
Imports in the EU's renewable energy policy: environmental non-tariff barriers and developing country biodiesel

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Abstract: In response to the negative externalities associated with the intensification of biofuel production; the spike in food prices in 2008 and threats to biodiversity, the European Union revised its biofuels policy to reduce its negative impact on the environment and food security. It did not, however, revise its renewable fuels policy which mandates ambitious consumption targets. The framework used to mitigate the negative externalities of environmental degradation (GHG emissions) and food insecurity through the diversion of land used for food production into the production of biofuels crops is Directive 2009/28/EC. The revised policy applies to the production of biodiesel imports from developing countries. The restrictions on land use and the proof required will make it difficult for developing countries to produce biodiesel for the EU market. The paper outlines the EU requirements and the problems developing countries will face in supplying biodiesel to the EU.

Keywords: biodiesel; development; environment; energy; European Union; EU; non-tariff barriers; renewable; sustainable.

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1 Introduction

In recent years, the volatility in the price of oil and the environmental degradation associated with greenhouse gas (GHG) emissions have led to major policy initiatives to foster alternative sources of energy in a number of developed countries. One alternative energy source, biofuels, is expected to improve energy security, lessen environmental damage and boost economic development in rural communities. However, the risks of food insecurity, in the form of rising food prices and loss of natural capital (biodiversity), may also result from expansion of biofuel output. This is because land used to produce food faces competition for its use in the production of biofuels. Hence, policy makers sensitive to the hardship caused by rising food prices and the wider social impact on the environment have attempted to limit the negative externalities of biofuel production on the environment and food insecurity. One important policy initiative in this area is the sustainability criteria imposed by the European Union (EU) Parliament on suppliers of biofuel destined for the domestic market in the EU. For foreign suppliers, however, the sustainability criteria amount to environmental non-tariff barriers as they impose more onerous standards than those applying to domestic firms. In other words, the environmental regulations effectively prohibit renewable energy sources from entering the EU market unless the GHG emission savings and land use criteria are satisfied. Directive 2009/28/EC is an attempt at both environmental preservation and balancing the employment of agricultural resources between food and fuel uses. In essence, the production and consumption of biofuels should result in an overall net reduction of GHG emissions without compromising natural capital¹ and food security. Biofuels which fail to meet this standard are effectively barred from entering the EU.

Directive 2009/28/EC requires a 10% minimum share of renewable fuels, or 40.2 million tonnes of oil equivalent to be consumed in the EU (Zahniser, 2010). The Directive requires the European Commission to provide a report that analyses ways for a 'balanced approach' between domestic production and imports of renewable fuels to be achieved, as well as proposing corrective action, if appropriate (Article 23, para. 5).² Imports were largely expected to be sourced from developing countries given their competitive advantages in production.³ The literature concerning the sustainability criteria impact has, however, been limited to discussions on the effectiveness of the criteria (Ogg, 2011) and whether the current practices of foreign suppliers are compliant, in particular Brazil (Lendle and Schaus, 2010; Zahniser, 2010). Other studies by Kretschmer et al. (2009) provide estimates of the expected welfare effects arising from the 10% mandate. This paper widens the scope of examinations of the EU biofuel mandate by exploring the impact of environmental non-tariff barriers to trade, and the Directive by extension, on developing country exports of biodiesel.

2 EU biofuels policy

The EU has supported the biofuel industry through tax exemptions, investment subsidies and, most importantly, consumption mandates. In 2003, the target was established at a 5.75% share for biofuel in transportation by 2010. The transport sector accounted for 21% of the emissions of GHG in 2003, whereas biofuels accounted for approximately 0.6% of total transport fuel (Commission of the European Communities, 2006). Williams and Kerr (2011) argue that the 2003 Directive had considerable success in encouraging biodiesel production but had the unintended consequence of diverting considerable land that had been used to produce food into the production of biofuel crops. Further, the expansion of biofuel production may result in a net increase of GHG emissions⁴ instead of a decrease (lower than fossil fuels) arising from indirect land use changes⁵. The expansion in the production of biofuels has been shown to threaten natural capital (Williams et al., 2013). The authors discuss the case of an expansion in biofuel crop capacity infringing on land rights that threatens the Tana Delta in Kenya; home to 350 species of birds, rare sharks and reptiles including the Tana writhing skink.

Even though the 2010 target of 5.75% share in transportation fuel was not achieved by the EU⁶, increased consumption of renewable energy remains a major policy goal of the EU. Despite the shortfalls, the EU biofuels policy was revised both by increasing the target proportion of biofuels in consumption and attempting to cure the negative externalities of food insecurity and increased GHG emissions from biofuel production; particularly in developing countries. The revised policy was set out in Directive, 2009/28/EC.

2.1 Directive 2009/28/EC

Directive 2009/28/EC requires that 20% of overall EU energy consumption comes from renewable sources. For the transport sector, a mandatory minimum of 10% by 2020 is imposed. The EU defines the 10% target as that share of final energy consumed in transport which is to be achieved from renewable sources as a whole, and not solely from biofuels (2009/28/EC, paragraph 18). In addition, second generation biofuels, that is, biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material, contribution to the target is given a weight which is twice that of the contribution granted to other biofuels [Directive 2009/28/EC, Article 21(2)]. In October 2012, the European Commission proposed changes to the 2009 Directive through the specification of the types of biofuels that can contribute to the 10% consumption mandate including capping the contribution of crop-based biofuels at 5% and limiting the global land conversion for biofuel production (*Ethanol Producer Magazine*, 2012). In effect, the proposal's aim is to skew the production of biofuels towards second generation fuel sources such as cellulosic and other non-food-based technologies. On September 11, 2013, the EU Parliament voted to cap food-based biofuels' contribution to the mandate of transportation at 6%, to set a target for advanced biofuels of 2.5%, allow biofuels made from cooking oil to count double when included in the mandate and to impose a 7.5% limit (blend wall⁷) on ethanol in gasoline blends.

A similar policy was first implemented in the USA through the Energy Independence and Security Act of 2007. The US policy specifies three types of biofuel to meet the mandate; conventional (corn-based), advanced⁸ and cellulosic⁹ biofuels. Therefore, the revision of the EU biofuel policy towards specific biofuels and/or capping of specific

technologies (production methods) may be evidence of EU and US biofuel policy harmonisation. Furthermore, the revision implies that the premium offered for second generation biofuels in the 2009 directive was deemed insufficient to divert production away from first generation biofuels (food derived) to a sufficient degree four years after the Directive was issued. Thus, the premium offered to advance the commercialisation of second generation biofuels is complemented by a less flexible mandate. The ‘inflexibility’ in the mandate may make investment in biofuels in developing countries risky as they are likely to suffer the greatest negative impacts from the policy revisions¹⁰. In other words, the policy revisions may lend support to protectionists. One form of trade policy that may lend support to protectionists is environmental tariffs. Kerr (2010) argues that unless carefully structured, environmental tariff¹¹ mechanisms could easily be used by protectionists to capture economic rents. That is, environmental tariffs may be exploited to provide benefits for those seeking traditional economic protection. This paper extends Kerr’s (2010) analysis by arguing that environment non-tariff barriers set in place through to 2020 by the EU inadvertently advance the interests of protectionists to the detriment of economic development in developing countries.

3 Roadmap to 2020

Member states of the EU are allowed to meet the goals of the directive through statistical transfers and joint projects between member states and third countries respectively. Statistical transfers involve member state governments exchanging statistically¹² a given quantity of renewable energy produced but with the rider that the transfer should not adversely affect the ability of the member state making the transfer to achieve its own target (Article 6). Furthermore, a transfer is only considered effective when the transfer has been reported to the European Commission [Directive 2009/28/EC, Article 6(3)]. It is possible, however, that a transfer may be deemed null and void by the Commission. The other approach to meeting the targets is through a joint venture with other member states and/or third countries (Article 1).

For renewable fuels to be counted towards the blending target, the sustainability criteria for biofuels, as set out in Directive 2009/28/EC, Article 17¹³ should be met. However, biofuel produced from waste and residues, other than agriculture, fisheries and forestry residues, only need to satisfy criterion A (Directive 2009/28/EC, Article 17). The sustainability criteria that apply to EU produced renewable energy and imports are set out as follows:

- a The GHG emission saving¹⁴ is at least 35%, increasing to 50% effective January 1 2017 and further increasing to 60%¹⁵, effective January 1 2018 (paragraph 2). Biofuels produced by ‘installations’ that were in operation as of 23 January 2008 are exempted from complying with this criterion until 1 April 2013. The term installation includes any processing installation used in the production process and production facilities added to the production chain with the intention of qualifying for the exemption (Commission Communication 19.06.2010). In the case of a production pathway with a typical or default GHG saving value below the minimum GHG emission saving rate, producers may calculate the actual value (Directive Para. 82; Lendle and Schaus, 2010). If the actual value is at least the required saving

rate, this type of biofuel would have satisfied the GHG emissions savings¹⁶ of the sustainability criteria.

- b Biofuels are not produced from raw materials obtained from land with high biodiversity value¹⁷ and high carbon stock (paragraphs 3 and 4).
- c Biofuels are not produced from raw materials on peatland in January 2008 unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil (paragraph 5).
- d The agricultural raw materials cultivated in the Community and used in the production of biofuels are obtained in accordance with the requirements and standards under the provisions referred to 'Environment' in part A and point 9 under Public, Animal and Plant Health of Council Regulation (EC) No 73/2009 of 19 January 2009.

Violation of the criteria is likely to lead to one or more than one of the following outcomes:

- 1 biofuel failing to comply with the requirements of the Directive concerning national targets
- 2 failure to comply with renewable energy obligations
- 3 being ineligible to receive financial support for the consumption of biofuels.

Provisions B and C of the sustainability criteria can be viewed as capacity constraints or *land specificity* requirements on economic operators willing to fulfil the target of 10% (Williams and Kerr, 2011) and aimed directly at limiting the loss of natural capital. In effect, capacity constraints on the production of biofuel feedstock enhance food security (Williams and Kerr, 2014). Of note, the measures imposed to prevent further loss of natural capital extend beyond the EU. That is, foreign supplies will only be counted towards the 10% if the criteria are met. In a trade context, the criteria amount to environmental non-tariff barriers as renewable energy without the environmental characteristics or 'green label', as provided for in the Directive, will be barred entry to, or have no commercial value¹⁸ in, the EU¹⁹. The heart of the matter is that the EU standards are based on production and processing methods (PPMs).²⁰ According to the WTO, trade barriers can only be imposed on 'unlike' products, but products cannot be considered 'unlike' based on the PPMs employed in their production (Hobbs, 2007). In effect, the EU regulations mean that biodiesel that does not meet the sustainability criteria are 'unlike' products and, thus, they constitute a non-tariff barrier to trade. In essence, the criteria are technical barriers to trade based on environmental regulations/standards. As such, these environmental non-tariff barriers arguably have two effects on non-EU member state's environmental policy-making. Firstly, in a trade context, the environmental non-tariff barriers infringe on the sovereignty of non-EU countries in regards to management of their environment, notably land resources. Secondly, they 'raise' the environmental standards of developing countries.

The implementation of this policy, particularly the land-use conditions, provides operators from countries with abundant land²¹ with a competitive advantage. The advantage stems from having their product considered for inclusion in the 10%, and thus qualifying for any price premium that being part of the mandate brings. The Directive implemented by member states is expected to preserve environmental goods such as

biodiversity and reduce the pressure on land resources employed in food production. Williams et al. (2013) discuss the adverse effects of expansionary biofuel production practices in Kenya.

In order to achieve these outcomes, verification that biofuels are meeting the criteria is accomplished using the mass balance method. The mass balance approach allows consignments of raw material or biofuel with differing sustainability characteristics to be mixed, but requires information about the sustainability characteristics [Article 18; paragraph 1 (a) and (b)]. In addition, the European Commission may act on its own initiative or on request from a member state to examine the application of sustainability criteria for a source of biofuel and within six months of receipt of a request and in accordance with Article 25(3)²² decide whether the member state may take biofuel from that source [Article 18(8)]. In other words, the European Commission can independently rule a source of biofuel unfit, and hence, not allow a member state to take biofuel from that source. As a result, the article extends the European Commission's influence in foreign countries through its ability to judge whether or not imported biodiesel can be counted toward satisfying the 10% mandate. Consequently, the European Commission has far reaching regulatory powers within the EU renewable fuels market that can adversely affect third party countries. This clearly increases the risks associated with producing crops in developing countries for use as an input to biofuels.

The European Commission is charged with evaluating the impact of the biofuel policy on the availability of foodstuffs at affordable prices, especially prices in developing countries, as well as wider development issues (Article 17, para. 7). Assessing implementation of biofuels policies in developing countries is both a complex task and subjective to considerable degree. In addition, the regulations require that countries which are significant sources of biofuel consumed within the EU have ratified and implemented the Cartagena Protocol on Biosafety, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and eight²³ Conventions of the International Labour Organization (Article 17, para. 7). The imposition of these requirements on trading partners, it can be argued, represent "unnecessary obstacles to international trade" – Agreement on Technical Barriers to Trade, Article 2.2. Thus, they may be considered a non-tariff barrier to trade. As a guide, the EU released an Implementation Plan for stakeholders wishing to satisfy the criteria related to GHG savings and land use. The Implementation Plan is outlined below.

4 Compliance with proof of sustainability criteria

The traders of biofuel are expected to prove that their product satisfies the sustainability criteria using one of three methods;

- 1 Provision of data to the relevant national authority showing compliance with the requirements of the member state (Communication Sec 2.1 2010/C 160/02²⁴).
- 2 A voluntary scheme recognised by the Commission. If the scheme satisfies the requirements, as a general rule, the scheme will be recognised for a maximum period of five years (Communication Sec 2.1 2010/C 160/02).
- 3 Provision of a bilateral or multilateral agreement concluded by the EU which the Commission has recognised. In other words, the EU can conclude bilateral or

multilateral agreements which consist of sustainability criteria that correspond with the directive (Communication Sec 2.1, 2010/C 160/02).

These options lower the risk and cost for firms engaged in the trade of biofuel, particularly, those from developing countries because they can receive approval prior to cultivation of the crop to be used as an input to biofuels or before the biofuel is shipped to the EU. The three options for compliance offer flexibility in reporting and GHG emissions savings criterion which stakeholders can manipulate to their own economic advantage. In a trade context, however, proof of compliance with the sustainability criteria adds a new cost for foreign suppliers. As the burden of proof is higher on foreign suppliers, the regulations violate the WTO's 'principle of non-discrimination' whereby foreign suppliers are not to be treated differently than domestic firms – known as 'national treatment'. Operators will seek to adopt the option with the lowest compliance cost in order to maximise returns. If a supplier intends to report on sustainability by using the provision of data option, that is, standards enforced at the member state level, the data submitted should include information on the country of origin of all transport fuels, fossil and renewable, as well as place of purchase. Further, the information must be audited by an independent party to verify compliance. The criteria for independent audits as found in the Implementation Plan or Communication Sec 2.6, 2010/C 160/ are as follows:

- 1 the audit is to be performed by an external auditor
- 2 auditors are independent of the activity being audited and free from conflict of interest
- 3 the verification body has the general skills for performing audits
- 4 auditors have the skills necessary for conducting the audit related to the scheme's criteria.

The provision of data to a member state is the responsibility of the party or parties who pay the excise duty. Information must be available regarding the sustainability criteria along the entire fuel chain (Commission 2010/C160/02). The provision of data to the relevant national authority must meet the requirements of the importing member state. If a supplier plans to use data to show compliance, varying data requirements may be problematic administratively for those suppliers servicing multiple markets within the EU, since the requirements are established by the individual member state rather than the European Commission [Communication Sec 2.1 2010/C 160/02 and Article 18(3)]. In other words, data requirements could vary across member states. This could mean that a biofuel that qualifies for shipment to one member state may not qualify for shipment to another member state. As a result, the flexibility of foreign suppliers to react to varying price signals among the member states is reduced. In some cases it may be impossible for a supplier to simultaneously satisfy more than one member state's data requirements leaving them tied to particular importers and open to opportunism in the prices they receive. The risk of opportunism is reduced to zero in the case of a voluntary scheme. Once a scheme is approved by the Commission, all member states must recognise the scheme within 20 days after the decision (MEMO/11/522: Certification Schemes for Biofuels). The sustainability scheme employed by a member state is subject to approval by the European Commission. A voluntary scheme is a control system that certifies the sustainability characteristics of biofuels. The voluntary scheme approach may be the most flexible compliance measure available to operators, but has a life span of only five years.

As a result, investments in land clearing or for processing facilities may be at risk given their much longer investment payback horizon.

4.1 Land use criteria

The land use criteria aim to limit the environmental footprint of biofuels and place biofuel production on a sustainable path. The status of the land prior to 2008 may be used as evidence of compliance with some or all of the land-related criteria if it can be shown that the land was cropland. In cases where an exception applies, land that meets more than one criterion is only eligible under the exempted²⁵ criterion since exception under one criterion would not provide an automatic exception from the other criterion or criteria that apply.

Inputs to biofuels cannot be obtained from wetland, continuously forested areas; land spanning more than one hectare with trees higher than five meters and a canopy cover of between 10–30% and peatland if the ‘status’ (physical categories) of the land has changed compared to its status in January 2008. The forms of evidence that can be used to show compliance with the land related criteria are aerial photographs, satellite images, maps, land register entries or databases and site surveys. Such verification methods are not well developed in countries in the developing world (Williams and Kerr, 2011) and may well exceed the technical capacity of many potential suppliers of biofuels from the developing world. An alternative is to hire the expertise from developed countries, which will add considerably to the costs of biofuel suppliers.

5 Trade in Biofuels

The ambitious EU mandate had the potential to increase international trade in biofuels due to the constraints on EU producers contained in the Directive. Foreign producers of biofuels could be able to reap the potential market access benefits if they can overcome the environmental non-tariff barriers in the regulations and remain profitable. Currently, Argentina and Indonesia – developing countries that are major exporters of biodiesel to the EU – account for 77% of total EU imports in 2010 (European Commission, 2013). However, an October 2nd, 2013 press release issued by the European Biodiesel Board (EBB) stated that Argentina and Indonesia have accounted for 90% of total imports since 2010. Table 1 shows the sources of biodiesels consumed in the EU for 2010²⁶.

Table 1 Country of origin of final biodiesel consumed in the EU in 2010

<i>Country of origin</i>	<i>Volume (ktoe*)</i>	<i>Share of imports (%)</i>
EU	8,270	n/a
Argentina	1,003	60.1
Indonesia	285	17.1
Malaysia	123	7.4
China	67	4.0
USA	61	3.7
Other countries	129	7.7
Total	9,938	-

Note: *1,000 tons of oil equivalent

Source: European Commission (2013), EUROSTAT, COMTRADE

Oosterveer and Mol (2010) conclude that the trade in biodiesel is characterised, for the most part, by the trading of feedstock for the production of biodiesel, rather than the product itself. In the EU, the share of total biofuel production comprised of biodiesel was 63% (European Commission, 2012). Exports of biodiesel from the USA has resulted in the EU latterly imposing high countervailing duties on the grounds that US producers were unfairly subsidised (Stearns, 2008). In addition, US exports of biodiesel to the EU were boosted by what is known as the *splash and dash program*²⁷ involving biodiesel imported into the USA but destined for re-export after receiving a tax credit of \$1.00 per gallon. According to de Gorter et al. (2010), the US Congress eventually plugged this loophole making only domestically produced biodiesel eligible for the tax credit, but the EU still followed through with a countervailing duty action. The EBB contends that the US biodiesel exports are supported by a domestic subsidy and, in addition, benefits from an EU subsidy. In contrast, as explained below, EU producers do not receive the same dual benefits and, hence, are disadvantaged (Inside US Trade, 2008). The inequity in benefits between the two countries arise because US producers benefit from the blender tax credit as well as the EU tax exemption because the EU sets the world price for biodiesel (de Gorter et al., 2010). In other words, the combination of EU and US tax incentives makes US biodiesel technically cheaper than EU biodiesel since both enhance the competitiveness of biodiesel. Producers in the EU meanwhile only benefit from the effect of EU incentives on the world price if they decide to sell on the world market. Thus, EU producers are protected from imports through countervailing duties which compound the ad valorem tariff of 6.5% on biodiesel imports (Oosterveer and Mol, 2010). In essence, given the extent of the impact of US subsidies, the EU imposed countervailing duties on US biodiesel exports (*Bloomberg Business Week*, 2010). These measures protect domestic EU producers' share of the market while the EU consumers loses through higher prices than otherwise. In light of the trade restrictions imposed on US biodiesel and the production advantages as well as preferential trade agreements²⁸ enjoyed by developing countries, if they remain competitive in spite of the environmental non-tariff barriers; these countries could fulfil any shortfall in EU domestic supply. Conversely, the inability to be competitive due to environmental non-tariff barriers may lead to considerable forgone opportunities over the long-run.

6 Modelling exports of biodiesel to the EU

The standard comparative statics, partial equilibrium international trade model (Gaisford and Kerr, 2001) can be adapted to provide insights into the trade effects of the EU sustainability policy for biofuels. The assumptions of the model for developing country exports of biodiesel to the EU under the mandate scheme are as follows;

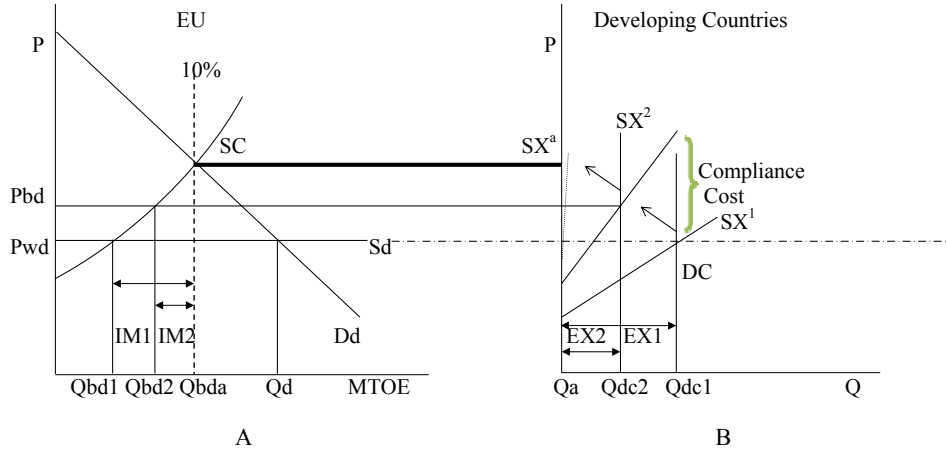
- 1 The model focuses on biodiesel satisfying the EU requirement of a renewable fuel share in transportation of 10% by 2020.
- 2 The cost to produce biodiesel is higher than diesel. As a result, given the higher cost of biodiesel, those distributing both biodiesel and diesel have no incentive to exceed the mandate.

- 3 The price for blended diesel in the EU is a reference point for the world price, that is, being the largest producer and consumer of biodiesel the EU is able to influence the world price.
- 4 Biodiesel is a substitute for petroleum-based diesel used in transportation.
- 5 Supply of diesel is elastic. That is, suppliers will be able to meet an increase in demand for diesel by using oil in the short run; the EU can easily import more oil to satisfy increased diesel demand.
- 6 Imports are expected to supplement the domestic production required to meet the blending mandate; that is, no waiver of the mandate will be granted due to shortfall in supply by member states. Developing countries are expected to be the source of imports.

Figure 1 shows the potential impact of compliance costs on exports of biodiesel. D_d is the demand curve for pure and/or blended diesel as biodiesel and petroleum-based diesel are substitutes for each other in transportation fuel. The price of diesel in the EU is P_{wd} and Q_d is the quantity of energy consumed in tonnes of oil equivalent (TOE). S_d is the supply of pure and/or blended diesel-based energy. DC is the demand by EU for biodiesel from developing countries. It represents the difference between EU domestic supply of sustainable biodiesel and the 10% mandate at the price of biodiesel. In other words, Q_{dc1} is the quantity of biodiesel imports (IM) the EU demands from developing countries to satisfy the 10% mandate. Thus, it is perfectly inelastic at Q_{dc1} . Therefore, $IM1 + IM2 = Q_{dc1}$ is necessary to satisfy the mandate. For example, a decrease in imports by the EU from developing countries due to higher domestic output simultaneously results in the same decline in the quantity of biodiesel exported to EU by developing countries. The effects of a leftward shift in DC due to foreign suppliers incurring compliance costs are shown in panels A and B.

In Panel A of Figure 1, SC is the supply of biodiesel which is compliant with the sustainability criteria and produced within the EU. Producers in the EU are willing to supply Q_{bd1} at the world price, P_{wd} . Given Q_{bd1} is to the left of the 10% mandate; we assume this shortfall may be filled by imports. $IM1 + IM2$ represent total imports needed from developing countries to satisfy the mandate.

In Panel B of Figure 1, SX^1 represents the supply (export) of developing countries to the EU without compliance costs, that is, no environmental non-tariff barriers. The addition of compliance costs incurred by exporters increases cost of supplying biodiesel. These costs lead to the supply curve shifting to SX^2 ; the supply of sustainable biodiesel. In other words, the decrease in supply represents the quantity of biodiesel that is unable to enter the EU market due to the environmental non-tariff barriers. That is, the non-tariff barriers are likely to force suppliers out of the market and/or prevent new suppliers from engaging in the trade of biodiesel. With the non-tariff barrier stemming from the requirement of GHG emission savings which rises to 60% in 2018, a decline in imports can be expected. For example, at the initial requirement of 35%, US soybean producers raised the point that soybean-based biodiesel from the USA did not qualify for the EU's sustainability criteria when using default GHG emission savings values.²⁹ As a result, exporters will need to prove compliance or calculate the actual savings – activities which are costly to undertake. Therefore, it is fair to expect that raising the bar to entry may reduce the competitiveness of exports, particularly those originating from developing countries.

Figure 1 Impact of compliance costs on trade of biodiesel (see online version for colours)

The inward shift in supply in conjunction with inelastic demand, DC, causes a rise in the price of biodiesel as shown in Panel A. At a higher price, P_{bd} , EU producers would increase supply moving up SC leading to a leftward shift in Q_{dc1} . Thus, EU suppliers benefit from higher compliance costs being imposed on developing country suppliers. Exports from developing countries would decline, remember $IM = Q_{dc}$ at any price. The increased compliance costs leads to a simultaneous increase in domestic EU supply and a leftward shift in the quantity required for export, DC shifts leftward. Therefore, EU quantity supplied domestically increases from Q_{bds1} to Q_{bds2} and imports reduce to $IM2$. Thus, the quantity exported by developing countries declines to $Q_{dc2} = IM2$. Furthermore, increasing compliance costs effectively raises the cost of exporting to the EU and shifts the supply curve further leftward. If the compliance costs (arising from environmental non-tariff barriers) are sufficiently high, they may effectively choke off imports into the EU. In other words, the model shows that increasing environmental non-tariff barriers, for example requiring higher GHG emission savings, have the potential to be effective trade barriers. A worst case scenario for developing countries is SX^1 shifting left rising to SX^A , then DC lies on the vertical axis of Panel B and $Q_a = 0$. In other words, in Panel A, domestic production (Q_{bda}) in the EU is sufficient to supply the entire mandate.

7 Discussion

The EU has been a global environmental leader in the campaign to reduce GHG emissions. This is the motivation for the ambitious biofuel policy. As the conflict between biofuel production and food security became evident, other policy objectives were imposed on the biofuels policy. While biodiesel offers a major development opportunity based on exports for developing countries, the multi-goal biofuel policy of the EU may well considerably limit this opportunity. The current bundle of EU goals, policies and regulations raises costs for potential developing country producers of biodiesel and make investments in developing such capacity very risky. The risks arise from the potential for biodiesel being refused as a source that can be counted toward

satisfying the mandate – a risk created by the policy framework, not normal commercial risk. Although, there is evidence that the mechanisms for proving that land used to produce biodiesel qualifies under the sustainability criteria and GHG emission levels as set out in the EU regulations can be provided by a developing country, for example, Indonesia, the majority of developing countries need technologies, skills and institutions that are not often present in developing countries, thus requiring the reliance on firms and personnel from developed countries such as ISCC.³⁰ Further, as is the case with any product sourced from foreign suppliers, domestic vested interests will benefit from, and have an incentive to seek, protection. Farmers in the EU would clearly benefit from protection arising from lower levels of imports due to the imposition of non-tariff barriers. Given that biofuels is seen as a mechanism to assist rural development in the EU, there will be little incentive to foster systems that lower the entry bar for developing countries. In such a case, developing countries considering advancing economic development goals through biodiesel trade with the EU should recognise such a strategy is very risky.

In light of the increasing barriers to access the EU market, future investments in developing countries such as Indonesia may be thwarted. The biodiesel feedstock in Indonesia is palm oil.

For Indonesia, an export tax is imposed on palm oil products, which differentially favours biodiesel exports. Further, a number of the major Indonesian producers of biodiesel have been able to qualify for the International Sustainability and Carbon Certification (ISCC) recognised by the European Commission (US Department of Agriculture, 2012). Voluntary schemes, however, expire after five years. Hence, those producers will need to be re-certified to maintain access to the EU market.³¹ With GHG emissions savings rising to 60% in 2018 compared with 35% when the scheme was approved, re-certification may be problematic. Further, if in the future, demand for biodiesel were to require additional land to be brought into palm production, then to qualify these new lands would have to satisfy the EU's sustainability criteria.

The case of Indonesia is evidence that operations in developing countries can meet the standards of a recognised voluntary scheme, notably the ISCC, while simultaneously overcoming the non-tariff barriers³². In other developing countries the environmental non-tariff barriers may simply make such investments too risky. Further, the EU has imposed anti-dumping duties on imports from Indonesia and Argentina. For Indonesian producers, the range of the imposed duties is between €0 and €83.84 per metric tonne and €75.97 to €104.92 per metric tonne for Argentine producers (*Bridges Weekly Trade News*, 2013). The US Department of Agriculture predicts the duties will negatively affect exports (USDA, 2012). In the case of Argentina, soybeans are the input for biodiesel. This crop is not used extensively for direct human food consumption. Soybeans are primarily used to produce soya oil. This soya oil has a number of uses, one of which is as a feedstock for biodiesel. Argentina has a large domestic program to promote the production of biodiesel. However, soybean-based biodiesel's default value is below the minimum threshold of 35%, thus, Argentinean biodiesel does not satisfy the EU's sustainability criteria unless an actual value is calculated to realise at least a 35% GHG emission savings. Thus, even when developing countries appear to comply with the provisions of the Directive designed to protect the environment and enhance food security, protectionist vested interests are able to benefit from alternative trade barriers being imposed³³, notably anti-dumping duties. Potential investors in biofuels in developing countries are likely to be further deterred by the fate of those countries that

have been able to overcome the environmental non-tariff barriers. The EU policy appears increasingly motivated by protectionism rather than enhancing sustainability.

8 Conclusions

When biofuel mandates were first established in the EU, there appeared to be room for imports from developing countries. This was seen as a development opportunity. The original biofuels mandates in both the EU and the USA failed to account for the shift in land use out of food production and into biofuel production that would follow – and the contribution it would make to increases in food prices (Williams and Kerr, 2011). In response to the negative externalities of environmental degradation and rising food insecurity in the EU and third party countries, the EU mandate was changed in an attempt to reduce the environmental footprint of renewable fuels as compared to fossil fuels and to moderate their effect on food production, particularly in developing countries. It would appear that the goal may have been met in developing countries. At the same time, however, the costs of compliance and the risks associated with ensuring that the production of biofuel feedstocks does not threaten food security may have discouraged investment in crop-based biofuels in developing countries.

The renewable energy policy of the EU has always been premised on not yet commercialised technologies. These alternative technologies, in particular feedstocks arising from non-food cellulosic material and lingo-cellulosic material have not reached the stage of commercialisation envisaged in the mandate's timelines (Williams and Kerr, 2011). This is true for developing as well as developed countries. Hence, the contribution that biofuel exports could make to economic development will have to await the ability to use those technologies profitably in the production of biofuels.

The revision of the biofuel mandate in the EU to address the adverse effects arising from the production and consumption of renewable energy on the environment and food security may have given protectionists in the EU the opportunity to impose considerable trade inhibiting costs on competitors from developing countries. The environmental non-tariff barriers and the associated technical requirements seem to be ill-designed for the technical capacities of developing countries and create a lack of transparency that makes investments in biofuel crop production in developing countries very risky. This was not the intent of the initiative in the EU biofuels policy revision and suggests that these requirements should be revisited.

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Notes

- 1 Defined as the stock of natural resources, environmental and ecosystem resources used as inputs in the production of goods and services in addition to being enjoyed for its own sake. (Olewiler, 2004).
- 2 For example, a scenario requiring appropriate action may involve a threat to food security or injury to domestic production as a result of 'unfair practices' by competitors.
- 3 The ability of developing countries to access the EU market for biofuels is also bolstered by high import barriers imposed on biodiesel originating in the USA.
- 4 In 2010, the European Commission published a report acknowledging that indirect land use change can reduce greenhouse gas emissions savings associated with biofuels, but also identifies a number of uncertainties associated with the modelling effort (http://europa.eu/rapid/press-release_IP-10-1772_en.htm?locale=en).
- 5 Indirect land use change refers to the increased biofuel feedstock production resulting in alternative land being converted to produce agricultural crops that were displaced due to the increased production of feedstock for biofuel purposes.
- 6 Only France, Germany, Poland, Slovakia, Sweden achieved the 2010 target (European Commission, 2013).
- 7 A blend wall exists in the USA for ethanol known as E15 or ethanol 15%. It represents the maximum blend of ethanol in gasoline that can be successfully used in most engines in the stock of vehicles in the USA.
- 8 Advanced biofuel means renewable fuel other than ethanol derived from corn starch that has a lifecycle greenhouse gas emission that is at least 50% less than baseline GHG emissions. The type of fuels eligible for consideration as advanced biofuel include: ethanol derived from cellulose, hemi-cellulose or lignin, sugar or starch and waste material. Biodiesel, biogas, butanol and other fuel derived from cellulosic biomass may be considered (Sec. 201, paragraph B, Energy Independence and Security Act 2007).
- 9 Cellulosic biofuel means renewable fuel derived from any cellulose, hemicellulose, or lignin that is derived from renewable biomass and that has lifecycle greenhouse gas emissions, that are at least 60% less than the baseline lifecycle greenhouse gas emissions (Sec. 201, paragraph E, Energy Independence and Security Act 2007).
- 10 Based on the assumption that developing countries have limited technical capacity to assess the implications arising from such changes and to respond effectively/accordingly.

- 11 Environmental tariffs are defined as taxes (border) applied to imports from countries that have less strict carbon reduction policies or that do not adequately enforce those policies (Kerr, 2010).
- 12 Directive 2009/28/EC, Article 3(1) states that each member state should ensure that the share of energy from renewable sources in gross final energy consumption is at least 20% by 2020. Therefore, a member state which exceeds the minimum requirement by 1 percentage point, that is, 21% may transfer statistically one percentage point to another member state with 19%.
- 13 The criteria are discussed below.
- 14 See Annex V of Directive 2009/28/EC for typical and default greenhouse gas emission saving values by production pathway if no net carbon emissions is from land use change.
- 15 A new proposal by the EU Commission if accepted by the EU Parliament will result in it establishing a 60% minimum GHG saving threshold for new production, before January 1, 2018.
- 16 The impact of indirect land use on emission levels was retained as a result of the vote on September 11, 2013 in the EU Parliament.
- 17 Inventory of data sources and methodologies to help 'Economic Operators' identify land status document is available at: http://ec.europa.eu/energy/renewables/biofuels/doc/2011_bsc_inventory_of_data_sources_and_methodologies.pdf.
- 18 Only biofuels that meet the criteria will be counted towards the consumption mandate. Therefore, an economic incentive only exists for importers in the EU to source those products which meet the environmental standards embedded in the Directive. Conversely, importing firms can gain a premium for second generation technologies.
- 19 Although, restrictions on imports are not new, for example, tariff rate quotas – based on volume (quantity), the sustainability criteria is based on value (quality); production and consumption restrictions lead to more environmental preservation than otherwise would be the case.
- 20 As defined in the Agreement on Technical Barriers of Trade (TBT) of the World Trade Organization (WTO).
- 21 See Williams et al. (2013) for a discussion on how countries with 'limited land' can still engage in the international trade of biofuels.
- 22 Further reference to Articles 3 and 7 of Decision 1999/468/EC applies having regard to the provisions of Article 8.
- 23 See Article 17, paragraph 7 of Directive 2009/28/EC.
- 24 Communication from the Commission on the practical implementation of the EU biofuels and bioliquids sustainability scheme and counting rules for biofuels.
- 25 Refer to Communication Sec 2.1 2010/C 160/02 for land use criteria exceptions.
- 26 The latest official data due to the collection and assessment of national statistical data is time consuming so there is a considerable time lag in processing statistics (Commission Staff Working Document, October 2013).
- 27 The *splash and dash* refers to the practice of importing biodiesel from a third country and receiving the tax credit of \$1.00 by merely producing a blend of 99.9% imported biodiesel with 0.1% diesel (Carriquiry and Babcock, 2008).
- 28 Majority of EU imports originating from developing countries enter the EU at a zero rate of tariff through super-generalised system of preferences (GSP) (Swinbank, 2009).
- 29 The default GHG emission savings value for soybean-based biodiesel is 31% (2009/28/EC) while the EU directive requires a minimum of 35%.
- 30 A global initiative developed through a multi-stakeholder approach with a large number of companies covering the entire supply chain. The development of the ISCC system was financially supported by the German Federal Ministry of Food, Agriculture and Consumer Protection via the Agency for Renewable Resources (FNR). As of 2012, ISCC is operating independently.

- 31 This will entail a yet unknown cost, but more important, the risk of failing to meet the standard for re-certification. With only five years of surety, long term investments in biofuel infrastructure may be inhibited.
- 32 One method to circumvent the land-related non-tariff barrier is to supply biodiesel produced from waste and residues, other than residues arising from agriculture, fisheries and forestry products.
- 33 The ability to use anti-dumping actions to harass foreign firms and obtain economic protection under dubious circumstances is well known. See Kerr (2006, 2001) for a discussion of anti-dumping's role in providing protection rather than offsetting an 'unfair' trade activity.