

# Biofuel Regulation in the EU: A Failure in the Path Towards Environmental Sustainability and Food Security?

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**Abstract** This chapter examines the European Union policy on biofuels from a legal point of view in order to discuss whether and to what extent the regulations have been shaped by the social and environmental issues connected to biofuels. Legal and policy documents will be analyzed in order to see how EU policy has addressed the questions arising from the growth of the biofuel sector and whether the efforts to solve the problems of fossil fuel dependence and greenhouse gas emissions have created other issues. The starting point will be the growing global demand for biofuels triggered by their public promotion in a number of countries worldwide. This will help to understand the magnitude of the phenomenon and of the concerns believed to stem from it. In the last part of this chapter, the current biofuel regulations will be discussed in order to see whether the proclamations became commitments, that is, if each social and environmental need was fully integrated into the regulations. Some of the environmental pressures have pushed for an amendment to current EU legislation, which could lead to a new ‘indirect land-use change’—‘indirect food insecurity’ (ILUC-IFI) dilemma. This could be interesting in terms of understanding how the EU is proceeding towards environmental and social sustainability in the production and use of biofuels. The main conclusion of this review is that although the EU policy articulates a range of principles and criteria on sustainability, each of which can be agreed upon, the real challenge has been in implementing the policy, which has not been without its problems.

**Keywords** EU biofuel policy • Food security • Land use • Sustainability

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## 1 Establishing the Context

What was the international context with regard to the energy sector while the EU policy on biofuels was emerging? What were the advantages of promoting bioenergy? How were environmental issues and food security addressed worldwide?

This section provides a brief overview of the global context and international legal framework. This will help in understanding the magnitude of the phenomenon and the concerns that are believed to stem from it. At the same time, it will set the scene for a review of the development of the EU's policy on biofuels.

Biofuels have increasingly emerged as a plausible alternative to oil. According to the recent HLPE Report on *Biofuels and Food Security*, in less than just one decade, world biofuel production has increased five times, from less than 20 billion liters/year in 2001 to over 100 billion liters/year in 2011.<sup>1</sup> A number of countries with important agricultural sectors and pressing needs for domestic energy supplies have opted to support the production of biofuels. As a result, such an increase in the world's supply and demand for biofuels depends on the public policies<sup>2</sup> that have thus played a central role in the creation of markets via obligatory or highly stimulated blending targets, coupled with a range of tax exemptions, subsidies and favorable credit.

In the 1970s, in response to the oil shocks, many countries instigated proposals for alternative fuel policies, and in the 1980s Brazil and the USA created a biofuel market and a related productive sector. In fact, the early 1970s signaled a change in the direction of the energy markets. Global demand for energy and oil rose more than had been predicted by oil companies. The United States began to import more oil. Finally, oil-producing countries, which were increasingly aware of the centrality of oil to their own economies and also to the economies of countries that imported it, were strengthened with the formation of OPEC. As a result, there was an increase in oil prices.

In Brazil,<sup>3</sup> the National Alcohol Program (Proalcool) was launched in 1975. It addressed both supply and demand with investment subsidies, the mandatory placement of ethanol pumps, fixed pricing and taxation of gasoline; thus, production increased rapidly. Currently, the growing use of ethanol in Brazil is linked to the development of the flex-fuel vehicle industry, which introduced vehicles that can switch between ethanol and conventional gasoline. Additional demand for Brazilian biofuels came from the United States to fill the advanced biofuel mandate.<sup>4</sup> In Brazil, the blending of ethanol with gasoline fuels is regulated, with a

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<sup>1</sup> High Level Panel of Experts (HLPE) on Food Security and Nutrition of the Committee on World Food Security (2013).

<sup>2</sup> Sorda et al. (2010), pp. 6977–6988.

<sup>3</sup> Hira and de Oliveira (2009), pp. 2450–2456.

<sup>4</sup> OECD/FAO (2012).

required ethanol content of between 20 and 25 %, depending on governmental decisions (which in turn depend on market conditions).

In the USA, ethanol production started to rise in the 1980s with the Energy Tax Act of 1978. This legislation introduced a subsidy aimed at blending ethanol with fossil gasoline. Later, many other policy tools were established, which provided insured loans for small biofuel producers, benefits to automobile makers for flex-fuel vehicles, and a tariff on imported ethanol. With a global production share of about 50 %, the USA is today the largest ethanol producer, especially since the enactment of the Energy Independence and Security Act of 2007.<sup>5</sup>

As far as the global biodiesel production is concerned, it has been estimated to increase to above 42 billion by 2021. The European Union is expected to be by far the largest producer and user of biodiesel. Other significant players are Argentina, the USA, Brazil, as well as Thailand and Indonesia.<sup>6</sup> In fact, in the last 10 years, public support for bioenergy has increased in both developed and developing countries, even though the three major markets continue to be Brazil, the EU and the US.

After an initial phase in which the stated objectives of biofuel policies focused on boosting domestic energy production and reaching self-sufficiency, in the 1990s the range of targets widened. For many countries, the list of objectives for the implementation of biofuel policies included not only the security of the energy supply but also regional development, the creation of new outlets or demand for agricultural products in order to boost farm incomes and, overall, environmental improvement (including mitigation of climate change).<sup>7</sup> In the US, for example, the amendments to the Clean Air Act in 1990 saw the beginning of a shift in renewable fuel policies towards environmental concerns.<sup>8</sup> Likewise, in the EU, among the bioenergy policy drivers was the goal of combating climate change, arising from the Kyoto commitments.

International action on environment and climate change helped to give importance to the question of renewable energy in the 1990s. The UN Framework Convention on Climate Change was signed in 1992 at the UN Conference on Environment and Development in Rio de Janeiro. In 1997, the Kyoto Protocol was adopted, which legally bound developed countries to emission reduction targets.<sup>9</sup> Besides the objective to improve the security of energy supplies, developed countries have been implementing biofuel policies in response to growing environmental concerns associated with climate change and global warming. The development of renewable fuels is seen by a number of countries as one way to reduce their greenhouse gas emissions, as part of established Kyoto commitments arising from the Convention on Climate Change. That development at this point

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<sup>5</sup> OECD/FAO (2012).

<sup>6</sup> OECD/FAO (2012).

<sup>7</sup> OECD (2008).

<sup>8</sup> Mayer et al. (2013).

<sup>9</sup> Danish (2007), pp. 31–56.

was not expressly connected to the opportunity to improve food security, though rural and social developments were taken into consideration.

## 2 The Main Social and Environmental Issues Linked to Biofuels

There are many reasons for the provision of more support for renewable energy: environmental, economic, and political. However, some think that these objectives have not always been fulfilled. In recent years, the contribution of biofuel use to reducing GHG emissions has been strongly contested and a number of unintended impacts of biofuel policies have been reported.<sup>10</sup> In the wake of such criticism against biofuel policies, some even argue about the term “biofuel,” “saying that the prefix ‘bio’ masks harmful social and environmental effects. Using ‘agrofuel’ instead, they stress the threat it poses ‘because of the intensive, industrial way it is produced, generally as monocultures, often covering thousands of hectares, most often in the global South’. For them, biofuels development implies changes in land use and/or land property relations, in ways undermining ecosystems and/or poor people’s access.”<sup>11</sup>

In 2007, Jean Ziegler, the UN Special Rapporteur on the right to food, called for a 5-year moratorium on biofuels on the basis that converting crops such as maize, wheat and sugar into fuels was driving up the prices of food, land and water. As a consequence, the poorest countries would not have been able to import enough food for their people: “It is a crime against humanity to convert agricultural productive soil into soil which produces food stuff that will be burned into biofuel,” he said using very harsh words.<sup>12</sup>

The biofuel and food price debate is controversial in scientific the literature. Since the sharp rise in food prices in 2007/2008, many studies and official reports have investigated whether the increase in biofuels production has had a significant impact on the development of agricultural commodity prices.<sup>13</sup> The evidence is not conclusive, and it seems that the impact of biofuels on the price of food also depends on the crop, on the local conditions and whether the discussion is on a global or local level.

These contradictions were recognized by the aforementioned HLPE Report on *Biofuels and Food Security*, which stated that “biofuel production and the policies used to support its development can relate both positively and negatively with each of the four dimensions of food security—availability, access, utilization (nutrition) and stability.”<sup>14</sup> This statement referred to the widely accepted FAO definition of

<sup>10</sup> Doornbosch and Steenblik (2007) and Pimentel (2012).

<sup>11</sup> Franco et al. (2010), pp. 661–698.

<sup>12</sup> UN News Centre (2007).

<sup>13</sup> World Bank (2008); Ajanovic (2010); Zilberman et al. (2013), pp. 275–281.

<sup>14</sup> High Level Panel of Experts (HLPE) on Food Security and Nutrition of the Committee on World Food Security (2013).

food security, according to which “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (World Food Summit, 1996).

Following on from the food security concerns, another issue is natural resources, especially land and water. Land use for energy production has been focused on by all strata of stakeholders and policy makers at a European and international level. The growing demand for bioenergy crops has led to great competition for land and water among food-oriented agricultural activities, energy production and the use of agricultural land for nature conservation and urbanization. In addition, biofuel policies have been considered as some of the key drivers behind the recent wave of large-scale land acquisition in developing countries, as many companies have been oriented by the increasing demand for biofuels in their land investment strategies.<sup>15</sup>

Besides the risk of the reallocation of land from the production of food crops to biofuel crops, international large-scale land acquisitions have a number of socio-economic impacts. Food insecurity is often the principal effect of biofuel land deals, but the displacement of local and indigenous communities should not be underestimated from a social point of view.

Competition for land also involves environmental questions when biofuel production requires land devoted to the protection of biodiversity and carbon sequestration, which is when direct and indirect land-use changes can occur. The former happens when the expansion of crops for biofuels takes place at the cost of forests or grassland. The latter results when the feedstocks for biofuels are not directly established on valuable environmental land but on arable soil, triggering the displacement of agriculture elsewhere to forested land or other natural areas.<sup>16</sup>

This phenomenon, which will also be addressed in the last part of this chapter, not only carries the risk of significant environmental damage, nullifying the GHG emission reductions attributed to biofuels and exacerbating anthropogenic climate change, but is also relevant to food security “since what is an ‘indirect’ land-use change relative to biofuels, is a ‘direct’ land-use change relative to food (food crops expanding directly on other lands), and vice versa. In other words, minimizing ‘ILUC’ effects could be at the expense of food security and create ‘indirect food insecurity’ (IFI). In turn, minimizing IFI could lead to ILUC effects.”<sup>17</sup>

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<sup>15</sup> Cotula et al. (2008). High Level Panel of Experts (HLPE) on Food Security and Nutrition of the Committee on World Food Security (2013).

<sup>16</sup> Commission (EC) Report on indirect land-use change related to biofuels and bioliquids (Communication) COM(2010) 811 final, 22 December 2010.

<sup>17</sup> High Level Panel of Experts (HLPE) on Food Security and Nutrition of the Committee on World Food Security (2013).

The complexity of these questions confirms that biofuels should be placed within the framework of the “food-energy-environment trilemma,”<sup>18</sup> which still appears as the right approach to the subject.

### **3 The EU Biofuel Policy Evolution: Intersection (and Possible Integration) with Social and Environmental Concerns**

Bearing in mind the major issues emerging from the development of biofuels, it is worth considering whether and how the European legislation on bioenergy takes into account these unintended impacts of biofuel policies and if it can be said to have been shaped by them.

Europe is at the forefront of energy policy and renewable energy development.<sup>19</sup> The European Union has acted both on energy and the environment for many years with the awareness that greenhouse gas emissions come largely from energy use and production. The importance of the environment in developing the energy sector was recognized in the Treaty of Lisbon, which came into force on 1 December 2009. It gives a new legal basis to energy that was lacking in the previous treaties: article 194 of the Treaty on the Functioning of the European Union declares that “In the context of the establishment and functioning of the internal market and with regard for the need to preserve and improve the environment, Union policy on energy shall aim, in a spirit of solidarity between Member States, to: (a) ensure the functioning of the energy market; (b) ensure security of energy supply in the Union; (c) promote energy efficiency and energy saving and the development of new and renewable forms of energy; and (d) promote the interconnection of energy networks.”

As is the case with other countries, in the 1980s the EU paid increasing attention to renewable energy, which was considered a good means for tackling energy security problems. Thus, at this time, the environmental advantages related to renewable energy were not yet at the center of the European Community’s considerations. The scenario slowly started to change from 1987, when a title devoted to the environment was introduced by the Single European Act into the Treaty of Rome of 1957. In addition, the Fourth Environment Action Programme of the European Community (1987–1992), published in the same year, specifically referred to the relationship between environmental policy and energy production. Thus, the EU’s energy policy took on an environmental dimension. No longer was the security of energy supply the only issue.<sup>20</sup> Integrating the environment into

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<sup>18</sup> Tilman et al. (2009), pp. 270–271.

<sup>19</sup> Alabrese (2012), pp. 38–45.

<sup>20</sup> Commission (EC) Energy for the Future: Renewable Sources of Energy—Green paper for a Community Strategy (Communication) COM(1996) 576 final; Commission (EC) Energy for the

Community energy policy was the specific subject of the Communication from the Commission in 1998 entitled *Strengthening environmental integration within Community energy policy*,<sup>21</sup> where several measures were proposed to incorporate the environmental dimension into energy policy objectives and actions. However, the first part of twenty-first century has been characterized by an increase in dependency on energy imports combined with an increase in oil prices. Yet again, the issue of energy security became central, and the EU laid down the *Green Paper—Towards a European strategy for the security of energy supply*,<sup>22</sup> in which not only dependence on external energy sources but also environmental concerns were confronted. Indeed, the document gave prominence to climate change and promoted the development of new and renewable energies. This policy was put into action in Directive 2001/77 on the promotion of electricity produced from renewable energy sources.

This was followed by Directive 2003/30 on the promotion of the use of biofuels or other renewable fuels for transport. The promulgation of the Biofuels Directive represents the first significant milestone in the development of a coherent EU policy on biofuels.<sup>23</sup> It aimed to introduce a nonbinding target of a 2 % market share for biofuels in 2005 and a 5.75 % share in 2010. A proper review of the Directive, which would have given an exact assessment of the measures set down, was not delivered, but in 2006 the Commission's suggestion of a new strategy on biofuels was published.<sup>24</sup> The detailed *EU Strategy for Biofuels* was considered by legal scholars as a document that paved "the way for the development of a more mature EU policy on biofuels."<sup>25</sup> It ratified that the 2005 target share of 2 % had not been achieved and stimulated the production and use of biofuels.

It is interesting to note that the promotion was done in consideration of the sustainability of biofuel production in terms of environmental, economic and social issues. While exploring the opportunities of biofuel production in developing countries, the Commission warned that the exploitation of their resources would have to be conducted with respect to good agricultural practice, namely that sustainable biomass production would have to be compatible with environmental requirements and that it could not impact negatively on the production of foodstuffs. The document highlighted the opportunities that would come from developing countries, considering that biomass productivity is higher in tropical areas and the production costs are comparatively low. Even the benefits for these countries

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future: renewable sources of energy—White Paper for a Community strategy and action plan (Communication) COM(1997) 599 final.

<sup>21</sup> Commission (EC) *Strengthening environmental integration within Community energy policy* (Communication) COM (1998) 571 final.

<sup>22</sup> Commission (EC) *Green Paper—Towards a European strategy for the security of energy supply* (Communication) COM(2000) 769 final.

<sup>23</sup> Switzer and McMahon (2011).

<sup>24</sup> Commission (EC) *An EU Strategy for Biofuels* (Communication) COM(2006) 34 final, 8 February 2006.

<sup>25</sup> Switzer and McMahon (2011), p. 714.

were addressed: “the production of biofuels from suitable feedstocks could also generate economic and environmental benefits in a number of developing countries, create additional employment, reduce energy import bills and open up potential export markets. In particular, the production of bioethanol could offer a feasible alternative for some sugar-producing countries affected by the reform of the EU sugar regime.”<sup>26</sup>

At the same time, social and environmental issues are taken into account as it is underlined that “in countries where a large-scale expansion of feedstock production is likely to take place, environmental concerns relate to pressures on eco-sensitive areas, like rainforests. There are also concerns regarding the effect on soil fertility, water availability and quality, and pesticide use. Social effects concern potential dislocation of communities and competition between biofuel and food production. These concerns need specific investigation and quantification and, if necessary, should be addressed through strong regulatory frameworks.”<sup>27</sup> In addition, the 2006 European Parliament Resolution on the promotion of crops for nonfood purposes,<sup>28</sup> which was completely devoted to the creation of new income opportunities for farming, recognized—although in passing—the problem of competition between food and fuel.

To increase the use of renewable energy sources, the European Commission drew up the *Renewable Energy Road Map. Renewable energies in the 21st century: building a more sustainable future*,<sup>29</sup> where its long-term strategy was set out. In the Road Map, the Commission proposed a mandatory target of 20 % for the renewable energy share of energy consumption in the EU by 2020 and a mandatory minimum target of 10 % for biofuels. The proposal was accepted by the European Council,<sup>30</sup> and for the first time a legally binding target was introduced.

The introduction of a binding biofuel mandate was subject, among other things, to production being sustainable. Even the European Parliament stressed the importance of sustainability criteria for biofuels and requested that the Commission should undertake action towards a mandatory certification system for biofuels in its Resolution of 2007 on the Road Map for Renewable Energy in Europe.<sup>31</sup> A stronger position of the European Parliament can be found in the Resolution on sustainable agriculture and biogas.<sup>32</sup> This document clearly declared that biogas

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<sup>26</sup> Commission (EC) An EU Strategy for Biofuels, 4.

<sup>27</sup> Commission (EC) An EU Strategy for Biofuels, 7.

<sup>28</sup> European Parliament Resolution on the promotion of crops for non-food purposes (2004/2259 (INI)).

<sup>29</sup> Commission (EC) Renewable Energy Road Map: Renewable energies in the twenty-first century: building a more sustainable future (Communication) COM(2006) 848 final, 10 January 2007.

<sup>30</sup> Council of the European Union (EU), Presidency Conclusions—Brussels 8/9 March 2007, 2 May 2007, 21.

<sup>31</sup> European Parliament Resolution on the Road Map for Renewable Energy in Europe, 25 September 2007.

<sup>32</sup> European Parliament Resolution on sustainable agriculture and biogas: a need for review of EU legislation (2007/2107(INI)).



production should be preferred that used organic waste and crop by-products unsuitable for food and feed production. In addition, the possible connection between bioenergy production (primarily bioethanol and biodiesel) and rising grain and food prices on the world market was recognized.

In 2007, a set of policy measures was introduced.<sup>33</sup> In the objectives put forward by the “Energy Package,” reducing greenhouse gas emissions was central. The Commission also proposed creating a new legislative framework to enhance the promotion and use of renewable energy. Discussions on the draft Directive stressed the need to develop effective sustainability requirements for biofuels, as well as giving prominence to the link between biofuels and food security. Consequently, Directive 2009/28<sup>34</sup> was issued.

This brief review of the main steps that created the EU biofuel policy shows that, together with the great opportunities for sustainable development and climate change mitigation, bioenergy growth has also met many challenges over the years. In the last part of this chapter, the current biofuel regulations will be examined in order to see if the proclamations became commitments, that is, if each social and environmental need turned into an obligatory rule.

## 4 The Current Scenario and the Future Horizon in the EU Biofuel Legislation

Directive 2009/28/EC on the promotion of the use of energy from renewable sources established mandatory targets to be achieved by 2020 for a 20 % overall share of renewable energy in the EU and a 10 % share for renewable energy in the transport sector. At the same time, through Directive 2009/30/EC,<sup>35</sup> the EU adopted a mandatory target to achieve a 6 % reduction in the greenhouse gas intensity of fuels used in transport by 2020. Each Member State would decide its own renewable energy mix and the means by which this target would be reached, but the contribution of biofuel towards these goals is significant.

According to the Directive,<sup>36</sup> different renewable energy sources are allowed within the framework of the mandatory target in the transport sector, such as renewable electricity, hydrogen and biofuels, though the actual implementation of

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<sup>33</sup> Commission (EC) An energy policy for Europe (Communication) COM(2007) 1 final.

<sup>34</sup> European Parliament and Council Directive (EC) 2009/28 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

<sup>35</sup> European Parliament and Council Directive (EC) 2009/30 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC.

<sup>36</sup> EC Renewable Energy Directive 2009/28; Art 3 (4).

the regulation focused mainly on biofuels. “The latest projections by member countries for their National Renewable Energy Action Plans show that 88 % of the target will be covered by traditional biofuel, and within biofuels, three-quarters will come from biodiesel.”<sup>37</sup> Biofuel development was promoted not only through a quota obligation scheme but also through direct subsidies. These targets cannot be fully met using only EU domestic biomass, which is basically why “the EU biofuel policy has triggered the creation of an increasingly globalized biofuels and biofuels feedstock market, involving a key role for developing countries agriculture.”<sup>38</sup>

The European need to address the growing challenge of climate change made the Renewable Energy Directive (2009/28/EC) and Fuel Quality Directive (2009/30/EC) set out a sustainability scheme for biofuels and bioliquids, which, however, only focused on environmental concerns.

According to the Directives, the increasing worldwide demand for biofuels and bioliquids should not encourage the destruction of biodiverse lands. Thus, sustainability criteria are defined ensuring that biofuels and bioliquids can qualify for the incentive rewards only when there is a guarantee that they do not originate from biodiverse areas or that they do not endanger ecosystems. Although these sustainability criteria are not mandatory in general, their fulfilment permits Member States to include energy from biofuels and bioliquids in measuring their achievement of national energy targets and their compliance with renewable energy obligations and, overall, for their eligibility for financial support. Thus, biofuels and bioliquids can be counted as renewable energy for the purposes of the Directive, and financial support can be obtained only when it can be guaranteed that they meet these criteria.

The requirements, set forth in article 17,<sup>39</sup> relate to greenhouse gas reductions, land with a high biodiversity value and land with a high carbon stock and agri-environmental practices. In brief, to qualify for financial support, biofuels and bioliquids have to reduce greenhouse gas emissions and must not be produced using raw materials from the land with a high carbon stock or high biodiversity value. In addition, where biofuels and bioliquids are made from raw materials produced within the European Union, they should also comply with European environmental requirements for agriculture.

However, and this is a crucial point, according to the Directive, the Commission will report every two years to the European Parliament and the Council on the impact on social sustainability of the increased demand for biofuel in the EU and in third countries and on the impact of the EU biofuel policy on the availability of foodstuffs at affordable prices, in particular for people living in developing countries. The reports will also address to what extent land-use rights have been respected. They will state, both for third-world countries and Member States, whether the country has ratified and implemented some Conventions of the

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<sup>37</sup> Mayer et al. (2013).

<sup>38</sup> High Level Panel of Experts (HLPE) on Food Security and Nutrition of the Committee on World Food Security (2013).

<sup>39</sup> EC Renewable Energy Directive 2009/28; EC Renewable Energy Directive 2009/30, Art. 7.

International Labour Organisation mentioned in the Directive, such as the Convention concerning Forced or Compulsory Labour, the Convention concerning Equal Remuneration of Men and Women Workers for Work of Equal Value, the Convention concerning the Abolition of Forced Labour, the Convention concerning Minimum Age for Admission to Employment, etc. In addition, the Commission will, if appropriate, propose corrective actions, in particular if evidence shows that biofuel production has a significant impact on food prices.

The Commission is also invited to submit a further report concerning the impact of Indirect Land Use Change (ILUC) on greenhouse gas emissions and address ways to minimize that impact. The report can be accompanied by a proposal containing a concrete methodology for emissions from carbon stock changes caused by indirect land-use changes.<sup>40</sup>

In the wake of these provisions, a Report from the Commission on indirect land-use change related to biofuels and bioliquids was issued in 2010<sup>41</sup> and a Proposal for a directive amending the Renewable Energy Directive and the Fuel Quality Directive was published on October 2012.<sup>42</sup> According to the Report, the increased use of biofuels in the EU raises the existing demand for agricultural commodities; thus, the biofuel feedstock needed may be produced on land *directly* converted from another status (such as forest or grassland, etc.) to agricultural land. However, in order to comply with the sustainability criteria introduced by the Directives, raw material could instead be cultivated on existing agricultural land. In this case, as the nonfuel demand (for food, feed or fiber) will still need to be satisfied, it could mean that nonagricultural land will be brought into production. Through this route, the extra biofuel demand could lead indirectly to land-use change. Moreover, the land-use change may not be induced locally but could take place even on different continents.

Although land-use change can have a wide range of impacts (greenhouse gases, biodiversity, social issues, etc.), the amendment proposal of the current European legislation only focuses on the consequences of the greenhouse gas emissions of biofuels, as required by the Directives. This phenomenon takes place when ILUC involves the conversion of high carbon stock land, which can lead to significant CO<sub>2</sub> emissions, thus reducing the GHG emissions savings that biofuels would provide by the displacement of fossil fuels.

The main aims of the proposal should be to start the transition to advanced biofuels, such as those made from wastes and algae, and to address ILUC. For these purposes, the proposal introduced a cap of 5 % for conventional biofuels (those produced from food crops) to count towards the targets of the Renewable Energy

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<sup>40</sup> EC Renewable Energy Directive 2009/28, Art. 19.6.

<sup>41</sup> Commission (EC) Report on indirect land-use change related to biofuels and bioliquids (Communication) COM(2010) 811 final, 22 December 2010.

<sup>42</sup> Commission (EC) Proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources COM(2012) 595 final, 17 October 2012.

Directive and a new incentive scheme to further promote sustainable and advanced biofuels from feedstocks that do not create an additional demand for land.

As far as the indirect land-use change is concerned, the Commission's proposal (assuming that a number of uncertainties were associated with the available models used to quantify indirect land-use change) did not include the ILUC factors among the criteria required for biofuels. Thus, although the proposal could act under the framework of the precautionary principle that might have allowed the introduction of such measures, it only established the introduction of reporting estimated emissions from carbon stock changes caused by indirect land-use change based on the best available scientific evidence. The following step within the legislative procedure, which is likely to proceed very slowly, took place in September 2013 when the European Parliament approved the draft with amendments without introducing ILUC factors into the sustainability criteria.

It is not worth going into more detail on the proposal and its weaknesses, given that it may never be passed; instead, it seems more appropriate to focus on some questions related to the sustainability criteria currently in force.

As already mentioned, EU policy only takes into account environmental sustainability issues which, however, just looking at the EC's Report on ILUC, do not seem to have been effectively tackled. Moreover, in order to deal with negative impacts on social sustainability and the availability of foodstuffs at affordable prices, and to guarantee the respect of land rights and the well-being of employees, the Directives set out the need for a biannual report from the Commission instead of a mandatory system of rules. However, the current amending proposal still does not address the social impacts of biofuels.

Is the proposal a missed opportunity for giving prominence to the social issues connected to biofuel production? It is worth noting that under the framework of the Policy Coherence<sup>43</sup> for Development, the EU is carrying out studies on the impact on developing countries of the European biofuel policy and of the increased demand for biofuels. In addition, international working groups, such as the Global Bioenergy Partnership,<sup>44</sup> and a number of NGOs advocate a comprehensive certification of biofuels to ensure the production of biomass in a socially and environmentally sustainable way.

So why does the EU not consider expanding the sustainability criteria to include social standards, food security, access to natural resources? Maybe one answer lies in international trade regulation. Given that the Directive affects global trade flows, the EU has to ensure that the sustainability criteria issued are compatible with the applicable World Trade Organization law. In other words, the implementation of certain trade measures in terms of biomass sustainability criteria need to be compliant with the rules of the GATT Agreement.

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<sup>43</sup> Commission (EC) Policy Coherence for Development Work Programme 2010–2013 (Commission Staff working document) SEC(2010) 421 final, 21 April 2010.

<sup>44</sup> Global Bioenergy Partnership [GBEP] (2011).

The complexity of the question can be simplified by underlining, firstly, that according to the principles of nondiscrimination, Member States cannot discriminate between *like products*, though an equal treatment of ‘like’ products is mandatory. Secondly, sustainable and nonsustainable biomass and biofuels can be regarded as ‘like’ products. Thirdly, GATT article XX lists a number of exceptions that could, however, justify trade restrictive measures that would otherwise be incompatible with WTO obligations. Therefore, the main question is whether the enforcement of socially and environmentally oriented sustainability criteria can be considered as part of the exceptions presented in article XX. As the exceptions only refer to environment-related measures, the provision of criteria to avoid competition with food products and social standards are most probably not compliant with WTO rules.

The proposed ILUC factors could also be highly sensitive because the available numerical assessment models are not robust enough to be defended within an agreed market regime, such as the WTO. This topic<sup>45</sup> is truly vast, and a thorough analysis is beyond the scope of the present paper. However, the matter was already being taken into serious account by the EU when Directive 2009/28/EC was still at the proposal stage.<sup>46</sup> Indeed, if the EU wants to introduce social sustainability criteria and ILUC factors, these international challenges need to be considered among the other issues at stake.

## 5 Concluding Remarks

The initial surge in biofuel production in many countries worldwide was driven by energy security goals and rising fossil fuel prices. It was soon realized that market forces alone were not sufficient to drive the process, which required heavy policy support (subsidies, quota obligation schemes and tariffs for imports). Yet the gap between the demand for biofuels and the potential domestic supply in developed countries entailed expanding biofuel production in developing countries, which had the land and the climate suitable to produce raw feedstocks on a large scale.<sup>47</sup> This condition triggered a number of social and environmental issues related to biofuel production and trade.

Since the emergence of its biofuel policy, the European Union has attempted to give appropriate attention to such concerns, as revealed from the communications, resolutions, proposals, drafts and legislation issued by its Institutions over the years. Looking at the EU biofuel policy from this perspective may make it seem that policy is being totally shaped by the worries stemming from the growth of the biofuel sector.

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<sup>45</sup> Lendle and Malorie (2010); Switzer and McMahon (2011) at pp. 713–736.

<sup>46</sup> Btg Report prepared for DG TREN [EC] (2008).

<sup>47</sup> FAO (2013).

However, in an attempt to further check the level of coherence and effectiveness of the measures set down, one could argue that the objectives have not been completely met and even some external issues have arisen: the efforts to solve the problems of fossil fuel dependence and greenhouse gas emissions have actually created several other problems. Indeed, the same climate change mitigation goal seems to have failed, considering the last proposal for the amendment of the Renewable Energy Directive. The initial aim to introduce the ILUC factors into the current regulation proves that biofuel may not be sufficiently efficient to reduce GHG emissions.

Moreover, current sustainability criteria do not properly address social sustainability: social dimensions tend to revolve around a few documents and reports that are supposed to be issued by the Commission.

In this connection, the EU biofuels policy could face a complex dilemma in the next few years. In fact, its development may lead to a situation in which the choice to introduce indirect land-use change factors into the regulations could result in an increase in “indirect food insecurity” (IFI).

ILUC emissions are extremely important if we want to guarantee the real effectiveness of biofuel in reducing GHG emissions. However, introducing the ILUC factors, without seriously improving the whole system, could lead to a worse effect in many countries, encouraging producers to shift from producing food crops to biofuel feedstocks. This may result in the effect that providing environmental protection—by preventing biofuel companies from the conversion of certain areas such as high-value forests or peatlands to grow feedstocks—could increase food insecurity. In the same way, drawing attention to food availability could affect the ability of biofuels to reduce GHG emissions and their impact on climate change and environmental protection.

Apart from this ‘ILUC-IFI dilemma,’ and, perhaps making the situation worse, it has also been noted that “another limitation of the existing biofuel certification schemes is the concern that small-scale farmers are left out of these biofuel developments because of the dominant governance structure of these certifications led by large-scale agro-industry and the cost structure of certification, which is out of reach for most smallholders.”<sup>48</sup> Although this assumption actually refers to all kinds of certification schemes, both public and private, the EU biofuel sustainability criteria themselves lack a structure that would enhance full participation by smallholders. This once again highlights the weak link between the EU biofuel legislation and its social implications.

To conclude, it is worth wondering whether the EU biofuel legislation, defined by the Commission as the “the most comprehensive and advanced sustainability scheme anywhere in the world,”<sup>49</sup> has been failing in the path towards environmental sustainability and food security objectives. While the policy structure articulates a range of principles and criteria on sustainability, each of which can

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<sup>48</sup> FAO (2013).

<sup>49</sup> Commission (EC) Report on indirect land-use change related to biofuels and bioliquids.

be agreed on, the real challenge has been its implementation on the ground—which has revealed several flaws.

## References

- Ajanovic A (2010) Biofuels versus food production: does biofuels production increase food prices? *Energy*. doi:[10.1016/j.energy.2010.05.019](https://doi.org/10.1016/j.energy.2010.05.019)
- Alabrese M (2012) Land use, bioenergy and sustainability. *EU Agrarian Law* 1(2):38–45
- Cotula L, Dyer N, Vermeulen S (2008) Fuelling exclusion? The biofuel boom and poor people's access to land. IIED/FAO, London
- Danish KW (2007) The international regime. In: Gerrard MB (ed) *Global climate change and U.S. law*. ABA Publishing, Chicago, pp 31–56
- DG TREN [EC] (2008) Sustainability criteria and certification systems for biomass production. [http://ec.europa.eu/energy/renewables/bioenergy/doc/sustainability\\_criteria\\_and\\_certification\\_systems.pdf](http://ec.europa.eu/energy/renewables/bioenergy/doc/sustainability_criteria_and_certification_systems.pdf). Accessed 24 Mar 2014
- Doornbosch R, Steenblik R (2007) Biofuels: is the cure worse than the disease? OECD Publishing, Paris. <http://www.oecd.org/sd-roundtable/39411732.pdf>. Accessed 24 Mar 2014
- FAO (2013) Biofuels and the sustainability challenge: a global assessment of sustainability issues, trends and policies for biofuels and related feedstocks. FAO, Rome. <http://www.fao.org/docrep/017/i3126e/i3126e.pdf>. Accessed 24 Mar 2014
- Franco J, Les Levidow DF, Goldfarb L, Hönicke M, Mendonça ML (2010) Assumptions in the European Union biofuels policy: frictions with experiences in Germany, Brazil and Mozambique. *J Peasant Stud* 37(4):661–698
- Global Bioenergy Partnership [GBEP] (2011) The global bioenergy partnership sustainability indicators for bioenergy. FAO/GBEP, Rome. [http://www.globalbioenergy.org/fileadmin/user\\_upload/gbep/docs/Indicators/The\\_GBEP\\_Sustainability\\_Indicators\\_for\\_Bioenergy\\_FINAL.pdf](http://www.globalbioenergy.org/fileadmin/user_upload/gbep/docs/Indicators/The_GBEP_Sustainability_Indicators_for_Bioenergy_FINAL.pdf). Accessed 24 Mar 2014
- High Level Panel of Experts (HLPE) on Food Security and Nutrition of the Committee on World Food Security (2013) Biofuels and food security. HLPE, Rome. [http://www.fao.org/fileadmin/user\\_upload/hlpe/hlpe\\_documents/HLPE\\_Reports/HLPEReport5\\_Biofuels\\_and\\_food\\_security.pdf](http://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE_Reports/HLPEReport5_Biofuels_and_food_security.pdf). Accessed 24 Mar 2014
- Hira A, de Oliveira LG (2009) No substitute for oil? How Brazil developed its ethanol industry. *Energy Policy* 37:2450–2456
- Lendle A, Malorie S (2010) Sustainability criteria in the EU renewable energy directive: consistent with WTO rules? ICTSD, Geneva
- Mayer S, Schmidhuber J, Barreiro-Hurlé J (2013). Global biofuel trade: how uncoordinated biofuel policy fuels resource use and GHG emissions. ICTSD, Geneva. <http://www.ictsd.org/downloads/2013/05/global-biofuel-trade-how-uncoordinated-biofuel-policy-fuels-resource-use-and-ghg-emissions.pdf>. Accessed 24 Mar 2014
- OECD (2008) Biofuel support policies an economic assessment. OECD Publishing, Paris
- OECD/FAO (2012) Biofuels. In *OECD-FAO agricultural outlook 2012*. OECD Publishing, Paris. [http://dx.doi.org/10.1787/agr\\_outlook-2012-6-en](http://dx.doi.org/10.1787/agr_outlook-2012-6-en). Accessed 24 Mar 2014
- Pimentel D (ed) (2012) *Global economic and environmental aspects of biofuels*. Taylor and Francis Group, Boca Raton
- Sorda G, Banse M, Kemfert C (2010) An overview of biofuel policies across the world. *Energy Policy* 38(11):6977–6988
- Switzer S, McMahon JA (2011) EU biofuels policy—raising the question of WTO compatibility. *Int Comp Law Q* 60(3):713–736. doi:[10.1017/S0020589311000285](https://doi.org/10.1017/S0020589311000285)

- Tilman D, Socolow R, Foley JA, Hill J, Larson E, Lynd L, Pacala S, Reilly J, Searchinger T, Somerville C, Williams R (2009) Beneficial biofuels—the food, energy, and environment trilemma. *Science* 325(5938):270–271
- UN News Centre (2007) UN independent rights expert calls for five-year freeze on biofuel production (October 26, 2007). <http://www.un.org/apps/news/story.asp?NewsID=24434&#U1ud4cY47K9>. Accessed 24 Mar 2014
- World Bank (2008) Rising food prices: policy options and World Bank response. World Bank, Washington, DC. [http://siteresources.worldbank.org/NEWS/Resources/risingfoodprices\\_backgroundnote\\_apr08.pdf](http://siteresources.worldbank.org/NEWS/Resources/risingfoodprices_backgroundnote_apr08.pdf). Accessed 24 Mar 2014
- Zilberman D, Hochman G, Rajagopal D, Sexton S, Timilsina G (2013) The impact of biofuels on commodity food prices: assessment of findings. *Am J Agric Econ* 95(2):275–281