Background note

INTERNATIONAL DIMENSION OF EU BIO-ENERGY POLICIES

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Introduction

Global interest in bioenergy has grown rapidly in recent years, as fossil fuel dependence has become a major risk for many economies. With oil prices dependent on developments in some of the world's least stable regions, a key motivation in the development of bioenergy is to diversify energy resources. While fossil fuels become scarce and more expensive, bioenergy is also seen helping to mitigate climate change. It further offers large new markets for agricultural producers that could stimulate rural growth and farm incomes.

In this context, EU Member States increase the use of bioenergy aiming to decrease the emission of greenhouse gas in the light of the Kyoto Protocol. To meet their targets, imports from (developing) countries are likely to increase, as the latter promote biomass production to strengthen their economies and generate employment, having comparative advantages regarding costs of labour and land.

The development of bioenergy can then present a broad range of opportunities, but it also entails many trade-offs for the sustainable use of natural resources and for sustainable agriculture and rural development at local, national and global scales. Large-scale development of biomass is likely to push out food crops, raising agricultural commodity prices and exacerbating food security. Biomass production could further create unexpected negative rather than positive external environmental effects particularly in the absence of the development and early introduction of standards, regulations, and efficient supply and conversion technologies.

Table 1 briefly indicates the key benefits as well as the challenges related to bioenergy production and trade.

Table 1: Key benefits and challenges of bioenergy

Bioenergy – Key benefits	
Sustainability	a clean and renewable energy source
Availability	bioenergy development can increase access to energy in rural areas

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Flexibility	bioenergy can deliver power, heat and transport
Energy Security	bioenergy can contribute to diversifying the energy mix; there is a wide variety of feedstocks for bioenergy and all countries can rely on some domestic sources
Mitigation of climate change	bioenergy can significantly reduce GHG emissions compared to fossil fuels
Diversification of rural livelihoods	in the energy sector, and utilising newly available energy services facilitating rural development
Reduction in land degradation	especially through planting of perennial bioenergy feedstocks
Bioenergy – Key challenges	
Ensuring sustainability	environmental, social and economic
Safeguarding food security	ensuring that increased demand for biofuels does not adversely affect the hungry
Protecting biodiversity	
Managing competition	for land and water
Controlling pollution	of air, water and soils
Removing barriers	to biomass and bioenergy trade

Source: Global Bioenergy Partnership, 2007

As a result, the associated socioeconomic and environmental impacts depend largely on local conditions and policy frameworks implemented to support bioenergy development. Agricultural policy, for example, including the availability of rural infrastructure, credit, and land tenure, determine the scale and distribution of economic benefits. Trade policies also have powerful effects on and are subject to sizable impacts from biomass expansion. The EU, in particular, has coupled subsidies for biomass with import tariffs that further protect domestic farmers. By impeding imports of more efficiently produced bioenergy from abroad, the combination of the two policies may be harmful to exporting (developing) countries.

An integrated policy approach that considers the effects and interactions of the relevant policy domains at different levels is therefore required. More importantly, international standards and certification systems are critical to ensure that bioenergy is produced using the most sustainable methods possible.

The European Commission has already taken the initiative to start developing a policy framework to guarantee sustainable biomass (a certification system). A special committee under the WTO on trade and environment has also been created to channel the discussions that could be used to outline proposed certification criteria.

This note aims at providing an overview on issues related to biomass production and international trade. It also focuses on issues related to recent developments in sustainable biomass certification; presenting the relevant initiatives and the possible ways of implementing sustainability standards, as well as discussing the complexity of setting and implementing sustainability criteria and standards.

Biomass production

At present, renewable energy sources account for 14% (59EJ) of the world's total energy consumption, whereas biomass is the largest source having an approximately 11% (47EJ) share of the total energy supply. Modern biomass energy has been a marginal source, as over two-thirds of biomass is used for cooking and heating in developing countries. This may seem small, but it is in fact the leading form of renewable energy and the main energy source in many poor countries. In countries such as Sweden, Finland, and Austria, which have a large forestry sector, forest-based biomass has a remarkable importance. In terms of biofuels, total consumption accounted for 0.33EJ in 2002, of which Brazil consumed 70% and the USA 23%. The share of biofuels in total transport consumption was only 0.4%, though the modern use of biomass is increasing rapidly in many parts of the world.

In the EU, about 20% of biomass potential is currently exploited; whereas the largest biomass resources are in Germany, France, Spain, Sweden and Finland. According to the EU Biomass Action Plan, if the EU made full use of its potential, it would more than double biomass use by 2010. On an international level, about two-fifths of the existing biomass potential is used (Fagernäs *et al*, 2006).

In terms of biodiesel, the EU is the largest producer in the world, and biodiesel represents 80% of the EU biofuel production. Germany alone represents more than half of this production, followed by France, Italy, Denmark, the Czech Republic, and Austria. On the contrary, bioethanol currently plays a subordinate role in the EU (accounting for 18.5% of all biofuel production); whereas Spain, France, Sweden, Poland, and Germany are the leading ethanol producers. Biogas is also a growing market in the EU. Germany and the UK are the major EU countries for the production of crude biogas. Finally, primary wood energy production also increases considerably over time. France, Sweden and Finland are the leading users of primary wood energy. Table 2 presents the biomass energy potentials and current use in different regions of the world.

Table 2: Bioenergy potentials and current use (Source: Fagernäs et al, 2006)

Biomass potential	North-America	Latin America	Asia	Africa	Europe	Middle East	Former USSR	World
Woody biomass	12.8	5.9	7.7	5.4	4.0	0.4	5.4	41.6
Energy crops	4.1	12.1	1.1	13.9	2.6	0.0	3.6	37.4
Straw	2.2	1.7	9.9	0.9	1.6	0.2	0.7	17.2
Other	0.8	1.8	2.9	1.2	0.7	0.1	0.3	7.6
Potential, Sum EJ/a	**19.9**	**21.5**	**21.4**	**21.4**	**8.9**	**0.7**	**10.0**	**103.8**
Use, EJ/a	**3.1**	**2.6**	**23.2**	**8.3**	**2.0**	**0.0**	**0.5**	**39.7**
Use/Potential, %	16	12	108	39	22	7	5	38

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Biomass resources and potentials are therefore large. However, future bioenergy potentials will be affected by many factors including future demand for food, competing land use types, environmental requirements, markets and incentives, continuous R&D progress, etc. The need for a common bioenergy market in the EU is also highlighted because the conversion technologies for bioenergy are often established in western countries of the EU and the biomass resources are in Eastern Europe (Fagernäs *et al*, 2006). Finally, if more stringent goods are set for bioenergy in the future, importing biomass from outside the EU could help boost insufficient European biomass resources.

Biomass trade

In order to secure long term and sustainable supply and demand of bioenergy, a well functioning market for biomass should be established. Without the development of an international biomass trade, the often ambitious targets for bioenergy may not be met. A global market may also become a driver for development of the under-utilised biomass potentials that exist in many (developing) countries.

Already bioenergy trade flows take place over long distances. Examples are export of ethanol from Brazil (the world's largest exporter of ethanol) to Japan, the EU, and the USA; palm kelner shells from Malaysia to the Netherlands and the UK; and wood pellets from Canada, Eastern Europe and Brazil to Sweden, Belgium, the Netherlands, and the UK.

Ethanol, vegetable oils, fuel wood, charcoal and wood pellets are currently the most important biomass products for bioenergy that are traded internationally. Table 3 summarises the volumes of world production and international trade of various biomass products. Local use of biomass is observed for most of the products, though remarkable shares of total production are exported in the case of sawn timber, paper and paperboard, palm oil and wood pellets.

Table 3: An overview of world biomass production and international trade in 2004

Product	World Production	Volume of International Trade
Industrial wood and forest products		
Industrial round wood	1 646 Mm^3	121 Mm^3
Wood chips and particles	197 Mm^3	37 Mm^3
Sawn timber	416 Mm^3	130 Mm^3
Pulp for paper production	189 Mt	42 Mt
Paper and paperboard	354 Mt	111 Mt
Agricultural products		
Maize	725 Mt	83 Mt
Wheat	630 Mt	118 Mt
Barley	154 Mt	22 Mt

Oats	26 Mt	2.5 Mt
Rye	18 Mt	2 Mt
Rice	608 Mt	28 Mt
Palm oil	37 Mt	23 Mt
Rapeseed	46 Mt	8.5 Mt
Rapeseed oil	16 Mt	2.5 Mt
Solid and liquid biofuels		
Ethanol	41 Mm^3	3.5 Mm^3
Biodiesel	3.5 Mt	<0.5 Mt
Fuel wood	1 772 Mm^3	3.5 Mm^3
Charcoal	44 Mt	1 Mt
Wood pellets	4 Mt	1 Mt

Source: EUBIONET II, 2007

In the EU, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden contribute the major of bioenergy production and use. These countries around the Baltic Sea as well as the Netherlands are also important international traders of biomass. The main flows are from the New Member States (i.e. Estonia, Latvia, Lithuania, and Poland) to the old Member States; and especially to Sweden, Denmark, Germany and the Netherlands. In Central Europe, the greatest volumes are traded to and from Austria. Some European countries also import biomass from overseas, mainly from Canada. The most important origins of the import are therefore the Baltic States, Belarus, North America, and Mainland Europe. Overall, almost all EU Member States are either exporting or importing biomass products, or both.

International trade in bioenergy is currently low, but is expected to considerably rise with increasing mandates for bioenergy use in regions with limited production potentials. Biomass productivity in tropical and sub-tropical climates is in fact higher than in temperate regions (like the EU) where demand for biomass is growing most. Sub-Saharan Africa, the Caribbean and Latin America, Eastern Europe, as well as Oceania and East and North-East Asia have the highest potentials for bioenergy production in the long-run (Faaij *et al*, 2006). In these regions, there are large areas of suitable cropland and pasture land, and low productive and inefficient production systems. Regions in South Asia and the Near East and North Africa, although land stressed, if they are suitable for food production, are also suitable for bioenergy crops (OECD, 2005).

Developing countries can therefore benefit from the dynamism of the sector, having also an advantage of existing preferential trade agreements. In this framework, the EU development policy aims to help suitable developing countries capture the benefits offered by biomass, while addressing the concerns in an appropriate way (EC, 2006). As trade negotiations also continue, WTO rules should seek to further facilitate the development of the bioenergy sector and sustainable bioenergy trade. Reducing and eliminating trade barriers and phasing out trade distorting subsidies would contribute to developing a global sustainable biomass market.

International standards & certification systems

It has already been argued that bioenergy is an already widely available source and, if used efficiently, it has the potential to create employment and economic growth, reduce demand for petroleum and address a whole range of environmental problems. However, concerns about the potential negative effects of large scale biomass production and trade, like deforestation or the competition between food and biomass production, have led to the demand for sustainability criteria and certification systems that can regulate the production and trade of biomass.

In particular, some main issues for which criteria should be developed for biomass production and trade include:

- Preservation and development of jobs in rural areas;
- Mitigation of poverty in rural areas;
- Prioritisation of food supply;
- Preservation of genetic diversity;
- Prevention of negative impacts of fertiliser and pesticide use; and
- Sustainable water use.

In this framework, the following indicators could be used for the development of sustainability criteria:

- GHG, energy balance;
- Competition with food, local energy supply, medicines and building materials;
- Biodiversity;
- Economic prosperity;
- Well-being: (i) working conditions of workers; (ii) human rights; (iii) property rights and rights of use; (iv) insight in social conditions of local population; and (v) integrity;
- Environment: (i) waste management; (ii) use of agro-chemicals; (iii) insight into the prevention of erosion and soil exhaustion, and conservation of fertility level (farming practices); (iv) insight into conservation of quality and quantity of surface and groundwater; (v) emissions to air; and (vi) origin of biomass; and
- Institutional governance.

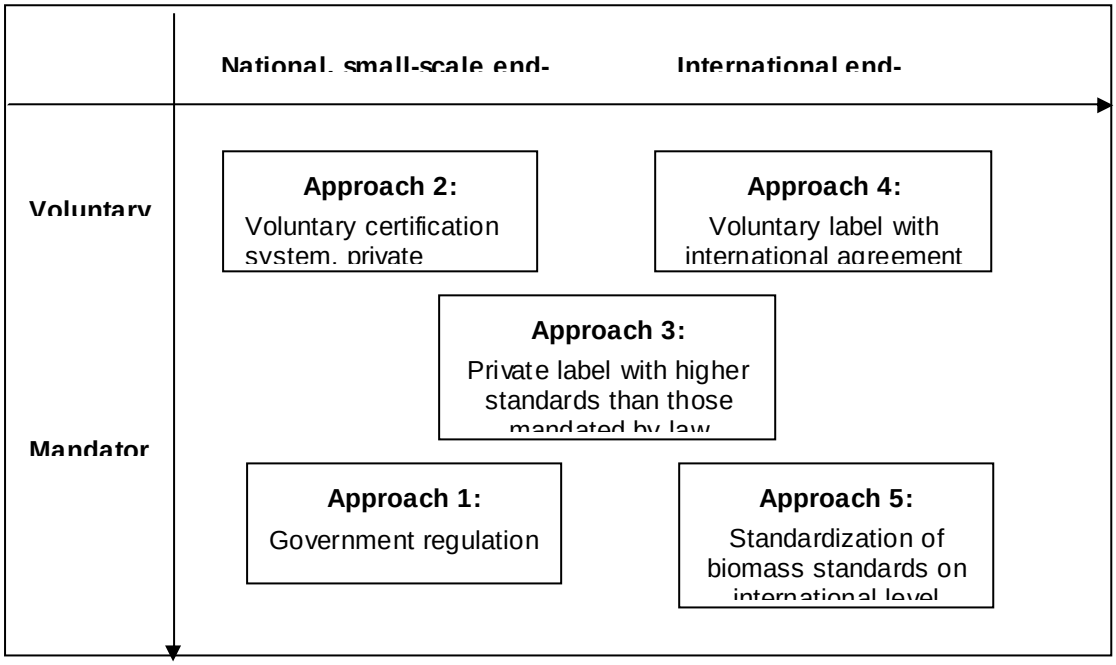
Similar standards already exist for agricultural products (e.g. EUREPGAP, Sustainable Agriculture Network) and for the sustainable production of forest products (e.g. Forest Stewardship Council). Large certification systems for forestry and agricultural products are also the Pan-European Forestry Certificate (PEFC) and the FAIRTRADE respectively. These could be a good starting point and reference framework.

Important efforts are in fact under way by national governments developing a policy framework to guarantee sustainable biomass. These are the governments of

Belgium, the Netherlands, the UK, Brazil, Germany, Canada, and the USA. On supranational level, the European Commission is also prominently active in the development of a biomass certification system. National initiatives and legislation have also triggered initiatives on biomass certification at companies active in the biomass supply chain (e.g. Cargill, Unilever, Shell, Volkswagen, DaimlerChrysler, Electrabel, etc.). Finally, various NGOs such as WWF, BirdLife International and Greenpeace; as well as international bodies and organizations (e.g. UN-Energy, UN Biofuels Initiative, FAO Forestry Department, UNEP, IEA Bioenergy Task 40, etc.) have raised concerns for sustainable biomass (van Dam, et al., 2007).

Nevertheless, to avoid great diversity of competing systems, it is argued that an international biomass certification system could be created starting at regional level and including gradually a wide range of parties to ensure credibility. Possible approaches for the implementation of biomass certification appear in the following figure.

Figure 1: Approaches for the implementation of biomass certification



Source: van Dam, et al., 2007

Starting with approach 2, it includes the interest and involvement of all relevant players, though a strong commitment is required (or some governmental intervention), as it lacks an obligation for the market to fulfil the sustainability criteria. Approaches 1 and 5, on the contrary, involve the risk to exclude smaller householders in the consultation process. Approaches 2, 3 and 4 ensure a gradual development of a certification system with gradual learning, so as to guarantee some level of sustainability for biomass production and trade. That is, approaches 1, 3 and

5 might lead to a tendency of simplification due to lack of consensus and limited experience. However, sustainability concerns are more secured then as standards are (partly) translated into policy instruments. Moreover, approaches 1, 2 and 3 may turn out to be inflexible, whereas a framework with minimum standards may enhance the flexibility of a system (approach 5). Finally, a biomass certification system has to comply with international trade regulations; therefore, approaches 4 and 5 might be more efficient (though an international agreement will have to be pursued over a longer period). On the other hand, a voluntary certification system (approaches 2, 3) diminishes the risk for possible additional barriers as standards have fewer implications for trade compared to regulations.

Overall, the effectiveness of certification schemes at reducing socioeconomic and environmental costs from bioenergy production and trade will require full participation from all actors involved as well as strong monitoring and controlling systems. The EU Commission's proposal for sustainability criteria for biofuels outlined the possible design and implementation of the scheme. It foresees that Member States would be responsible for ensuring that the identified sustainability criteria are respected. A main instrument to enforce the scheme will be that biofuels that fail to meet the sustainability criteria would not count towards national biofuel targets and would not be eligible for tax reductions and similar types of financial support.

According to van Dam *et al* (2006), though, not everyone sees a certification system as a means to guarantee sustainable biomass production, due to the following limitations: (i) lack of adequate criteria and indicators; (ii) requirement of effective control and monitoring system; (iii) open market limits the effectiveness of a certification system; (iv) small stakeholders' limitations to implement requirements; (v) stakeholder involvement required for a legitimate and reliable system; (vi) limitations related to (inter-)national legislation and international trade; (vii) cost levels of biomass certification; and (viii) issues related to inequalities in development and trade.

It should also be noted that at an international level and within the emerging biomass trade context, three key areas under the WTO rules are also relevant to promote sustainable production and trade of biomass. These are: (i) classification (tariff barriers), (ii) subsidies and (tax) incentives, and (iii) domestic regulations and standards including environmental and social sustainability criteria. In particular, the problem of inconsistency in HS Classification should be addressed and government support measures should incur the least distortion of market signals and choices and thus allow the most cost efficient and environmentally sound biomass products to thrive in the market place. On labelling and certification of biomass products, finally, certification criteria should not translate into trade barriers. Certification should be simple, fair and cost effective; the WTO TBT Agreement should work for bioenergy and the multiplicity and complexity of private standards should be managed as there is growing concern about the impact of the proliferation of private environmental and social standards on market access for developing countries.

Conclusion

To conclude, it is expected that international biomass production and trade will increase significantly in the future due to the possibility of lower cost of imported biomass, better supply security through diversification of bioenergy sources, and support by energy and climate policies. At present though, the development of international biomass trade is still in its initial stages. Sustainability criteria and certification systems may be instrumental to ensure environmentally friendly biomass production, though attention should be given to possible derived barriers to international trade, especially for exports from developing countries.

As this topic is very complex and opinions are very diverse, the key objective of this conference is to explore current knowledge on this area and provide for a platform for interesting parties to exchange ideas, opinions and contextual information. Furthermore, we aim to explore the need and interest for future actions, providing strategic policy recommendations on how to proceed with the concept of international trade in biomass.

This array of questions will be the starting point for the discussion process:

- How much biomass can be imported that meets EU sustainability criteria for production? Which countries/regions are most promising as potential importers of those biomass resources?
- Do EU sustainability criteria ensure an environmentally friendly and socially acceptable production of biomass in exporting countries?
- What are the constraints of guaranteeing imports of sustainably produced biomass in terms of international trade requirements?
- What do scenarios imply for the quantity of production that is possible to produce within Europe and biomass that needs to imported?