the reality ( e.g. in Sierra Leone a major investment can be considered a good practice, and the same applies to some investments Mali). Therefore, here again, the tone is too negatively biased..
12. Still on large scale investments, the paper should mention that bad investments have not started in agriculture have not started with biofuel development. They have happened all the time, and therefore the issue goes beyond biofuel – This would reinforce the recommendation on responsible agriculture investments.
13. In the first part of the chapter the author refers to the energy content of crops currently produced and compares it with the total energy demand on the global level.
14. The statement that the energy embedded in the plants cannot supply the global energy needs may be correct, but it is also out of the context of energy planning principles to even assume such a scenario. Bioenergy, as one of the primary energy sources, has always been considered as part of overall portfolio of (renewable) energy sources. Depending on the availability and accessibility of alternative energy sources to a specific country, the share of bioenergy in total primary energy supply differs among countries. In addition, the efficiency in conversion of primary energy to final energy is one of the key factors effecting the sustainability of biomass use.
15. Based on the national long term energy policies, IEA had developed future global scenarios and presented them in the World Energy Outlook 2012. From the scenarios presented, it is clear that it is foreseen that bioenergy supplies only a part of total energy needs. Currently, and most probably liquid biofuels produced from agricultural feedstock, are the most cost-effective substitution for fossil fuels in supplying the energy demand of transport sector.
16. Further on, the author compares the efficiency of conversion of solar energy through photosynthesis and that of photovoltaic cells. Considering solely the efficiency of the process, the efficiency of the energy conversion may be significantly lower in photosynthesis, as the author states. Nevertheless, in the context of energy utilization for transport one should take into consideration complete life cycle of the energy consumption. Considering that liquid biofuels can directly be used for transport, with no or minimal modifications of distribution infrastructure and vehicles characteristics, the necessary energy and material inputs in development of electric vehicles and distribution infrastructure should be included in the scope of such life cycle analysis.
17. In the final paragraphs of the chapter, the author refers to the role of forests in climate change prevention as carbon sinks, and implies to the potential negative effects of change of carbon rich land cover areas to agricultural areas. The baseline for the authors’ statements and the indented conclusions are not well elaborated.
18. It is evident that the forest may have an important role in sequestrating carbon, but only in the case when they are sustainably managed. A sustainable management of forests encompasses sustainable harvesting of biomass. Considering national and international bioenergy policy developments, which are also presented in this document, it is evident that there is a need for implementation of sustainability criteria and other relevant safeguarding measures, which will guaranty positive energy balance and negative GHG balance of bioenergy use. These facts should have been acknowledged also by the author of the following chapter (Chapter 4.1.3 – paragraph one).

**CHAPTER 5;**

1. ***Para 5.3 Certification Schemes and Social Compliance***

***Beginning of page 52 -*** ***The text below in [ ]should be completely substituted by the text in blue below (including the table).***

[Internationally the GBEP has been active in the promotion of sustainability criteria and indicators for biofuels. Within this framework the FAO has led the negotiations on social criteria, and provisionally agreed indicators cover:

- Net job creation

- Wages

- Changes in unpaid time spent by women and children collecting biomass

- Biomass used to expand access to modern energy services

- Change in mortality and burden of disease attributable to indoor smoke from solid fuel use

- Incidence of occupational injury, illness and fatalities

Willingness to reach agreement was also reached with relation to the following points although further discussion is still required:

- Food security

- Labor conditions

- Access to land, water and other natural resources

- Household income (Morese, 2010) ]

The Global Bioenergy Partnership (GBEP), with the significant contribution of FAO, developed a set of 24 voluntary sustainability indicators for bioenergy (FAO, GBEP, 2011) under the three pillars of sustainable development: environmental, social and economic. These indicators, agreed among a wide range of government and international organizations, provide a comprehensive yet practical mean of evaluating the impacts of bioenergy production and use in a country with a view to informing policy development. FAO led the GBEP work that brought to the development of the following agreed social indicators:

|  |
| --- |
| SOCIAL PILLAR |
| THEMESGBEP considers the following themes relevant, and these guided the development of indicators under this pillar:Price and supply of a national food basket, Access to land, water and other natural resources, Labour conditions, Rural and social development, Access to energy, Human health and safety |
| INDICATOR NAME | INDICATOR DESCRIPTION |
| Allocation and tenure of land for new bioenergy production | Percentage of land – total and by land-use type – used for new bioenergy production where:* a legal instrument or domestic authority establishes title and procedures for change of title; and
* the current domestic legal system and/or socially accepted practices provide due process and the established procedures are followed for determining legal title
 |
| Price and supply of a national food basket | Effects of bioenergy use and domestic production on the price and supply of a food basket, which is a nationally defined collection of representative foodstuffs, including main staple crops, measured at the national, regional, and/or household level, taking into consideration: * changes in demand for foodstuffs for food, feed and fibre;
* changes in the import and export of foodstuffs;
* changes in agricultural production due to weather conditions;
* changes in agricultural costs from petroleum and other energy prices; and
* the impact of price volatility and price inflation of foodstuffs on the national, regional, and/or household welfare level, as nationally determined
 |
| Change in income | Contribution of the following to change in income due to bioenergy production:* wages paid for employment in the bioenergy sector in relation to comparable sectors
* net income from the sale, barter and/or own consumption of bioenergy products, including feedstocks, by self-employed households/individuals
 |
| Jobs in the bioenergy sector | * Net job creation as a result of bioenergy production and use, total and disaggregated (if possible) as follows:
	+ skilled/unskilled
	+ temporary/indefinite
* Total number of jobs in the bioenergy sector and percentage adhering to nationally recognized labour standards consistent with the principles enumerated in the ILO Declaration on Fundamental Principles and Rights at Work, in relation to comparable sectors
 |
| Change in unpaid time spent by women and children collecting biomass | Change in average unpaid time spent by women and children collecting biomass as a result of switching from traditional use of biomass to modern bioenergy services |
| Bioenergy used to expand access to modern energy services  | * Total amount and percentage of increased access to modern energy services gained through modern bioenergy (disaggregated by bioenergy type), measured in terms of energy and numbers of households and businesses
* Total number and percentage of households and businesses using bioenergy, disaggregated into modern bioenergy and traditional use of biomass
 |
| Change in mortality and burden of disease attributable to indoor smoke | Change in mortality and burden of disease attributable to indoor smoke from solid fuel use, and changes in these as a result of the increased deployment of modern bioenergy services, including improved biomass-based cookstoves |
| Incidence of occupational injury, illness and fatalities | Incidences of occupational injury, illness and fatalities in the production of bioenergy in relation to comparable sectors |

Source: FAO (GBEP), 2011

The GBEP indicators permit an evaluation of the impacts of bioenergy on food security at the national, regional and household levels.

The core GBEP indicators relevant to food security are 1) Price and supply of a national food basket, 2) Land use and land-use change related to bioenergy feedstock production, 3) Allocation and tenure of land for new bioenergy production, 4) Change in income, 5) Bioenergy used to expand access to modern energy services, and 6) Infrastructure and logistics for distribution of bioenergy. The price and supply of a national food basket indicator is a technically sound approach to assessing the effects of bioenergy on a nationally determined collection of representative foodstuffs, including main staple crops. This indicator seeks to account for the main factors that influence the price and supply of food in relation to bioenergy use and domestic production, taking into consideration changes in the demand for agricultural products, changes in the cost of agricultural inputs including the impact of energy prices, weather conditions, and food imports and exports. It also considers the influence of changes in food prices on national, regional and/or household welfare levels. The core set of indicators relevant to food security are complemented by additional indicators that monitor the economic, environmental and social factors that affect food security, including jobs in the bioenergy sector, biological diversity in the landscape, soil quality, water use and efficiency, and productivity.

The GBEP work finds that the sustainable production of food and energy side-by-side may offer an effective means to enhance a country’s food and energy security while simultaneously reducing poverty and mitigating climate change. FAO (GBEP), 2011

Exact reference for the GBEP Report on indicators:

[FAO (GBEP), 2011. The Global Bioenergy Partnership Sustainability Indicators for Bioenergy](http://www.fao.org/docrep/016/ap506e/ap506e.pdf)

1. The arguments regarding small scale bioenergy, including biofuels could be reinforced by conclusions from an FAO recent report on this topic <http://www.fao.org/docrep/011/aj991e/aj991e00.htm>

**Detailed comments (mostly omissions or typos)**

1. Page 14 Section 1.5. Sentence middle of the page “In addition Europe´s cooperation for development programs would no longer support biofuels investment projects” Please specify where this statement is to be found in the text of the proposed changes because i have not found any statement in that respect
2. Figure 2 – p 17. It would be good to add important feedstock types ( palm oil and rapeseed for instance)
3. Page 19 Section 2.3.1. One should also add he use of residues for animal feeding as another competing use of residues
4. Page 21 Correct typo “potential” instead of “potentially”
5. Page 23, section 3.2. Words missing in the paragraph
6. Page 35 – last para Figure of 10% biofuel by 2020 needs referencing or double checking because it is the first type I see it. Figures usually relate to 2050, including from well-respected reports such as 27% ( IEA 2011 Technology Roadmap on biofuel for transport <http://www.iea.org/publications/freepublications/publication/biofuels_roadmap.pdf> ) and 10 % (WBGU 2008 report <http://www.wbgu.de/en/flagship-reports/fr-2008-bioenergy/>
7. Page 52 text on GBEP needs to be updated because the sustainability indicators have been agreed in December 2011 – see GBEP report here <http://www.globalbioenergy.org/fileadmin/user_upload/gbep/docs/Indicators/The_GBEP_Sustainability_Indicators_for_Bioenergy_FINAL.pdf>
8. Several references missing in the reference list: Morris 2009 (p39); Cai 2011 (p41) Maltiz 2012 (p48); Benedict 2011 (p53)

**Additional references from NRC: List of bioenergy publications with links**

Those highlighted should be a priority

**Leaflet on FAO Sustainable Bioenergy Support Package** <http://www.fao.org/bioenergy/28392-0a61de8f511d0a4d08b2137bc929214a7.pdf>

**GBEP Report on sustainability indicators 2011** <http://www.globalbioenergy.org/fileadmin/user_upload/gbep/docs/Indicators/The_GBEP_Sustainability_Indicators_for_Bioenergy_FINAL.pdf>

**The Bioenergy and Food Security Approach**

BEFS – AF 2011<http://www.fao.org/docrep/013/i1968e/i1968e00.htm>

BEFS Tanzania 2011 <http://www.fao.org/docrep/012/i1544e/i1544e00.htm>

BEFS Peru 2011 <http://www.fao.org/docrep/013/i1739e/i1739e00.htm>

BEFS Thailand 2011 <http://www.fao.org/docrep/013/i1739e/i1739e00.htm>

Smallholder involvement and certification 2012 <http://www.fao.org/docrep/015/i2597e/i2597e00.pdf>

Good environmental practices 2012 <http://www.fao.org/docrep/015/i2596e/i2596e00.pdf>

Good socio-economic practices 2012 <http://www.fao.org/docrep/015/i2507e/i2507e00.pdf>

Compilation of tools 2011 <http://www.fao.org/docrep/015/i2598e/i2598e.pdf>

Tools to monitor food security at national and operator’s level 2012 <http://www.fao.org/docrep/015/i2599e/i2599e00.pdf>

BEFSCI operator level score card on food security impacts <http://www.fao.org/bioenergy/foodsecurity/befsci/operator-tool/en/>

**Integrated Food and Energy Systems**

Overview on integrated food energy systems 2010 <http://www.fao.org/docrep/013/i2044e/i2044e.pdf>

Assessment of IFES in China and Vietnam 2010 <http://www.fao.org/bioenergy/download/26794-0140d2e14b981e9923be4670c73e05c95.pdf>

**Small scale bioenergy**

Lessons from case studies 2009 <http://www.fao.org/docrep/011/aj991e/aj991e00.htm>

WISDOM ftp://ftp.fao.org/docrep/fao/008/j5135e/j5135e02.pdf

**NRL’s consolidated reply with regard to the HLPE paper on biofuels:**

1. **Comments with regard to land** (*Paolo Groppo*):

The part on land tenure is done well. For example, the para:

“The justification for such investments lies in the notion of “available” land which is equated with unused and un-owned land. NGO and peasant organization mobilization have exposed this myth and it is now accepted that land which is the object of investment is normally land which is occupied by traditional communities under different forms of communal rights or as State land”.

Is exactly what we have tried to highlight as a result of our field projects and the evidences coming from the discussions stimulated by the  Land Portal initiative ([www.landportal.info](http://www.landportal.info)).  There is no available land, meaning land without people. Every single square meter of land has some sort of historical right (whose extension might be discussed, but it exists). This means that a serious participatory approach is needed, more than, as advocated by the authors, a simple compliance with the FPIC principles.  As is said later in the report, section on “SOCIAL IMPLICATIONS OF BIOFUELS:

Where profound asymmetries of power and economic resources exist, rights can be routinely trampled on. In addition, opportunism and corruption, which are endemic to modern governments and not the preserve of failed States, can cheat communities out of their rights while formally following the rules of the game. On the other hand, within traditional communities, co-option and opportunism are favored by patriarchal systems of authority. Empowerment, therefore and the promotion of a vigorous civil society are the pre-conditions for the ability to defend and negotiate rights”. (p. 49)

This is what FAO has been doing, through several types of concrete field approaches for both land and forestry communities: I do want to recall our (NRL) approach to Participatory and Negotiated Territorial Development (PNTD) and the Forestry approach  to Community Forestry. Similar approaches also exist for fishery communities.  What they have in common all these approaches is the fact that they start from the recognition of the centrality of the problem of asymmetries of power and therefore do have a pro-active position to work in order to mitigate it. Since this document will have an FAO logo, I do consider that it would be worth recalling what are FAO experiences and proposals, before going to other  proposals, like FPIC, which are certainly more fashion, but who clearly do not pretend to attack the core problem of asymmetries, therefore leaving the problem where it is.

1. **The part regarding the quantification of land and water resources needed for biofuels is not as good** (*comments by Jippe Hoogeveen*):

It is not clear how land and water use for biofuels is quantified. Both references and calculation methods are not clear. It appears that the writers are of the opinion that there are not enough land and water resources to grow more biofuels in the future than already done now. Whether this is true is not substantiated enough by evidence and references. Especially the part on water use for biofuels is weak. The report does not make distinction between irrigated and rainfed agriculture, between consumptive and non-consumptive use, between geographical locations and the different sources of water.

Please find below some more explicit comments on the most relevant sections in the report (focused on water use for biofuels).

Executive summary:

The first paragraph of the Executive summary of the report reads:

If 10% of all transport fuels, to date, were to be achieved through biofuels, this would absorb 26% of all crop production. At present, if we would use the totality of the world´s crops to produce biofuels, it would represent at most only 13% of the world´s primary energy, which, if inefficiencies in appropriation were included, would realistically be closer to 9%, and which in 2050 would only correspond to 4-6% world’s energy. This would further mobilize 85% of the world´s fresh water resources.

The least sentence, that 85% of the World’s fresh water resources is mobilized by crop production, is not true. Currently about 2.7 billion cubic kilometers are being withdrawn for irrigated crop production, which is about 6%. It is not clear to me where these 85% are coming from. Later on in the report (p41), a reference to Foley (2011) is mentioned, but this reference is still to be added to the references. It is likely that evapotranspiration by all agricultural land including, grasslands and production forest is meant, but even then these 85%  seem high. Also, the major part of the evapotranspiration is rainfed and taken directly from the soil and not from lakes, rivers and aquifers which form the world’s fresh water resources.

Policy recommendations:

Draft Policy recommendation 3:

3. The negative experience with jatropha has shown that the pressure on land provoked by biofuels is equally a pressure on water resources. Investments in land are increasingly being understood as simultaneously investments in water. Policy must now catch up with analysis and integrate land and water so that land concessions cannot be made without an evaluation of the impacts of land use on water resources.

Is a correct one in the sense that policies should not be made without an integrated analyses of the impacts of land use on water resources. However, it is not clear what jatropha has to do with it. Jatropha is used in the report as a negative example to show that no adequate production of non-food crops can come from marginal lands (of course this is no surprise to anybody who knows a bit about agricultural production).

Draft policy recommendation 11:

11. On the other hand, the wealth of biofuels case-studies reviewed in our Report shows the importance of shifting from a narrow biofuels to a more comprehensive bioenergy policy approach. In developing countries with vast hinterlands, the mobilization of biomass for different forms of bioenergy can be the most effective development strategy to provide electricity and alternative power for cooking, water management, and local productive facilities in addition to transport fuel.

It is not clear to me how the mobilization of biomass for bioenergy can be an effective development strategy to provide power for water management. No examples are given in the report.

4. Biofuels and land

In “4.1.1. Food and Feed Demand” reference is made to FAO’s perspectives study Agriculture towards 2050. However, no reference is made to the part regarding water use in agriculture. It is clear that the writers are not convinced by the results of this study. In particular the way the potential cropland is calculated (based on the GAEZ-model). According to report:

Yet, the FAO has itself warned that these estimates are overly generous for a variety of reasons. They ignore land with major soil constraints, which according to FAO includes 70% of all the otherwise suitable land in sub-Saharan Africa and Latin America. In addition, as early as 2003, the FAO warned that 60% of this land was covered by forests, protected areas or human settlements.

It would be good to add a reference to substantiate the above mentioned statement. To my knowledge of the GAEZ, soil constraints, forests and human settlements are deducted from potential suitable land.

Further on is written:

What remains rarely receives much mention, but, by process of elimination, the remainder consists of wetter savannas (those savannas capable of crop production) and sparser woodlands. It has become common to view these lands as somehow surplus (Lambin 2011). One joint World Bank/FAO study actively encourages their conversion to food production or bioenergy in sub-Saharan Africa (Morris 2009; Deninger 2011). But tropical savannas and sparse woodlands have large quantities of carbon and high levels of biodiversity (Searchinger 2011b; Gibbs 2008). Their conversion would result in substantial environmental losses.

This statement may be true but it is beyond the scope of the report. The same is true for the statement:

Although the prospect probably exists to expand agricultural land if necessary to meet food needs, that would run counter to global goals to maintain carbon stores to resist global warming.

In “4.1.2 Bioenergy” some calculation are done on how much crop production is necessary for the provision of bioenergy. These calculations are ambiguous. It says that:

producing 10% of the world’s transportation fuel by 2020 would require 26% of the world’s crops today

and

If 100% of all the world’s harvested biomass were devoted to bioenergy, that would yield probably on the order of 30% of the world’s energy supply today

If statement 1 is true, 100% of crop production would provide about 40% of the world’s transportation fuel in 2020. But total energy supply is much more than only transportation fuels, so I cannot imagine how both statements can be true.

In the same section there is the earlier mentioned statement on the 85% of water resources that are withdrawn. Also an explanation is provided on the energy inefficiency of the photosynthesis which is difficult to follow. It is especially not clear how energy content of crops are measured.

On page 47 is written:

Recent research has shown that many of the jatropha projects have now been abandoned or have been replaced by food crops as it is becoming clear that jatropha needs both water and modern inputs if it is to achieve acceptable productivity levels (Friends of the Earth, 2010, African Biodiversity Network, 2010) . Tim Williams (2012), from the International Water Management Institute, has insisted that while water is in fact the key resource, land deals are negotiated without explicitly taking into account the water implications of large-scale projects because land and water are subject to different regulatory systems and different governmental responsibilities. Large-scale projects can lead to water being overdrawn, to the diversion and the drying up of water sources. Women as water providers can be particularly prejudiced as they often have to travel greater distances to find water sources. In addition, large-scale monoculture may modify rainfall patterns.

The part of Tim Williams saying that land deals should take into account explicitly water implications of large scale projects is a very important point. This point should probably be made more explicit, and be placed out of the context of Jatropha and the fact that women have to travel longer distances to fetch water. Also the remark that large scale monoculture may modify rainfall patterns is not relevant here.