

Biofuels, trade and sustainability: a review of perspectives for developing countries

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Abstract: Recent growth in demand for biofuels is resulting in rapid increases in their production and trade. Although this may offer interesting export opportunities for tropical countries who can produce biomass more efficiently, whether this effectively leads to growing exports depends to a large extent on the conditionalities that prevail on the major biofuel markets. Market protection by developed countries, concerns about the environmental impact of producing biofuels, and demands for securing food production are all conditions preventing the world biofuels market from being a level playing field. These conditions for international trade are not yet fixed, however, and various stakeholders struggle with the desired arrangement. This review provides an overview of the state-of-the-art biofuels trade, with special emphasis on issues of access, trade barriers and sustainability relevant for developing countries. © 2009 Society of Chemical Industry and John Wiley & Sons, Ltd

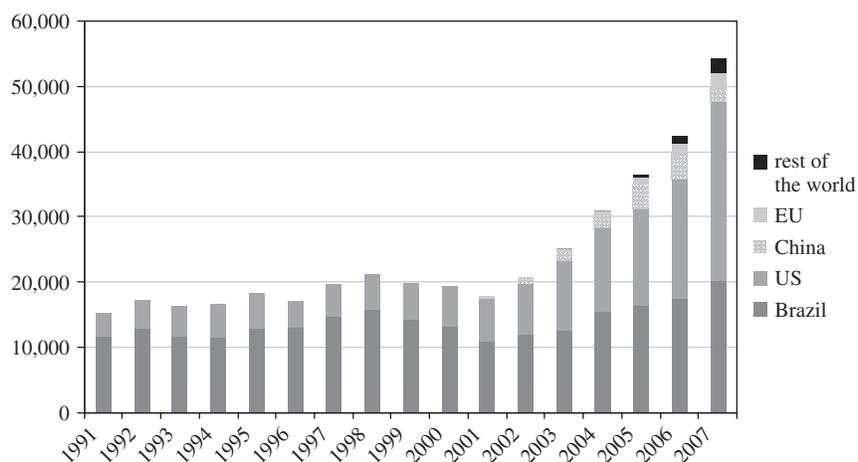
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Introduction

Biofuels production has been growing rapidly in recent years (Figs 1 and 2). Although globally still less than 2% of all transport fuels is of vegetable origin, this percentage is expected to grow substantially in the coming years. Currently production is taking place in only a few countries, whereby the USA and Brazil are responsible for some 90% of the world's bio-ethanol and the EU (especially Germany, France, and Italy) for 60% of the world's biodiesel

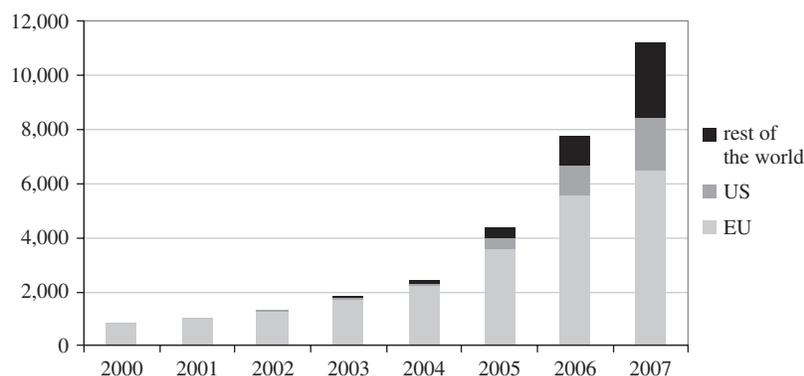
production (Table 1). However, several other countries are investing in biofuel production, to profit from opportunities to substitute fossil fuel imports and to export to the world market.

Biofuels-related trade has grown substantially in recent years as international demand for the end product (fuels) and its material base (biomass) rose. International ethanol trade has grown rapidly in particular, but less so in pure biodiesel. On the other hand, trade in the inputs to ethanol is limited, but substantial in biodiesel feedstock (palm



(Source: Renewable Fuels Association data (www.ethanolrfa.org/); China Statistical Yearbook; European Bioethanol Fuel Association data (www.ebio.org/home.php))

Figure 1. World bioethanol production, 1991–2007 (million liters).



(Source: National Biodiesel Board (www.biodiesel.org/), European Biodiesel Board (www.ebb-eu.org/))

Figure 2. World biodiesel production, 2000–2007 (million liters).

oil and soybeans).^{2,3} In 2007, more than 7 billion liters of bioethanol were internationally traded, up from 1 billion liters in 2000.⁴ Brazil remains the global leader in ethanol exports, providing over 3.5 billion liters or 50% of the global world exports in 2007, whereas the USA, the EU and Canada are the main importers.¹

The growing demand for biofuels, particularly in European countries, may offer interesting export opportunities for developing countries as producing biomass is more (cost-) efficient under tropical circumstances. Whether

these countries can profit from this comparative advantage depends on a number of domestic factors, but also on external conditions. This review focuses on the access of developing countries to the major biofuel markets, and the conditionalities prevailing on these markets. A level playing field is essential for tropical developing countries to gain access.³ But currently the biofuel world is far from level, as most countries have installed protective policies with respect to their own biofuel industry. Moreover, biofuels are increasingly criticized as potentially endangering the environment

Table 1. Biofuels production by country, 2007 (million liters).¹

	Ethanol	Biodiesel	Total
United States	26,500	1,688	28,188
Brazil	19,000	227	19,227
European Union	1,253	6,109	8,361
China	1,840	114	1,954
Canada	1,000	97	1,097
India	400	45	445
Indonesia	0	409	409
Malaysia	0	330	330
Other countries	1,017	1,186	2,203
World	52,009	10,204	62,213

and food availability. This has resulted in calls and proposals for conditionalities to biofuel trade, but these issues are far from static, rather, they are still under construction, where various stakeholders debate and struggle with the desired outcomes.

This review aims to provide an overview of state-of-the-art biofuels trade from developing countries, with special emphasis on issues of access and sustainability. First, the most relevant domestic and international trade regulations are reviewed for the main biofuel producers and users: the USA, Brazil and the EU. Second, an analysis is made of the key World Trade Organization (WTO) and other multi- and bilateral trade agreements with respect to biofuels. Finally, some of the international initiatives for sustainability certification and labeling of biofuels are reviewed. The review concludes with an outlook for developing countries' perspectives in the globalizing world of biofuels production and trade.

Biofuels trade and the EU

In 2003, the EU decided to target a 5.75% (energy content) share of biofuels in transport fuel by 2010 and 10% by 2020 (Directive 2003/30/EC). In effect, the EU found achieving its 2010 target impossible as by 2008 only 4.2% was considered realistic. Therefore the Commission revised its policy in a proposal for a new Renewable Energy Directive, which targets an overall 10% share for renewable energy in the transport sector by 2020.⁵ Although this target could technically be met solely from domestic production, the

Commission considered it both likely and desirable that it should be met through a combination of domestic production and biofuels' imports.

The EU is promoting domestic ethanol production through tax reductions of as much as € 0.65 l⁻¹ in Germany and € 0.525 l⁻¹ in Sweden. The EU introduced a biodiesel standard (DIN EN14214) which fixes, among others, the iodine level required for vegetable oil used for the production of biodiesel, which in turn determines the type of feedstock that can possibly be used. Only rapeseed oil complies easily with this standard, limiting the use of soy oil and (to a lesser extent) palm oil.

Biofuel trade policy

With respect to imports, the Commission states that 'third countries should be able to benefit from the promotion of renewables in the EU through the supply of biofuels and other bioliquids which meet sustainability requirements.'⁵ In 2004, the EU imported over 3 million liters of ethanol and in 2005, 2 million liters.⁴ The United States Department of Agriculture (USDA), however, gives much lower figures for 2006 (0.32 million liters) and 2007 (1 million liters), but these are inconsistent with its own data for Brazilian exports of ethanol to the EU over 2006 and 2007, as well as with monetary import data.⁶ About 36% of this volume was imported as normal trade, whereby EU tariffs range from 22.9% to 43% according to different ethanol tariff lines. Some 64% of EU ethanol imports entered under preferential trade arrangements. However, larger developing countries that have bilateral trade agreements with the EU, such as Mexico and South Africa, have not been granted duty-free access for ethanol while negotiations with Brazil, responsible for 25% of the EU's imports, taking place within the MERCOSUR-EU agreement are still ongoing.

Biodiesel imports to the EU have been insignificant, until the recent increase in imports from the USA, rising from 8 million liters in 2005, via 1.1 billion (2007) to 1.9 billion liters over the first eight months of 2008.⁸ The European biodiesel market is protected by a relatively low *ad valorem* import tariff of 6.5%. For vegetable oils destined for technical or industrial uses the rate is even lower (3.2 to 5.1%). To relax pressure on rapeseed oil production, biodiesel producers have begun sourcing feedstock from foreign sources. So, oilseeds such as soybeans enter duty free and

duties on palm oil from the main exporters (Indonesia and Malaysia) range from 0 to 3.1%. Imports of vegetable oils grew more than 50% between 2003 and 2006, and palm oil from Indonesia and Malaysia accounted for 50% of these imports.² However, to what extent these imports are used for the production of biofuels, or for other purposes, is not clear. The classification of feedstock for biofuels in international trade is complicated, because it consists of many different agricultural products (or raw biomass) which can also be applied for the production of food, feed or other forms of energy.⁹

Conditionalities on biofuels

Immediately after the presentation of the draft Renewable Energy Directive in January 2008, the potential social and environmental impacts were publically debated. The sustainability impact of using biofuels was particularly contested, triggered by two publications in *Science* and the EU could not ignore the public call for strict criteria (EC DG TREN official, 2009, pers. comm.).^{10,11}

The European Commission's initial focus was on greenhouse gas (GHG) reductions and biodiversity impacts, but the European Parliament and various member states proposed additional environmental conditionalities.¹² Partly in response to these comments, the requirements for the sustainability of (both domestically produced and imported) biofuels were further elaborated in a revised note in March 2008.¹³ The main conditions for biofuels to be included in the official target of (10% in 2020) were:

- GHG emission savings shall be at least 35%, including the full carbon effects of land conversion of growing biomass;
- biofuels shall not be made from land with recognized high-biodiversity value;
- biofuels shall not be made from raw material obtained from land with high carbon stock;
- biofuels produced from raw materials cultivated outside the territory of the Community are acceptable only if the exporting country has ratified and effectively implemented at least 10 of a list of international labor and environmental treaties;
- imported raw materials cultivated outside the territory of the Community have to provide information about

sustainable water and soil management plans and the use of dangerous agrochemicals; and

- information should be offered on the producer's right to use the land and on procedures to consult local populations and interest groups on plans and activities that may affect their rights, property, resources, or livelihoods.

The biofuels producers and importers are responsible for showing that these environmental and social criteria have been fulfilled and their verification is left to the member states. Nevertheless, the Commission may decide that bilateral and multilateral agreements between the EU and third countries provide sufficient guarantees or that voluntary labeling and certification schemes adequately demonstrate that consignments of biofuels comply with the criteria of the proposed Directive.

The debate on these conditionalities is still ongoing and may result in higher standards for GHG reduction and in more attention for the social consequences of massive crop-based biofuel production, such as labor conditions and the consequences on food availability, especially for the poor.

Biofuels trade and the USA

The USA has promoted domestic production of bioethanol from maize turning the country into the world's largest bioethanol producer with 26.5 billion liters by 2007. The predictions are that in the coming years more than 30% of the corn harvested annually will be used for ethanol.¹⁴ Biodiesel production also increased quickly, albeit at a lower level; after tripling between 2005 and 2006, it almost doubled from 0.95 billion liters in 2006 to 1.68 billion liters in 2007.

The US Government required the use of gasoline oxygenate, including from ethanol as early as 1990 in areas with poor air quality. However, it was not until the Energy Policy Act of 2005 that the US Congress instituted a federal mandate for biofuel use in the transportation sector. The Renewable Fuels Standard (RFS) called for an escalation in the amount of renewable fuel sold in the USA from 2006 through to 2012. High oil prices and a demand shock caused by the phase-out of methyl-tert-butylether (MTBE), along with other incentive policies, created a favorable environment for biofuels.² By 2008, the USA had already exceeded its RFS mandate.

The 2002 Farm Bill contains measures to support bioenergy via loans, grants and guarantees for the construction of biofuel plants. Corn production is heavily subsidized, while various states have different tax exemptions and nationally, small producers receive a tax credit of 2.6 cents/liter on the first 56.8 million liters. Steenblik compared the various subsidies on bioethanol and biodiesel production of different OECD countries (Table 2).¹⁵⁻¹⁷

By December 2008, the 174 active ethanol distilleries in the country had a joint capacity of 40.9 billion liters of ethanol, with some 24 still under construction (capacity: 6.7 billion liters).¹⁸ US imports of bioethanol (mainly from Brazil via the Caribbean) have been rather low (below 0.6 billion liters annually), although they increased to 2.5 billion liters in 2006 (but 1.6 billion liters in 2007).^{*} Within the USA, fuel use of ethanol receives partial tax exemption based on the exemption of \$0.052 l⁻¹ for E10G blends (gasoline with 10% ethanol) if locally produced biofuel is used. To secure the domestic impact, the USA taxes ethanol imports at a rate of \$ 0.14 l⁻¹ and 2.5% *ad valorem* for undenatured ethanol and 1.9% for denatured ethanol. Some import duties for ethanol are scheduled to expire in 2009, although proposals have been made to Congress to renew them.

Trade barriers for biodiesel do not exist, but interest groups such as the American Soybean Association are

pressing Congress to enact a tariff. Every gallon of biodiesel blended with mineral diesel is eligible for a \$1 subsidy, and producers also benefit from a federal excise tax credit, as well as an income tax credit next to numerous state-level subsidies.^{3,20} By September 2008, 176 biodiesel plants existed in the USA, with a production capacity of 9.5 billion liters, while another 39 plants were under construction (production capacity: 3.2 billion liters). Imports of biodiesel increased from 0.18 billion liters in 2006, via 0.57 billion liters in 2007 to 0.76 billion liters over the first eight months of 2008 (mainly soy-based biodiesel from Brazil and palm-oil-based biodiesel from Southeast Asia). Biodiesel exports toward the EU increased sharply, paralleled by a continued increase in domestic production, but a sharp decrease in domestic biodiesel consumption.²¹ This development was especially propelled by the biodiesel subsidy in the EU, which proved also valid for biodiesel blended with a small portion of US-produced diesel ('splash and dash' practice).

The USA has not formulated sustainability conditions for domestically produced or imported (feedstock for) biofuels. Only technical product standards for bioethanol and biodiesel exist, with no reported barriers to trade.

Biofuels trade and Brazil

Brazil's interest in biofuels dates from the 1970s when, during the first oil crisis, the Government encouraged ethanol production through a combination of subsidies, tax incentives and regulatory measures (the ProAlcool-program).

^{*}Note that Yacobucci¹⁹ and Jank *et al.*² have slightly higher import figures for 2005 and 2006.

Table 2. Provisional Total Support Estimates (TSE) for ethanol and biodiesel in selected OECD countries in 2006.¹⁵

OECD economy	ethanol		Biodiesel		Total liquid biofuels	
	TSE (billions of US\$)	Variable share ¹ (%)	TSE (billions of US\$)	Variable share ¹ (percent)	TSE (billions of US\$)	Variable share ^a (percent)
United States ^b	5.4 – 6.6	60 – 65	0.5 – 0.6	~85	5.9 – 7.2	~65
EU ^c	1.6	98	3.1	90	4.2	93
Canada	0.15	70	0.013	55	0.11	65
Australia ^d	0.035	~70	0.021	~70	0.5	~70
Switzerland	>0.001	94	0.009	99	0.01	98
Total	7.2 – 8.4		3.6 – 3.7		10.8 – 12.1	

^aThis refers to the percentage of support that varies with increasing production or consumption, and includes market prices support, production payments or tax credits, and subsidies to variable inputs.

^bThe range reflects largely alternative treatment of the income fuel-tax credits (revenue loss basis vs outlay equivalent basis).

^cTotal for the 25 member states of the European Union in 2006.

^dCalendar year.

Production grew and despite a slump in the 1980s, ethanol production became a profitable activity, especially following the introduction of the flex-fuel vehicle in 2000. Brazil's interest in biofuels was driven by economic need to secure jobs, increase farmers' income and strengthen the development process. Ethanol is produced nowadays without much financial support from the Government. Foreign investments have increased rapidly and investors from the USA, the UK, Japan and India are purchasing or creating joint mergers with Brazilian counterparts.²² The country produced 20 billion liters of ethanol and exported 17% (3.4 billion liters) in 2007, not far from its 2006 figures.¹⁴ For marketing year 2008/2009 a production volume of 26.7 billion liters and an export of 4.8 billion liters (18%) is expected.²³ Brazil is currently the largest ethanol exporter to the EU and the USA, where direct exports are made as Most Favorable Nation, but bioethanol enters the USA duty free via the Caribbean Basin Initiative (CBI). Brazil applies an official import tariff of 20% on both undenatured and denatured ethanol, mainly to reflect its general interest in opening international biofuels trade because imports are minor and even this tariff has been (temporarily) waived since 2006.

The situation with respect to biodiesel is notably different. In 2004, Brazil launched its National Biodiesel Production Program (Federal Law #11.097), similar to its ProAlcool program for ethanol. Biodiesel production capacity in 2008 was 4.3 billion liters, and actual production estimated at 1.1 billion liters (mostly from soy), more than twice the 2007 volume.²³ As a starter on the biodiesel market, Brazil applies an import tariff of 14%, much higher than the USA and the EU (6.5%). Brazil also introduced a Social Fuel Seal to take into account regional social inequalities and the agro ecological potential for biodiesel feedstock production. Certification enables biodiesel producers to benefit from reduced taxation rates on biodiesel, eligible for 80% of the biodiesel volume auctioned. The rate of tax exemption is 100% for biodiesel certified with the Social Fuel Seal produced from castor oil or palm oil in the north and north-east regions, versus 67% for biodiesel produced from any other source in other regions. The limited verification and certification capacity of the responsible parastatal organization, however, complicates implementation and enforcement of the seal.

Brazil does not apply other sustainability conditions targeting its domestically produced biodiesel and bioethanol, although internationally concerns exist on the conditions for workers and on the environmental impacts of land-use change.²²

Biofuels trade for developing countries

Biofuel production costs are relatively low in developing countries where tropical conditions prevail, although this is conditioned by the presence of adequate (material, institutional and knowledge) infrastructures and a supportive policy environment. Up till now, however, their contribution to global biofuels trade has remained fairly small. This is partly due to the technological and institutional challenges in producing these goods, but import requirements in OECD countries also limit access of developing countries.^{15,17,24}

While international trade between most countries is regulated via the multilateral agreements of the WTO, countries may also have bilateral and multilateral agreements to facilitate trade. The USA, for example, exempts ethanol imported under the Caribbean Basin Economic Recovery Act (CBERA). Reprocessed Brazilian bioethanol can (and does) enter the USA duty free via this route; above a 7% US market share, however, 50% local (Caribbean) feedstock should be used for duty-free access.² In the USA-Central America Free Trade Agreement (CAFTA) provisions for duty-free entry of a fixed volume of ethanol have been made for Costa Rica and El Salvador, while Mexico and Colombia also have preferential duty-free entry of ethanol to the USA.

Ethanol imports to the EU fall under the general Most Favored Nation (MFN) regime with a tariff of €0.195 l⁻¹ for undenatured and €0.104 l⁻¹ for denatured ethanol. The standard import tariff for MFN is equivalent to a 63% *ad valorem* tariff, but several developing countries have preferential access. The EU has a General System of Preferences (GSP) for developing countries, comprising three different preference levels:

1. The standard GSP, which applies to most developing countries and all ACP countries (Africa, Caribbean and Pacific countries).

2. The EBA (Everything But Arms) initiative, which applies to the less developed countries.
3. The GSP+ regime, which applies to a range of countries that have ratified and implemented a list of international conventions on labor and human rights.

In 2004, the EU imported just over 3 million liters of bioethanol. About 36% of this volume was imported under normal (MFN) conditions and about 64% under preferential trade arrangements. Motaal mentions even 70% of bioethanol imports entering the EU under preferential trade agreements, of which 61% duty free and 9% at a reduced tariff, but he provides neither year nor source for these percentages.³ Pakistan, responsible for 20% of EU ethanol imports and the largest ethanol exporter under these preferential trade arrangements (which it gained in 2002), lost its privileged status in 2005 and seems no longer competitive. Subsequently, several of its distilleries were closed and exports to the EU disappeared.²⁵ Other ethanol-exporting countries that benefited from EU trade preferences include Guatemala, Peru, Bolivia, Ecuador, Nicaragua, and Panama (special drug diversion programs); Ukraine and South Africa (GSP); the Democratic Republic of Congo (EBA); Swaziland and Zimbabwe (ACP); and Egypt (Euro-Mediterranean Agreement).⁸ Larger developing countries that have bilateral free trade agreements with the EU, such as Mexico and South Africa, have not been granted duty-free access for ethanol,²⁴ and neither do Thailand nor Brazil (two main sugar producers) receive any tariff preferences. Still, in 2007, Brazil was the main exporter of bioethanol to the EU with almost 1 billion liters. Since biodiesel production outside of the EU is still limited, external trade in biodiesel is much smaller than in bioethanol, although recently US exports to the EU have increased significantly.

With these preferential trade arrangements, for most developing countries access to the EU market for ethanol and biodiesel is not the main issue, except for countries such as Brazil, Thailand, South Africa, and Argentina, which have arguably the biggest potential for biofuel export expansion.² Contrary, technical standards and the implementation of currently debated sustainability criteria may constitute non-tariff barriers for import into the EU for all developing countries.

Biofuels trade negotiations within the WTO

Biofuels have already caused a number of trade disputes. Biofuels are heavily subsidized by most OECD countries (Table 2), giving exporters reason to complain.^{15,17} Other issues concern non-tariff barriers, for instance between Europe and the USA on the export of American B99 blended biodiesel and on the EU's biodiesel fuel specification. Following discussions over the EU's draft Renewable Energy Directive – and especially its social and environmental criteria – Brazil, along with seven other biofuel-producing states, warned in November 2008 that it would file a complaint with the WTO if the EU were to push ahead.

These and other disputes would make further regulation of biofuels trade under the WTO a logical step. However, until today, the WTO has not developed specific disciplines on trade in energy goods and therefore only the general WTO rules are applicable.²⁷ A specific problem for determining the trade regime for biofuels concerns their classification. Bioethanol – which is considered an agricultural good – falls under the Agreement on Agriculture (AoA), while biodiesel is classified as an industrial good and falls subsequently under GATT. Brazil proposed (in 2005 and again in 2007), supported by Chile, New Zealand, Colombia and Singapore, and NGOs such as Oxfam (interview Oxfam Netherlands, December 2008) without success, to classify renewable energy, including bioethanol and biodiesel, under environmental goods, which would allow for larger tariff reductions than average.³

Agreement on Agriculture

Subsidies and tariffs for agricultural production and trade are covered by the AoA where WTO members agreed to harmonize their domestic subsidies to farmers. Essentially most subsidies should be stopped or phased out, but for particular goals targeted subsidies were allowed; these are the so-called 'green box' subsidies. Direct support to bioethanol production would not qualify for this status, but might be included in the broader 'amber box'. The sum of all amber box subsidies is capped at a pre-agreed level for each country and allows governments to make room for biofuel within this box.

Technical Barriers to Trade

Certification of products falls under the Technical Barriers to Trade (TBT) Agreement. The WTO prohibits discrimination between foreign and domestic products when they are 'like' products; and TBT demands regulations not to create unnecessary trade obstacles and be transparent. Determination of 'like' products is done on a case-by-case basis, applying four criteria:³

1. Properties, nature and quality of the product
2. Tariff classification
3. Consumers' tastes and habits
4. Product end-use

GATT states a few exceptions, which may justify product specifications and environment-related measures on products and the use of instruments to assure these standards are met. With respect to the environment, these measures are justified when necessary to protect human, animal or plant life or health (Article XX(b)) or related to conservation of exhaustible natural resources (Article XX(g)). To justify such trade measures, they must be taken in tandem with comparable measures on domestic production or consumption (even-handedness). As air is considered an exhaustible resource, the argument of adequate supply of (sustainable) biofuels within this context has some plausibility.

In order not to violate the TBT obligations, trade regulation must be product-based and not based on the production process. Furthermore, a measure should not be applied to create arbitrary or unjustified discrimination. However, measures to minimize overall impacts on global carbon emissions throughout a fuel's life cycle (such as the EU's 35% GHG criterion) do not seem to interfere with these conditions as they relate to a global environmental problem. It may be expected that most biofuel products from developing countries will meet this requirement, provided they do not come from converted virgin peat or forest land.

The use of standards and certification schemes can help ensure that biofuels are produced in a sustainable manner. The Code of Good Practice (annex 3 of TBT) provides a discipline to these practices: members should use international standards where appropriate, but otherwise there should be (1) an open market for all certification schemes; (2) no political action to diminish the trade of uncertified

products; and (3) no inclusion of the origin of the product on the label to avoid discriminatory action against specific regions. Some of the mandatory biofuels certification and labeling schemes that are under construction do not fulfill these WTO criteria.

Sustainable biofuels and certification and labeling schemes

Voluntary labeling schemes meet criticism but are not considered inconsistent with WTO requirements. Many national governments, international organizations, private companies and research institutes are involved in developing criteria, standards and ideas on labeling and certification schemes. These initiatives can be summarized into four categories: (1) government-initiated; (2) NGO-initiated; (3) private-company-initiated; and (4) hybrid combinations of these three.

At the moment there is not yet a widely accepted definition of 'sustainable biofuels', or a scheme for certification and labeling.²⁷ Nevertheless some agreement can be observed on four ecological issues that should be included in sustainability schemes:

1. GHG emissions
2. Energy balance
3. Biodiversity loss;
4. Specific environmental effects (i.e., soil condition and water use)

The problem, though, is that each feedstock is different and many crops produce their best yields in specific regions of the world or require certain soil or water conditions. These local differences demand specific attention and are not easily generalized. Furthermore, there is wide disagreement on the implementation of international conventions, while inclusion of social criteria is even more difficult. Agreement is lacking on the issues to be included (e.g., labor conditions, food availability), let alone on how to measure them.^{27, 28}

At an early stage of global biofuels development, the Dutch Government requested a committee to develop criteria for sustainable biomass, which became known as the 'Cramer criteria'.²⁹⁻³¹ Based on extensive consultation with stakeholders, the committee drew a list of nine principles for both domestically produced and imported biofuels and added a

translation into indicators and reporting obligations. As one of the first governmental initiatives, this Dutch approach has influenced the EU negotiations leading to the draft Renewable Energy Directive, and the conditionalities included (interview, EC DG Trade official, December 2008). The UK Government's Renewable Transport Fuel Obligation (RTFO) was developed nearly simultaneously and is essentially a reporting requirement for biofuels suppliers to show the presence of positive direct impacts of biofuels production on GHG savings, and on sustainability in general.³² Reporting on the potential indirect impacts of biofuel production remains the responsibility of the Renewable Fuels Agency. Whereas the Dutch initiative has been stalled to wait for the European directive, the UK system has been implemented. Its criteria will be more strictly applied over the years and be in full force by April 2011. These Dutch and UK government initiatives are the most elaborated schemes in the EU, but other member states are taking comparable initiatives such as Germany³³ and Sweden, as does the European Commission.

Environment and development NGOs are actively participating in public debates on the sustainability of biofuel production and trade. As yet, they have not developed specific international certification and labeling schemes for biofuels. Many have participated in different initiatives such as the roundtables presented later,³⁴ others have formulated national schemes for assessing the sustainability of biofuels (such as the Dutch NGO Stichting Natuur en Milieu),³⁵ and yet others have provided critical comments to the different initiatives (e.g., Biofuelwatch). In addition, some of the already existing international NGO-based certification schemes are used as models on which future biofuel schemes may rely, such as the Forest Stewardship Council (FSC) label; the Sustainable Agriculture Network (SAN); the Utz Certified (Good Inside) label; and the ISEAL Alliance as a combination of different international NGOs.

Besides governments and NGOs, private companies also introduce schemes, generally limited to internal company practices. Van Dam *et al.*³¹ mention the examples of Essent, Electrabel, BioX, Daimler-Chrysler, Volkswagen and Shell. Their experiences and some of their general principles may be very useful for future application by a wider community of users, but currently their internal company approach

limits this. Other initiatives, intended for use by a broader group of companies, may be more promising at the moment. The GlobalGAP, for instance, as a generic standard for good agricultural practice introduced by a consortium of European retailers, initiated the International Sustainability & Carbon Certification (ISCC) as a 'reliable certification scheme allowing for the differentiation between sustainable and non-sustainable biofuels' to be implemented by 2010.

Finally, within several hybrid initiatives standards, guidelines and certification schemes are developed through multistakeholder approaches bringing together private companies, NGOs and sometimes governments. One such roundtable addresses all biofuels but others deal with one crop only. The Roundtable on Sustainable Biofuels (RSB) aims to achieve global, multistakeholder consensus around the principles and criteria for sustainable biofuels production, building on existing national and commodity-based initiatives. The Roundtable on Sustainable Palm Oil (RSPO) is crop-based, in existence since 2002, involving private companies, NGOs and other stakeholders related to producing, trading and processing palm oil. The RSPO has developed a set of 8 principles and 39 criteria for sustainable palm-oil production in 2005. After a two-year trial phase, the principles became operational in 2008, but the certification process remains under attack from NGOs such as Biofuelwatch.³⁶ Third-party verification arrangements are being put in place for evaluation of compliance with RSPO principles, criteria and traceability. The Roundtable on Responsible Soy (RTRS), founded in 2005, is similar to the RSPO but not as far developed. The Better Sugarcane Initiative (BSI) is a comparable multistakeholder forum destined to determine principles and define globally applicable performance-based standards for 'better sugarcane' with respect to its environmental and social impacts.

In conclusion, there is no shortage of labeling and certification initiatives intended to safeguard the sustainability of internationally traded biofuels. But there is also no outlook on any movement toward one dominant and harmonized form of biofuels certification. The WTO is largely absent from current biofuel labeling and certification developments and debates; instead, the EU and various non-governmental and hybrid initiatives take the lead. Without any active involvement it remains uncertain how the WTO would

interpret the EU criteria on environmental and social criteria in its Renewable Energy Directive (EC DG Trade official, December 2008, pers. comm.). Hence, developing countries aiming to produce for the world market have a hard time figuring out the conditionalities they need to fulfill, and for what markets these conditionalities will prove to be relevant.

Conclusions

In recent years, following the acceleration in their global trade, policy on biofuels trade has become very dynamic. Frequently, policies change for reasons of energy security, economic objectives, environmental concerns and unexpected (side-)effects of particular policy decisions. Although various authors plea for a level playing field with respect to biofuels trade, there seems to be little movement in that direction, and little interest among the major (governmental and non-governmental) biofuel players to quickly come to that. With the continuous stagnation of the current Doha round of trade negotiations in the WTO, other bilateral (e.g., between Brazil and the EU)[†] and multilateral agreements (e.g., between the EU and Mercosur; between the USA and the Caribbean area) on biofuels are being negotiated and concluded.³⁷ While global biofuels trade continues to be heavily influenced by protective measures, with global annual biofuels subsidies ranging between \$11 billion and \$13 billion¹⁶ and up to \$1 per liter,¹⁵ the breaking down of biofuel tariff barriers, especially for developing countries, is often included in these non-WTO agreements. Thus, access to the world market does not seem to be a key issue for most of the poorer tropical countries.

This seems less the case with respect to sustainability conditionalities. Public and private actors are seeking various ways to condition the environmental and social effects of biofuel production and trade. So far it seems that an agreement on the environmental conditions of biofuels (production) is more likely than on the social effects. Potential consequences for developing countries are large here, also because these countries often lack the infrastructures to fulfill elaborate criteria, procedures and conditions; while

uncertainty about which market will use which criteria only adds to these complications. Negotiations on sustainability criteria and measurements therefore need to actively include these countries to allow them to profit from these market opportunities in a more balanced manner

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