Global Assessment of Biomass and Bioproduct Impacts on Socio-economics and Sustainability

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Recommendations on the integration of socio-economic sustainability criteria in European legislation and policies

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Authors: Rocio Diaz-Chavez, Imperial College London, UK
Sébastien Haye, École Polytechnique Fédérale de Lausanne, Switzerland
Anne-Sophie Dörnbrack, École Polytechnique Fédérale de Lausanne, Switzerland
Dominik Rutz, WIP Renewable Energies, Germany
Rainer Janssen, WIP Renewable Energies, Germany

In collaboration with:

Contact: Dr Rocio Diaz-Chavez
Centre for Environmental Policy, ICEPT
Imperial College London
14 Princess Gardens
South Kensington, London SW7 1NA
Tel: 004420 75949338
Fax: 004420 75949334

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Global-Bio-Pact website: www.globalbiopact.eu

Contents

Abbreviations

EC	European Commission
EP	European Parliament
EU	European Union
GATT	General Agreement on Tariffs and Trade
GMO	Genetically Modified Organism
IPIECA	The global oil and gas industry association for environmental and social issues
ISCC	International Sustainability and Carbon Certification
M&E	Monitoring & Evaluation
RED	Renewable Energy Directive (EU)
RFS	Renewable Fuel Standards (US)
RSB	Roundtable on Sustainable Biofuels
TBT	Technical Barriers to Trade (WTO)
US	United States of America
WTO	World Trade Organisation

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Preface

The main aim of the Global-Bio-Pact project was to research on the development and possible harmonisation of global sustainability certification systems for biomass production, conversion systems and trade in order to prevent negative socio-economic impacts.

This report presents recommendations on how to integrate socio-economical sustainability criteria in European legislation and policies compatible with environmental sustainability criteria. These recommendations are based on the results of the different work packages of the Global-Bio-Pact project.

In December 2008, the Renewable Energy Directive (RED) was ratified by the European Parliament, including reporting obligations for the European Commission (EC) on the impact on social sustainability in the European Community and in third countries of increased demand for biofuel. Furthermore, the EC has to assess the impact of the EU biofuel policy on the availability of food at affordable prices, in particular for people living in developing countries, and wider development issues. Reports shall be submitted by the EC every two years. The first report is expected in March 2013. Furthermore, in October 2012, the European Commission has made a proposal for the amendment of the RED. The current report will respond to these policy developments with regard to socio-economic impacts.

The Global-Bio-Pact project aimed to contribute to the reporting obligation of the EC and provides recommendations on socio-economic sustainability improvements and how to link them to the current Renewable Energy Directive.

1 Introduction

In order to evaluate impacts of biomass production and processing for biofuels and bio-products reliable data and profound research is needed. Currently, most sustainability schemes face the lack of reliable data on two issues, namely on (1) socio-economic impacts of biomass production and conversion and (2) the use of biomass for bio-products, since currently mainly biofuels and not bio-products are investigated (Rutz et al. 2010, Rutz et al. 2011). Furthermore, the true impact of the industrial use of biomass and bio-products on global food security (e.g. for 1st and 2nd generation biofuels) as well as the detailed interaction and relationship between certification schemes and world trade in biomass and bio-products is not well understood.

These main knowledge gaps for the development of sustainability criteria and effective certification schemes are addressed by the Global-Bio-Pact project in a comprehensive approach involving partners from Europe, Latin America, Africa, and Asia. The activities of the Global-Bio-Pact project serve as coordination platform to directly provide recommendations on how to integrate socio-economic sustainability criteria in the Renewable Energy Directive.

Since 2010, the Global-Bio-Pact consortium conducted an extensive research work on the socio-economic impacts of biomass, bioenergy and biofuel supply chains. The main aim of the Global-Bio-Pact project was the development and harmonisation of global sustainability certification systems for biomass production, conversion systems and trade in order to prevent negative socio-economic impacts[1].

The emphasis of the project was placed on a detailed assessment of the socio-economic impacts of raw material (feedstock) production and a variety of biomass conversion chains. The project reviewed the impacts of biomass production on local, national and international levels. This included investigations on inter-linkages between socio-economic and environmental impacts. Furthermore, the Global-Bio-Pact project investigated the impact of biomass production on food security and the interrelationship of global sustainability certification systems with the international trade of biomass and bio-products as well as with the public perception of biomass production for industrial uses.

Within the project context biomass is referred as the feedstock used to produce biofuels, bioenergy and bioproducts. The project analysed different feedstock types and agricultural production systems in different parts of the world as well as conversion systems. Extensive reports are available on each case study conducted within the project. The case studies showed the differences in the supply chains according to the particularities, not only of the feedstock, but also on the national and local circumstances.

The Global-Bio-Pact developed a set of socio-economic sustainability criteria and indicators to measure impacts of biomass production (Diaz-Chavez et al, 2012). The project elaborated recommendations on how to best integrate socio-economic sustainability criteria in European legislation and policies on biomass and bio-products.

This report presents an overview of the results and proposes recommendations on how to integrate socio-economic sustainability criteria in European legislation and policies, while being compatible with environmental sustainability criteria. Thereby, it has to be considered that the biomass sector, and more specifically the biofuels sector, is still very fluctuant subject to continuous changes in framework conditions. During the project, several important changes in national and international policies occurred with significant impacts on the overall biofuels production.

[1] Although, the report from Dörnbrack et al (2012) concluded that harmonisation is not necessary.

2 European legislation: the Renewable Energy Directive

One of the most important governmental initiatives that contributed to develop markets for biomass and bioenergy was the introduction of the "Directive on the promotion of the use of energy from renewable sources" (Renewable Energy Directive - RED) of the European Union, which includes sustainability aspects of biofuel production. Socio-economic aspects are addressed as well (Rutz et al. 2010, Rutz et al. 2011), which will be described in the subsequent chapters.

2.1 Socio-economic issues in the Renewable Energy Directive

The RED includes concrete environmental prerequisites for biofuels. It also includes reporting obligations for the Commission on the impact on social aspects in the Community and in third countries of increased demand for biofuels (Article 17) (Box 1). Based on the results of these reporting obligations on social sustainability, a revision of the Renewable Energy Directive is foreseen to possibly include additional criteria ensuring the socio-economic sustainability of (biomass and) biofuels.

Box 1. Socio-economic aspects in the RED (2009 p. 38f; Article 17(7))

"The Commission shall, every two years, report to the European Parliament and the Council, in respect of both third countries and Member States that are a significant source of biofuels or of raw material for biofuels consumed within the Community, on national measures taken to respect the sustainability criteria set out in paragraphs 2 to 5 and for soil, water and air protection. The first report shall be submitted in 2012.

The Commission shall, every two years, report to the European Parliament and the Council on the ***impact on social sustainability*** *in the Community and in third countries of increased demand for biofuel, on the impact of Community biofuel policy on the availability of foodstuffs at affordable prices, in particular for people living in developing countries, and wider development issues. Reports shall address the respect of land-use rights. They shall state, both for third countries and Member States that are a significant source of raw material for biofuel consumed within the Community, whether the country has ratified and implemented each of the following Conventions of the International Labour Organisation:*

- *Convention concerning Forced or Compulsory Labour (No 29)*
- *Convention concerning Freedom of Association and Protection of the Right to Organise (No 87)*
- *Convention concerning the Application of the Principles of the Right to Organise and to Bargain Collectively (No 98)*
- *Convention concerning Equal Remuneration of Men and Women Workers for Work of Equal Value (No 100)*
- *Convention concerning the Abolition of Forced Labour (No 105)*
- *Convention concerning Discrimination in Respect of Employment and Occupation (No 111)*
- *Convention concerning Minimum Age for Admission to Employment (No 138)*
- *Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour (No 182).*

Those reports shall state, both for third countries and Member States that are a significant source of raw material for biofuel consumed within the Community, whether the country has ratified and implemented:

- *the Cartagena Protocol on Biosafety*
- *the Convention on International Trade in Endangered Species of Wild Fauna and Flora.*

The first report shall be submitted in 2012. The Commission shall, if appropriate, propose corrective action, in particular if evidence shows that biofuel production has a significant impact on food prices."

2.2 Amendment to the Renewable Energy Directive

In October 2012, the EC published a proposal to amend the RED (COM2012 595, 2012): *"The aim of the current proposal is to start the transition to biofuels that deliver substantial greenhouse gas savings when also estimated indirect land-use change emissions are reported. While existing investments should be protected, the aims of the current proposal are to:*

- *limit the contribution that conventional biofuels (with a risk of ILUC emissions) make towards attainment of the targets in the Renewable Energy Directive*
- *improve the greenhouse gas performance of biofuel production processes (reducing associated emissions) by raising the greenhouse gas saving threshold for new installations subject to protecting installations already in operation on 1st July 2014*
- *encourage a greater market penetration of advanced (low-ILUC) biofuels by allowing such fuels to contribute more to the targets in the Renewable Energy Directive than conventional biofuels*
- *improve the reporting of greenhouse gas emissions by obliging Member States and fuel suppliers to report the estimated indirect land-use change emissions of biofuels.*

The proposal also aims at protecting existing investments until 2020. The proposal does not take a position on the actual need for financial support to biofuels before 2020. However, the Commission is of the view that in the period after 2020 biofuels which do not lead to substantial greenhouse gas savings (when emissions from indirect land-use change are included) and are produced from crops used for food and feed should not be subsidised." (COM2012 595, 2012)

The use of biofuels produced from "food crops, such as those based on cereals and other starch rich crops, sugars and oil crops" to meet the 10% renewable energy target of the RED shall be limited to 5%, according to the proposal. Specific issues related to socio-economic topics are not included.

Furthermore, the communication looks to "prepare for the transition towards advanced biofuels and minimise the overall indirect land use change impacts in the period to 2020" (COM 2012, page 8). Box 2 presents the proposal regarding the amendment of Article 18 on sustainability.

Box 2. COM 2012 on the change to Article 18 (4), second sub-paragraph (COM, 2012).

"The Commission may decide that voluntary national or international schemes setting standards for the production of biomass products contain accurate data for the purposes of Article 17(2) or demonstrate that consignments of biofuel or bioliquid comply with the sustainability criteria set out in Article 17(3) to (5). The Commission may decide that those schemes contain accurate data for the

purposes of information on measures taken for the conservation of areas that provide, in critical situations, basic ecosystem services (such as watershed protection and erosion control), for soil, water and air protection, the restoration of degraded land, the avoidance of excessive water consumption in areas where water is scarce and on the issues ***referred to in the second subparagraph of Article 17(7)****. The Commission may also recognise areas for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature for the purposes of Article 17 (3)(b) (ii).”*

As it can be observed in this proposal, the amendments are environmental related and there were not changes regarding socio-economic issues.

3 Socio-economic aspects from different perspectives

Despite the lack of clarity regarding the contribution of bioenergy and biofuels to the global price of commodities (Baffes and Haniotis 2010), a large number of direct socio-economic impacts is relatively undisputed. It is generally agreed that these socio-economic impacts, both positive and negative, are not specific to the bioenergy and biofuel supply chains, since they mainly occur at the stage of feedstock (agriculture/forestry) production, when the fate of feedstock is generally not determined or unknown from the producer her/himself (food or energy). Dam et al. (2011) explained in the Global-Bio-Pact report on socio-economic impacts how socio-economic impacts may differ according to the type of feedstock (e.g. soy, palm, jatropha, energy crops, etc.) and to the location, but there is a general agreement that feedstock production for bioenergy and biofuels presents the following potential impacts:

Positive impacts (potential)

- Employment opportunities and general improvement of local livelihood
- Improvement in agricultural techniques and improvement of local food security
- Increased local access to energy
- Improvement of working conditions

Negative impacts (potential)

- Working conditions that do not comply with ILO conventions
- Competition and conflicts over land and resources
- Contamination of local resources
- Local food insecurity in regions with food problems

It is usually acknowledged that the negative impacts are primarily observed in poorly developed countries where existing laws are not sufficiently enforced or where the combination of formal and customary rights creates complex situations and loopholes in the system. For instance, the effect of current US and EU biofuel blending obligations on traditional land-use and tenure rights in the developing world is well documented (German et al., 2011).

As demonstrated throughout the various reports of the Global-Bio-Pact consortium, biomass, bioenergy and biofuel production are always associated with socio-economic impacts, including both, positive and negative impacts. However, the uncontrolled or unregulated expansion of bioenergy and biofuel production worldwide, e.g. in response to the blending obligations in the US and the EU, may lead to a general offset of socio-economic benefits by the negative impacts encountered by local communities.

Therefore, any policy or regulation, that sets blending obligations, should be accompanied by mandatory criteria to guarantee the sustainability of supply chains. Socio-economic aspects shall be included in such regimes to avoid that the benefits for climate change and global energy security are being offset by detrimental effects on local communities and livelihoods.

3.1 Linkage to environmental aspects

The Global-Bio-Pact report by Rettenmaier et al. (2012) on the linkages between socio-economic and environmental impacts has shown that trade-offs and negative correlations between environmental and socio-economic impacts are often related to inappropriate management practices during feedstock production and conversion which either reflect the absence of respective regulations or are a sign of weak governance (in terms of implementation of decisions / law enforcement).

The second cause for trade-offs and negative correlations is land use conflicts and land-use change. For direct land-use change (dLUC), the same applies as for inappropriate management practices (see above). However, in order to solve the problem of indirect land-use change (iLUC), global governance would be required since it affects more than one state or region.

Trade-offs and negative correlations between environmental and socio-economic impacts are also a sign of deteriorations of ecosystem services[2] which negatively affect the constituents of human well-being. This holds especially for 'provisioning' and 'regulating' ecosystem services which affect some (but not all) constituents of well-being through impacts on security, the necessary material for a good life, health, and social and cultural relations (Millennium Ecosystem Assessment 2003). Regarding 'good social relations' and 'freedom of choice and action', the linkage to ecosystem services is weaker.

The strong link between 'provisioning' ecosystem services and human well-being is also taken up in the Low Indirect Impact Biofuels (LIIB) methodology (Ecofys et al. 2012), which constitutes a further development of the Responsible Cultivation Areas (RCA) methodology (Ecofys 2010).

3.2 Public Perception

The factual evidences of both positive and negative impacts of biomass, bioenergy and biofuel production chains are further reinforced by the public perception which varies across different countries. As illustrated in the Global-Bio-Pact report of Fallot et al. (2012), socio-economic considerations are recurrent in the public opinion.

The socio-economic considerations raised by the public include both positive and negative impacts on local economies, livelihood, employment, and land tenure rights. The public perception is highly influenced by different circumstances and reports of the media at local, national and international levels. This fact requires the consideration of public perception for the promotion of sustainability in biomass production chains. This is needed to ensure that biomass, bioenergy or biofuel projects deliver on their promises (e.g. job creation, energy access, infrastructure development) or to prevent negative impacts (e.g. violation of tenure rights, decrease in local food security, local contamination.

Furthermore, attention must be given to the influencing factors of public perception. The main influencing factor is the news on biomass in the media. The majority of the people are no experts in the sector and rely on the facts presented by the media. It seems that often also the media lack of experts in the field and that they have frequently difficulties to report about biomass and bioenergy in an objective way. Often, facts are interchanged and aspects are

[2] Ecosystem services are the benefits people obtain from ecosystems. These include provisioning, regulating, and cultural services that directly affect people and supporting services needed to maintain the other services. /Millennium Ecosystem Assessment 2003/

generalized, although biomass and bioenergy value chains are very specific, depending on the location of the feedstock production as well as on the conversion process.

Another important factor is the power and capacity of some lobby groups. In general the traditional commercial energy sector has more resources and interest to block new developments in the sector. In contrast, smaller and more decentralized sectors, such as many renewable energy suppliers, have fewer resources available to influence public perception. However, also actors in the biofuel value chain can be very powerful, especially if it is related to the large-scale commercial feedstock production.

Finally, when considering public perception, it has to be considered that usually negative messages and press releases are gaining more attention than positive ones. Negative messages have furthermore the tendency to stay longer in the minds of the people.

3.3 Voluntary Standards and Certification Schemes

Several voluntary standards and certification schemes try to address socio-economic impacts of biomass, bioenergy and biofuels through different approaches and with different level of stringency. Some of them are recognised by the EU under the RED, thus providing certified operators with additional assurance regarding positive socio-economic outcomes of their project and the mitigation of negative impacts on local communities and livelihood.

However, it needs to be noted that significant discrepancies exist in the level of assurance provided by the voluntary standards recognised by the EU (German and Schoneveld 2011).

The Global-Bio-Pact report of Diaz-Chavez (2011) also describes standards and certification systems which are not specific for biofuels (e.g. Forest Stewardship Council, Rainforest Alliance, Social Accountability International), but which can be used to demonstrate compliance with socio-economic requirements in the context of sustainable biomass, bioenergy or biofuel supply chains.

It is important to note that the level of assurance provided by voluntary standards depend on the verification system in place. Compliance by operators with socio-economic requirements may be verified with systems offering different levels of robustness (NL Agency, 2012).

In summary, voluntary standards and certification schemes offer different levels of guarantees vis-à-vis socio-economic impacts of biomass, bioenergy and biofuels. These differences are mostly observed at the level of:

- **Sustainability Requirements** (Principles & Criteria): Some schemes are specifically aligned with what the RED requires and thus do not address socio-economic impacts through any mandatory requirement. Several schemes actually address socio-economic impacts, but at different levels of comprehensiveness and complexity.
- **Implementation**: For a given sustainability criterion, different types of evidence can be used to demonstrate compliance. As described in NL Agency (2012), “ISCC requires that records are kept for training activities by employees including the topic covered, the trainer, the date and attendees; training must be sufficient (criterion defined as minor must). Bonsucro requires, on the other hand, that >90% of employees should be trained on health and safety issues. Information is to be given on the training expense of workers as a percentage of payroll expense.” In most cases, the level of details required for proofs of compliance will have a direct impact on the robustness of the audit process, but also on the costs.
- **Assurance System**: Assurance systems describe how auditors and certification bodies receive accreditation to perform audits and deliver certificates. In the context of the RED, recognised schemes show different levels of assurance, based on whether or not the accreditation of auditors is submitted to stringent criteria or not.

Additionally, standards work mainly through audits which are normally a “snapshot” of the activity of a single operation. Therefore it is not possible to assume that sustainable

development principles will be achieved at regional or national level only through audited certification.

3.4 Trade-related aspects

As described in the Global-Bio-Pact reports of Walter et al. (2012a), Walter et al. (2012b), Eijck et al. (2012), and Fallot et al. (2012) the current EU legislation, including blending obligations and sustainability requirements, have raised important concerns on trade-related aspects. For instance, emerging countries usually see the sustainability requirements of the RED as Technical Barriers to Trade (TBT)[3]. This is due to the nature of some of the land-use criteria, as found in Article 17 of the RED, which prohibits the use and conversion of specific ecosystems. Since those ecosystems are primarily found in certain regions of the world, the land-use criteria of the RED could theoretically be considered in violation of Article I and III of the GATT (World Trade Organisation 1994; Szabo 2010). However, Article XX of the GATT (World Trade Organisation, 1994) defines exceptions to the agreement as follows:

"*Nothing in this agreement shall be construed to prevent the adoption or enforcement by any contracting of measures: (…)*

b) Necessary to protect human, animal or plant life or health; (…)

g) Relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption."

Article XX and its associated "Chapeau" would therefore make the current sustainability criteria of the RED generally justifiable under WTO rules (Schaus and Lendle 2010; Charnovitz et al. 2008). Considering the need for socio-economic safeguards to prevent negative impacts on livelihoods and local communities, the same rationale could justify the introduction of socio-economic requirements in the RED (or any other legislation), as "necessary to protect human life or health" (see above), provided that such measure is applied equally to any country in the world without any kind of discriminatory prejudice. It would therefore be important for such requirements to be defined in collaboration with the countries producing biomass, bioenergy or biofuels through a multi-stakeholder and consensual process. It should be noted that some of these requirements apply in general to agricultural crops, independently if the different co-products of the crop are used for feed, food or other industrial purposes.

Furthermore, it must be noted that the Agreement on Technical Barriers to Trade (World Trade Organisation, 1995) requires mandatory government regulations to use international standards as a basis, where they are available, relevant and appropriate. However, Charnovitz et al. (2008) state that voluntary standards could be considered as mandatory, if they are used to demonstrate compliance with law. Nevertheless, not every voluntary standard recognized by the European Union could be considered an "international standard" for the purposes of the TBT Agreement. Whether a standard could be considered "international" mostly depends on whether the standard development process is sufficiently inclusive to allow WTO members to participate. The Roundtable on Sustainable Biofuels (RSB) could, for example, qualify under this definition (Charnovitz et al. 2008). In addition, the RSB is generally seen as the most far-reaching voluntary standard with regards to socio-economic criteria (German and Schoneveld 2012). Further research on the impacts and benefits of voluntary standards in this sector is necessary.

3.5 Monitoring and Evaluation of socio-economic impacts

Current regulations and voluntary standards share an important objective: ensure that the use of biomass, bioenergy and biofuels does not occur at the expense of local communities and livelihood, or natural resources and ecosystem services. The sustainability criteria

[3] http://www.wto.org/english/tratop_e/tbt_e/tbt_e.htm

included in standards and legislative framework restrict certain practices with higher risks of social or environmental impacts, while promoting those with lower risks. A clear distinction must be made between the different feedstock categories and types.

Standard setting and the development of legislation are continuous processes and should allow for lessons learned as well as for the incorporation of experience and progress in state-of-science to improve sustainability requirements and their implementation. A key element to this continuous improvement is the development and implementation of a Monitoring and Evaluation (M&E) System.

ISEAL's Impact Code (ISEAL Alliance 2010) defines Monitoring as "a continuing function that uses systematic collection of data on specified indicators to provide indications of the extent to which outcomes are being achieved" and Evaluation as "The systematic and objective assessment of an on-going or completed project, programme or policy, and its design, implementation and results."

The concept of Monitoring and Evaluation builds upon the idea that the implementation of sustainability requirements, whether through voluntary standards or regulations, will change supply chains to a point where general impacts on the environment and the people are measurable (Theory of Change). Being able to measure the impact of a standard or a regulation over time is essential to evaluate the completion of the initial objectives of the standard/regulation as well as to improve the content and implementation of the standard/regulation, based on lessons learned and data collection.

It is essential to develop M&E systems in a way that permits an accurate and fair assessment of the performance and impact of standards and regulations. The data collection phase is particularly important, especially the selection of Impact Indicators, which are used to measure the evolution of certain aspects of the environmental or socio-economic contexts before and after the implementation of voluntary standards and/or regulations.

The Global-Bio-Pact set of impact indicators (Diaz-Chavez et al. 2012) is a compilation of relevant impact indicators to be used to measure changes over time with regards to the socio-economic and environmental conditions in regions where feed, food, biomass, bioenergy and biofuel operations are located. These impact indicators were developed on the basis of socio-economic criteria, as found in current standards and legislation (Diaz-Chavez 2011), and in consultation with Global-Bio-Pact partners. They were consecutively tested in existing biomass and biofuel operations in Argentina and Brazil to verify their practicality and operability. The results can be found in the report "Test auditing of the Global-Bio-Pact socio-economic sustainability criteria and indicators" (Vuohelainen and Diaz-Chavez 2012). The final set of impact indicators developed by the Global-Bio-Pact address changes related to:

- Local economies (e.g. employment, income, capacity building)
- Working conditions (e.g. employee income, employment benefits)
- Health and Safety (e.g. work related accidents and diseases)
- Land rights and conflicts (e.g. legal title of land right)
- Food Security (e.g. land converted from staple crops)
- Gender (e.g. benefits created for women)
- Biodiversity (e.g. reduction of biodiversity, conservation measures)
- Air, Soil and Water quality (e.g. implemented practices)
- Water availability (e.g. changes in water availability)

The Global-Bio-Pact project recommends to introducing a mandatory Monitoring and Evaluation obligation in the RED on selected socio-economic impacts for biomass and bioenergy companies that sell their products on the European market.

The Global-Bio-Pact project recommends further to develop and implement Monitoring and Evaluation systems to assess the real impact of national agricultural policies, regulations and voluntary standards against their initial objectives.

Credible voluntary standards usually develop an internal M&E system to evaluate their impact over time. This is also required to all members of the ISEAL Alliance, in line with the ISEAL Impact Code (ISEAL Alliance, 2010). However, to date, the Roundtable on Sustainable Biofuels is the only Full Member of ISEAL, whereas Bonsucro is an Associate Member. No other EU-recognised biofuel schemes are members of ISEAL. An opportunity would be to use this as a basis for requiring mandatory M&E aspects in certification schemes that are recognised by the EC under the RED.

As an alternative, the EU itself could develop its own M&E System, on the basis of existing reporting requirements for the European Commission and Member States with regards to the social impacts of biofuels produced or consumed in the EU. A global Monitoring and Evaluation system would also support the individual M&E systems set up by voluntary standards by providing additional socio-economic data beyond the restricted scope of certified operations.

The Global-Bio-Pact report on the application of the indicators in the field (Vuohelainen and Diaz-Chavez, 2012) explained the difficulties to gather data for monitoring impacts that a company and a consultant (verifier/auditor) face. Data need to be collected from different participants of the supply chain, the community, the government and non-governmental organizations. It was concluded that joint efforts between the private sector and the government are necessary to initiate a monitoring programme where these indicators can be followed in time. These have to be tailored to national and local circumstances as the case studies in Global-Bio-Pact demonstrated these differences.

Voluntary standards can contribute to the implementation of M&E systems. Nevertheless, they face difficulties when implementing them. On the one hand, it is usually advised to measure impact indicators on the basis of the information collected during regular audits. This approach has obvious benefits in terms of costs, since it reduces the cost to perform or outsource data collection by appointed consultants. On the other hand, several categories of impacts are measured beyond the restricted scope of certified operations. This makes the data, which was collected during an audit too restricted and incomplete to properly implement the M&E system. In addition, audits are usually submitted to non-disclosure agreements, making the extraction of real data limited.

This challenge can be overcome by voluntary standards, for which socio-economic and environmental data collection is required to demonstrate compliance. As illustrated in the Global-Bio-Pact report on “Recommendations on using audit procedures and tools for achieving sustainability within certification schemes” (Dörnbrack et al. 2012), impact assessments may require operators to collect data on the general socio-economic and environmental context. The RSB Standard (RSB 2010) for instance, requires an impact assessment (ESIA) to be performed by all operators. This impact assessment includes steps to evaluate the impact of operations on local communities and livelihood, but also to collect national and local data regarding poverty and food security. The parameters measured during the RSB Impact Assessment are in line with the suggested Impact Indicators (see below). The M&E system developed by the RSB will likely use some of the data collected during the impact assessments process. However, not all biofuel standards require impact assessments and the case of the RSB is not transposable to all EU-approved schemes.

Another option to overcome the challenge of data collection is related to the recommendation for regulators (e.g. in the EU) to implement an M&E System at the regional and national scale. Data collected at national level and reported at the EU level could be used by voluntary standards to feed into their own M&E systems. In return, voluntary standards could also share the data collected in the context of their M&E System. This approach would mutualise the cost of data collection and improve the quality of data as those would need to be verified and validated before being used as secondary data. Nevertheless, it would be

important to define the standards that do actually monitor impacts and not just impacts of certification.

4 Options for addressing socio-economic impacts in the RED

The RED promotes all kinds of renewable energy, among others bioenergy, by allowing the Member States to incentivise their use and to account them towards the national targets. In order to prevent negative impacts related to the use of biofuels and other bioliquids, sustainability criteria were introduced in the RED. Currently, they only focus on environmental impacts.

However, some examples of biomass and bioenergy production and conversion have shown also negative socio-economic impacts. In many cases these negative impacts at local, regional, or national level are more related to general agricultural policies of the country rather than to the characteristics of a certain value chain for biofuels. The key question to European policy makers is if and how socio-economic aspects can be included in the RED in order to prevent negative socio-economic impacts in biomass and bioenergy value chains. Preventing negative socio-economic impacts would positively impact the public perception of biomass and bioenergy and thus boost the overall European Bio-Based Economy.

The problem of addressing socio-economic impacts in the legislation is that these impacts are more difficult to assess, to standardise and to limit by any thresholds. Furthermore, socio-economic impacts can often be only assessed with qualitative data and not by quantitative data and often it is necessary to consider a period of time, including a baseline. Measurable units can be only applied to some impact categories.

With regards to an amendment of the RED, there exist several options to address socio-economic issues:

A) Keeping the status-quo - taking no action

B) Specify, extend, and enforce monitoring procedures

C) Include selected socio-economic criteria in the RED

D) Include additional environmental sustainability criteria to indirectly cover socio-economic aspects

E) Include measures at national levels

An additional recommendation not directly linked to the RED is to **end the promotion of good examples to the public.**

These options are discussed in more detail in the following chapters. Some options can be also combined.

4.1 Option A: Keeping the status-quo - taking no additional action

The first option (A) is to keep the current status and to take no further action on socio-economic impacts of biomass and bioenergy. This would mean that the EC has a reporting obligation to the European Parliament on some selected socio-economic impacts, according to the RED. It is specified that every two years reports on socio-economic impacts shall be made. Also in the proposal for an amendment of the directive (COM2012 595, 2012), socio-economic aspects are not further addressed.

So far, no reports are yet publicly available. According to representatives of the EC, a report will be published in March 2013. It is not clear how this reporting looks like, how it is realised and which impacts it will have. It therefore remains the risk that socio-economic issues continue to be not sufficiently addressed in the RED.

The Global-Bio-Pact highlights the urgent need to specify this issue and to introduce clear and transparent monitoring processes to assess socio-economic impacts. This can be done

through a transparent system at EU level enabling each MS to clearly report on socio-economic issue and not only on environmental ones.

The only concrete action seems to focus food security. The proposed amendment of the RED from the EC "promotes" food security by limiting the food crops for biofuels. However, limiting food crops for biofuels production does not reduce food in-security.

Thus, option A is not recommended to be promoted.

4.2 Option B: Specify, extend, and enforce monitoring procedures

Option B proposes to specify, extend, and enforce the monitoring on socio-economic impacts of the biomass and bioenergy that is used in Europe. The results form the basis for further reactions and decisions, such as e.g. bi-lateral agreements between Europe and exporting countries. Different levels of monitoring could be implemented:

- monitoring of the impact of certification schemes on future biomass/bioenergy markets
- monitoring of socio-economic impacts of specific biomass/bioenergy value chains at company level
- monitoring of general socio-economic impacts of biomass/bioenergy on the European level

It is recommended that all three levels of monitoring shall be addressed by policies. The specification, extension, and enforcement of monitoring procedures are a crucial step towards more transparency and credibility in the sector. Both, the European Union itself, as well as all involved companies of biomass/bioenergy value chains shall be requested to monitor socio-economic impacts at different levels. Furthermore, they shall be requested to publish the monitoring results. Consumers and the public could use these data and reports to build their own opinion. Thereby, companies could be forced to improve their value chains and biomass/bioenergy with negative impacts could have a clear market disadvantage compared to better ones.

4.3 Option C: Include selected socio-economic criteria in the RED

Currently the reporting obligation of the EC to the European Parliament, as stated in the RED, specifies the focus on the following aspects:

- on the availability of foodstuffs at affordable prices, in particular for people living in developing countries
- on wider development issues
- on the respect of land-use rights

Selected mandatory socio-economic criteria could be included in the RED (option C), similar to the environmental criteria. As stated before, this seems to be more challenging than for environmental criteria. Based on the existing aspects that are already addressed in the RED, it seems obvious to include more specific criteria on food security, poverty reduction and on land use issues at national scale. Furthermore, not to include compliance indicators but impact indicators as those selected in the Global-Bio-Pact project.

Some biofuel certification schemes already include also socio-economic issues. Thus, it is proved that it is generally possible to address socio-economic issues in certification schemes, but the results clearly reflect a particular situation that may be or not be linked to the biofuels production in the area. This could also consider the assessment of impacts on water, land rights and local food security, at least in specific areas.

Considering these certification schemes, the Global-Bio-Pact has developed a "Global-Bio-Pact set of selected socio-economic sustainability criteria and indicators" to measure the socioeconomic impacts of biofuel production (Diaz-Chavez et al. 2012). The indicators were

selected through a process where impacts, case studies and participation of stakeholders were assessed. The set of indicators consists of basic Information, socio-economic indicators, and environmental indicators. Each indicator is linked to a measurement, monitoring process or unit depending of its nature. This set of indicators is not meant to be directly included in certification schemes or in legislation

Major limitations to this option C are on the one hand higher costs and efforts that are needed to certify biomass and bioenergy and on the other hand difficulties in formulating quantifiable requirements on food security, poverty reduction and on land use issues.

The impact of biofuels on "food security" is debated in several scientific publications (Achterbosch et al. 2012). Food security can be differentiated into (1) food availability, (2) food access (consumption) at household and individual level, (3) stability of food access over time, and (4) food utilisation resulting in a good nutritional status. Furthermore, the size of the system (local, national, international) plays an important role in the debate on food security. It is therefore very difficult to identify the impact of biomass and bioenergy on food security. Particularly food security is related to the degree of economic development of a certain society rather than its ability to produce food (see Achterbosch et al, 2012). There are many examples of entire countries with no food production capacity and a very high food security level. Therefore, it seems rather difficult to include food security as a mandatory criterion in legislation.

The impact on "wider development issues" is a rather vague formulation. The impact of biomass and bioenergy production on poverty is controversially discussed (see the reports on the case studies of Mali and Tanzania of the Global-Bio-Pact Project)[4], depending on the scale of the investigated system. As stated before the general agricultural and tax distribution policies are crucial in addressing this kind of issues. Whereas, biofuels for export could significantly contribute to economic growth at national level, it could lead to increased poverty at local level, especially in developing countries.

Finally, "land use rights" need to be respected. This is a crucial issue in areas where feedstock is produced (see the reports of Mali (Burrel et al, 2011), Tanzania (Sawe at al, 2011), Indonesia (Wright, 2011), and Van Eijck and Faij, 2011). Difficulties may occur in several developing countries that have no official land register or only communal land. In these countries it is difficult to ensure that land use rights are respected.

In summary, the mandatory inclusion of socio-economic criteria in the RED is challenging and constitutes not the first priority.

4.4 Option D: Include additional environmental sustainability criteria to indirectly cover socio-economic aspects

The Global-Bio-Pact report by Rettenmaier et al. (2012) proposes to set new mandatory environmental sustainability criteria regarding soil, water and air protection, i.e. criteria that have a strong link to ecosystem services (e.g. UNEP et al. 2011). In this form, some social impacts affecting 'security', 'basic material for good life' and 'health' can be covered indirectly. Some of the voluntary certification systems do include such criteria, but since they are not needed to fulfil the requirements of the RED (so far, only criteria related to GHG emissions and biodiversity are mandatory), there is a risk that economic operators opt for the weakest (recognised) certification system which does not include the suggested criteria regarding soil, water and air protection.

Moreover, we recommend to improve and to amend the RED also in terms of environmental criteria:

- widen the scope of the RED to cover solid and gaseous biofuels, too, i.e. to extend its coverage beyond the transport sector. Not only in this case, the mandatory

[4] http://www.globalbiopact.eu/publications.html

environmental sustainability criteria regarding biodiversity need to be extended, in particular with regard to the protection of forests with high biodiversity and to sustainability requirements for forestry (see below).

- include additional mandatory environmental sustainability criteria regarding biodiversity. There is an urgent need to include (and define) “highly biodiverse forests” under land cover-related criteria (Article 17) as well as “minimum requirements for good silvicultural and environmental condition” under cultivation-related criteria (Article 17(6)).
- properly consider greenhouse gas emissions from carbon stock change due to indirect land-use change (iLUC) in the rules laid down in Annex V of the RED, not only in the reporting obligation set out in Article 22(2), as recently proposed by the European Commission (EC 2012).

4.5 Option E: Include measures at national levels

In order to avoid negative socio-economic impacts, measures can be also taken at governmental level, which means at the European level with regards to the RED. As already stated in the RED reports from the EC to the European Parliament (RED 2009; p. 38f; Article 17(7)) shall state, both for third countries and Member States that are a significant source of raw material for biofuel consumed within the Community, whether the country has ratified and implemented various ILO Conventions as well as the Cartagena Protocol on Biosafety and the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

The first report should have been submitted in 2012. The Commission shall, if appropriate, propose corrective actions and in particular if evidence shows that biofuel production has a significant impact on food prices.”

It is currently not clear if such a report has been submitted in 2012. The current bottleneck is that only a reporting obligation of the EC to the EP is requested. An option would be to make the ratification and implementation of the mentioned ILO Conventions a precondition for the use of biomass and bioenergy in the EU.

Furthermore, it is not specified which “corrective actions” could be taken. An option would be to block the use of those biomass and biofuels that have not ratified or implemented the mentioned ILO Conventions. Nevertheless, this may create trade barriers and could be against the World Trade Organisation principles.

Finally, the “Commission shall, if appropriate, propose corrective action, in particular if evidence shows that biofuel production has a significant impact on food prices.” As mentioned in chapter 4.3, it is very difficult to provide “evidence that biofuel production has a significant impact on food prices”. The impacts of increasing demand for biomass and bioenergy on food prices is controversially discussed among scientists. In general it is acknowledged, that increasing demand for biomass and bioenergy is only one factor that leads to increasing food prices, among e.g. speculations, weather conditions, and destroyed harvests (see Achterbosch et al, 2012). The term “significant impact” leaves room for interpretation. It is also not clear why the RED only mentions impacts on food prices and not on other potential impacts.

With respect to these uncertainties, it is recommended to clarify these issues and to transparently communicate this to the public. In general, measures at national level, if implemented and enforced correctly, are a good way towards more sustainability in the biomass and bioenergy fields.

4.6 Extend the promotion of good examples to the public

As mentioned in chapter 3.1, the public perception is a very important factor that heavily influences the acceptance of biomass and bioenergy. The use of biomass and bioenergy has many advantages in comparison to fossil based products particularly on environmental

issues (e.g. GHG savings) and at local level (see Hilbert et al. 2011a; Hilbert et al. 2011b). These benefits must be continuously promoted in order to increase the positive public perception of biofuels. There is an urgent need to inform the European citizens not only about the negative impacts, but also to provide information about positive impacts – both on environmental and socio-economic issues. Also the use of voluntary standards may help to inform the general public on the sustainability of the biofuels used. The increased information of the benefits of biomass and bioenergy can be done by different means. It can be implemented directly by the EC, or indirectly through projects supported by the EC.

5 Conclusion

A core objective of the RED is to increase the share of renewable energy in Europe, including a sectoral target for biofuels. This aim is to increase one the one hand the security of energy supply, but on the other hand to reduce greenhouse gas (GHG) emissions. GHG emissions are more related to environmental impacts (although they also have indirect social impacts) and security of supply is more related to social impacts.

It is obvious that the RED should not promote biomass and bioenergy that has negative impacts, either environmental or social. Therefore, measures are needed to guarantee that biomass and bioenergy have mainly positive or at least neutral impacts. In reality there will always exist trade-offs and not all negative impacts can be avoided. Therefore, some guidelines on the prioritisation of impacts may help. It must be considered that also conventional fuels are associated with negative impacts, both environmentally and socially.

For fossil fuels, no sustainability scheme exists, only guidelines provided by IPIECA[5]. Considering the comparison with fossil fuels, it must be ensured that European legislation, such as the RED, is not too complex and does not block-out the development of biomass and bioenergy. However, the application of certain (limited) sustainability criteria to biomass and bioenergy may open a gateway for the certification of other (bio-)products in a bio-based economy. Thereby, certification could act as a tool to improve the overall agricultural sector, not only for bioenergy, but also for bio-products and even food, feed and fibre. Thus, legislation should be designed to avoid the worst negative impacts, but at the same time to allow for enough freedom for the development of the market.

The Global-Bio-Pact project worked three years with six case studies including different feedstock and supply chains. During that time, the number of current recognised standards to assess sustainability for biomass and bioenergy production has increased considerably. The project identified and assessed socio-economic impacts through the development of a Set of Indicators that were tested in the field. The Global-Bio-Pact partners consider that the use of these indicators will help the different users in promoting the sustainable production of biofuel production.

The studies and results about different types of feedstocks, societies, and agricultural systems clearly demonstrated that it is difficult to develop general approaches for different feedstocks. There is a clear need to differentiate between the types of feedstock (e.g. perennial and annual crops, as well as dedicated energy crops and residues or co-products).

The final recommendations from the Global-Bio-Pact project are as follows:

- The set of indicators of the Global-Bio-Pact project is able to indicate and to monitor the impacts of bioenergy production. It is expected that these indicators will be useful for different users from project developers, government and standards.
- The EU should consider the implementation of a **Monitoring and Evaluation System** at the regional (national) scale within the EU. The data collected at EU level could be used by voluntary standards to feed into their own M&E systems. In return,

[5] http://www.ipieca.org/

voluntary standards could also share the data collected in the context of their M&E System with a differentiation between impact indicators and compliance indicators.

- A mandatory Monitoring and Evaluation obligation should be introduced for some selected socio-economic impacts for biomass and bioenergy companies that sell their products on the European market under the RED. These criteria could be the ones considered in current available voluntary standards along with some of the criteria selected in the Global-Bio-Pact project. Furthermore, biomass and bioenergy companies shall be obliged to publish the results of this monitoring as part of their Corporate Social Responsibility Programmes or as part of the compliance with voluntary standards. After a certain period, results could be used in a second step to include selected socio-economic criteria in the legislation.
- The introduction of socio-economic requirements in the RED (or any other legislation), could be seen as "necessary to protect human life or health", provided that such measures are applied equally to any country in the world without any kind of discriminatory prejudice.
- It should be assessed if the ratification and implementation of the mentioned ILO Conventions could be a precondition for the use of biomass and bioenergy in the EU. The use of biomass and bioenergy from countries that have not ratified or implemented the mentioned ILO Conventions may be blocked out by the legislation. This has to be assessed especially with regards to international trade agreements.
- An amendment of the RED should specify in more detail the socio-economic requirements, including more details on the reporting obligation of the EC to the EP.
- There is an urgent need to inform the European citizens and the general public not only about the negative impacts, but also on the positive impacts of the biomass production– both on environmental and socio-economic issues.
- The difficulty to provide "evidence… that biofuel production has a significant impact on food prices" has been explained. The impacts of increasing demand for biomass and bioenergy on food prices is still controversially discussed. In general it is acknowledged, that increasing demand for biomass and bioenergy is only one factor that leads to increasing food prices although in some cases they could lead to increasing food-feed availability in certain markets. Other factors need to be considered such as speculation, national agricultural policies, weather changes, land disputes, potential indirect impact as displacements and impacts on crops. Furthermore, the term "significant impact" needs to be specified. It is not clear why the RED only mentions impacts on food prices and not on other potential impacts. Thus, other impacts may be included as well.

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