

Analysis of the Mechanisms to Control the Fulfillment of the EU Sustainability Criteria for Biofuels in Directive 2009/28/EC

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Abstract—The article analyzes mechanisms established to control the fulfillment of the EU sustainability criteria for biofuels that were presented in Directive 2009/28/EC. The article is the continuation of the research started in the work Pavlovskaja, E. (2013) “Controlling the Fulfillment of the EU Sustainability Criteria for Transport Biofuels”, which was published in RELP 4/2013. The conducted analysis is grounded in the opinions of the leading researchers in the environmental energy studies.

The results of the article highlight that there are difficulties to achieve the desirable quality of control when the EU sustainability criteria are implemented. It is pointed out that EU allows the co-existence of voluntary sustainability standards with corresponding sustainability criteria, benchmarked by the EU Commission, that basically function on their own. What is more, EU relies much on independent auditors. The results of their work are not double-checked by any of the EU administrative bodies. This can give rise to fraud at any stage of the production chain.

A number of aspects in the EU approach are detected that are not easy to get better in practice. For example, control of the sustainability criterion on the use of land presupposes the existence of a regime that functions beyond state boundaries, and is continually supervising land use in different parts of the planet. There is no such a regime or its elements at present, and it is doubtful whether and when it will be created in the future. Besides, it is not clear how production chains for biofuels should be defined, how this information should be controlled, and who will control the work and competence of the engaged independent auditors. A repeating question is that it is problematic how all companies involved in the biofuel production and supply can practically be identified and then controlled.

The article discusses possible ideas for improvement.

Keywords—biofuels; Directive 2009/28/EC; sustainability criteria; implementation; control of the fulfillment; environmental law

I. INTRODUCTION

The analysis of the EU framework for biofuels indicates that an important issue that concerns the implementation of sustainability criteria for a product [1] is how their practical fulfillment is controlled and verified [2]. In this article, control mechanisms of the fulfillment of the EU sustainability criteria, regulated in Directive 2009/28/EC and initially explored in the article Pavlovskaja, E. (2013) “Controlling the Fulfillment of the EU Sustainability Criteria for Transport Biofuels”, published in RELP 4/2013, are further analyzed and reflected upon. Their benefits and drawbacks are highlighted and discussed.

Particular attention is paid to how the suggested control mechanisms are planned to function and their potentiality to fulfill their purpose. Practical possibilities of the involved actors to comply with the regulations on control from Directive 2009/28/EC are considered. Promising ideas for improvement are discussed.

To make it easier for the reader, the structure of the present article follows the structure of the first article about the mechanisms to control the EU sustainability criteria for biofuels.

II. PREVIOUS RESEARCH ON THE MECHANISMS TO CONTROL THE FULFILLMENT OF THE EU SUSTAINABILITY CRITERIA IN DIRECTIVE 2009/28/EC

A. Applying the Meta-standard Model

In earlier investigations, the meta-standard model was applied by several researchers on the EU approach to fulfill and control the fulfillment of the sustainability criteria for biofuels [3]. This model was chosen, because it suited to describe and analyze the development of the situation with the EU sustainability criteria. Compliance with them, according to the EU regulations, can be achieved through the benchmarking of the existing voluntary sustainability standards, which were approved to guarantee that the sustainability criteria of Directive 2009/28/EC are fulfilled [4].

The meta-standard model can be described as a less hierarchical and non-state-centric governance approach. In its wide meaning it can be understood as “governing of governing”. It represents a set of established principles or norms that shape and steer the entire governing process. There are no clearly delimited settings, within which meta-governance should take place, or particular persons, who should be responsible for this.

Schlegel and Kaphengst (2007) defined the meta-standard model as a benchmark model that relied on different existing sustainability standards [5]. Taking biofuels as an example, Pelsy (2008) meant that an existing voluntary sustainability standard for sustainable biofuels may, through an evaluation process in compatibility with the EU law, be approved as qualifying standards of the main meta-standard for biofuels [6].

Among the main characteristics of the meta-standard model, there is a need for a precise explanation of what

makes a product sustainable, as well as clearly formulated requirements, principles and criteria for its sustainable production and, where necessary, sustainable transportation. Sustainability criteria for transportation can be an issue for a separate sustainability standard that is valid for several products of a similar type.

To my mind, describing and analyzing the EU approach to the sustainability criteria for biofuels with the help of the meta-standard model is an interesting and viable idea. It can be discussed to what extent the meta-standard model is an appropriate instrument here, taking into consideration that the EU policy-makers have neither given this name to their approach, nor have applied this model. On the other hand, the use of the meta-standard model highlights different aspects of the EU approach to biofuels, which otherwise were not prominent.

B. Other Critical Issues Addressed in the Previous Research

Matus (2010) provided valuable response from a workshop, which brought together biofuel producers with those who draft sustainability criteria, and auditors who control their fulfillment. The workshop was held in the USA, and did not have direct connection to the EU policy for biofuels. The purposes of the workshop were to identify the primary barriers to the implementation of sustainability requirements for biofuels, define pilot testing scenarios and start working at potential solutions [7]. On the basis of the held discussions, Matus pointed out that producers, who were certified to voluntary sustainability standards, experienced certain difficulties to prove that they were meeting the required sustainability criteria [8].

Matus continued that there was a process of transition into operation that had to occur between the sustainability criteria formulated in a standard, and an actual guidance that producers received about the actions that were required of them. During this process, there was a tension between ensuring credibility and understanding what practices were actually possible for the producers [9]. Matus underlined that the capacity for implementation and verification on the ground were especially important for small-scaled producers.

The opinion of Matus about “the process of transition into operation” reminds the operationalization approach of the Swedish researcher Westerlund. He (2003) meant that an environmental goal should be transformed and explained with the help of different rules, so that it is clear for the involved actors what they are obliged and not obliged to do, in order for the environmental goal to be achieved [10]. The opinion of Matus is of much value. It contains reflections on what is important for the practical implementation of sustainability criteria.

Doornbosch and Steenblik (2007), who did their research within the forestry sector, demonstrated that for

a voluntary sustainability standard for forestry it was difficult to develop efficient control mechanisms that checked the production chain of wood products from the very beginning in forest, up to the final stage. The researchers pointed out that wood could be processed into many different products and sourced from many different wood species, origins and owners and that shipping documents could be easily falsified. They also stressed that the efficiency of sustainability standards for forestry was undermined by the segmentation of the market. Wood products from sustainable sources supplied a small higher price market segment, whereas non-sustainable products went to the rest of the market. Doornbosch and Steenblik argued that the profusion of different sustainability standards for forestry undermined the potential for increased transparency in the market and the costs facing sustainable producers [11].

The discussion addressed towards the voluntary sustainability standards for forestry could most likely be applied to the biofuel sector, though sustainability standards for biofuels could experience more complex difficulties than forest sustainability standards, since the production chain for biofuels is more complicated [12].

III. TWO LEVELS OF CONTROL ANALYZED IN THE ARTICLE

Following the research patterns developed in the article Pavlovskaja, E. (2013) “Controlling the Fulfillment of the EU Sustainability Criteria for Transport Biofuels”, which was published in RELP 4/2013, two main levels of control of the fulfillment of the sustainability criteria were distinguished.

The first level of control is exercised by EU, more exact by the EU Commission, on how the legislated sustainability criteria are fulfilled by the Member States. The second level of control should take place within each Member State. This implies that each Member State organizes a national control system of how the sustainability criteria for biofuels are fulfilled. The second level of control includes meeting bilateral and multilateral agreements, which confirm compliance with some or all of the sustainability criteria from Directive 2009/28/EC. Another possibility to count that the sustainability criteria are fulfilled is when similar sustainability criteria in voluntary sustainability standards approved by the EU Commission are complied with. This possibility can also be referred to the second level of control.

As an example of the first level of control, the EU Commission is required to report to the EU Parliament and Council every two years on the implementation of measures taken to fulfill the sustainability criteria from Directive 2009/28/EC, as well as on the impacts of the EU biofuel policy on a range of concerns, such as food prices in developing countries and land-use rights. As a separate issue, the Commission shall highlight environmental impacts, environmental costs and

benefits, and availability of biofuels produced of wastes, residues and non-food cellulosic material.

In the present article, the attention is concentrated on the second level of control, which consequently contains three main approaches to control the fulfillment of the sustainability criteria at the level of the Member States (see Figure 1):

- 1) to follow regulations in Directive 2009/28/EC and guidelines in the related policy documents on how the sustainability criteria in Article 17 shall be controlled (Articles 18 and 19), and to implement or transpose these regulations in a national legislation;
- 2) to use a voluntary sustainability standard, one or several, approved by the Commission; and
- 3) to meet bilateral or multilateral agreements concluded by EU with third countries and approved by the Commission. The agreements shall confirm compliance with some or all of the sustainability criteria from Directive 2009/28/EC.

The last approach, to meet a bilateral or multilateral agreement, is only encouraged in Directive 2009/28/EC, but is neither thoroughly regulated, nor explained. The article does not analyze this possibility, even though it presents an interesting field of investigation. An explanation for this is that when the research on the control issue started, no bilateral or multilateral agreements were met, and the opportunity of this was still rather theoretical. That is why this approach is schematically marked with a dotted line on Figure 1.

sustainability criteria in Directive 2009/28/EC. Its description can be found in Article 18, where it is called "Verification of Compliance with the Sustainability Criteria". It is mainly based on the obligation of the Member States to get evidence of compliance with the sustainability criteria from economic operators. Economic operators should be obliged "to arrange for an adequate standard of independent auditing", see Article 18.3. The control mechanisms promoted here are based on the chain of custody method and the mass balance system.

The second type of rules on control (Box B) is also based on the evidence of compliance from economic operators, though it is more specific. It mainly concerns the fulfillment of the first sustainability criterion that deals with GHG emission savings. A special calculation methodology, using default values or an actual value, is provided for this purpose in Directive 2009/28/EC. The third type of rules (Box C) is aimed to control the use of land, and can be applied to the second, third and fourth sustainability criteria that deal with the land use. It should also be based on the evidence of compliance from economic operators, though control mechanisms for this type of rules were not thoroughly developed in Directive 2009/28/EC. The difficulty here is that the majority of land for the biofuel production is located outside EU, often in different parts of the world, and it is not clear how EU planned to establish control.

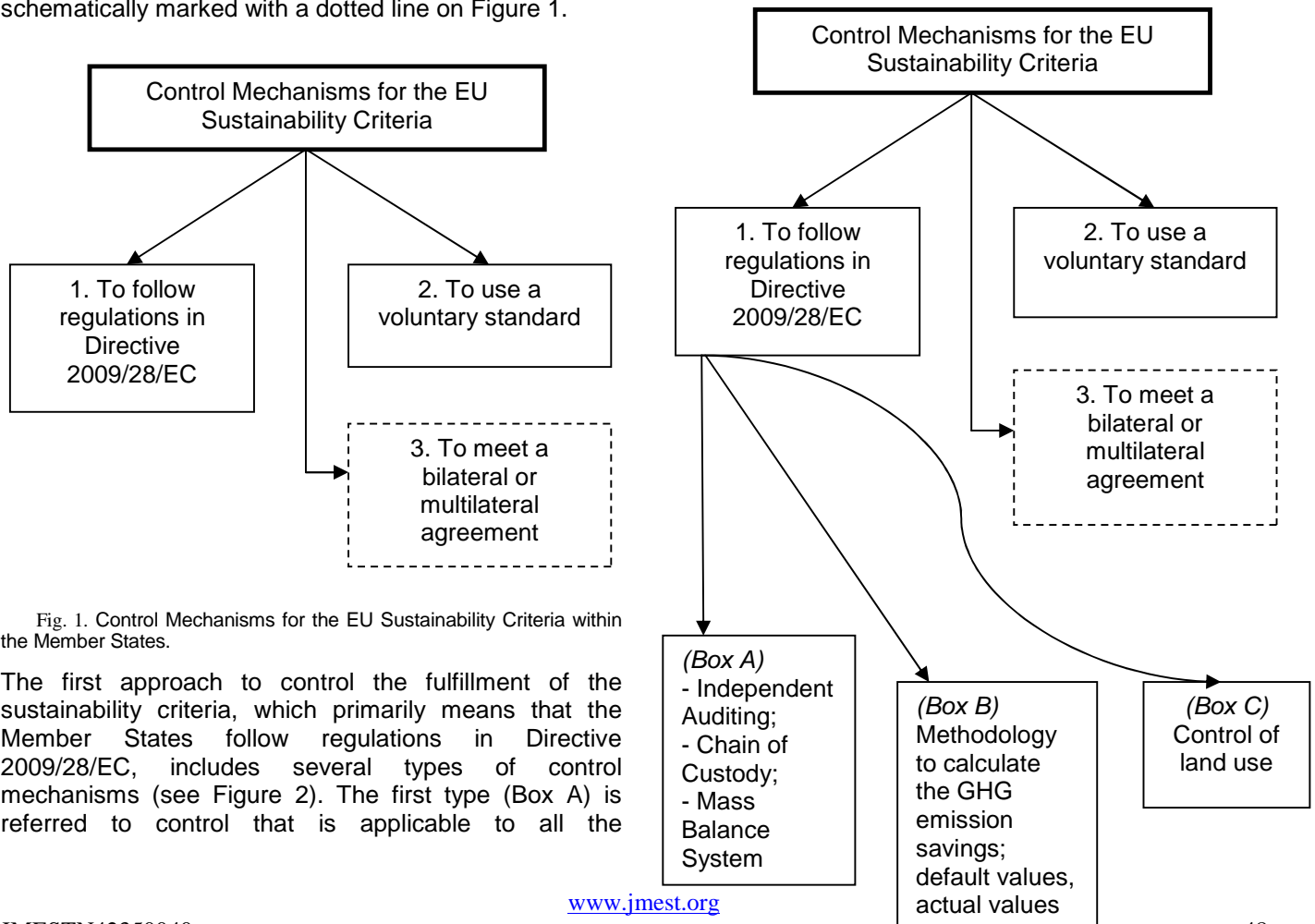


Fig. 1. Control Mechanisms for the EU Sustainability Criteria within the Member States.

The first approach to control the fulfillment of the sustainability criteria, which primarily means that the Member States follow regulations in Directive 2009/28/EC, includes several types of control mechanisms (see Figure 2). The first type (Box A) is referred to control that is applicable to all the

Fig. 2. Control Mechanisms for the EU Sustainability Criteria within the Member States, detailed.

IV. REFLECTIONS ON THE FIRST LEVEL OF CONTROL: CONTROL BY THE EU COMMISSION OF THE MEMBER STATES

As explained above, the first level of control is represented by the control of the EU Commission of how the Member States are implementing and fulfilling the legislated sustainability criteria. It also includes reporting obligations of the EU Commission to the internal EU bodies.

This level of control is efficiently organized and convincing. It is transparent to the public. National Action Plans and regularly reports, which the Member States are obliged to submit, can be easily accessed at a special web-site of EU. This can be seen as a strong advantage of the established approach to control. Reporting obligations of the Commission to the supervising EU internal bodies seems to be efficiently organized and are not in demand of further commentaries.

Thinking about the perspective of the involved actors, it can be highlighted that the control mechanisms used at this level take their practical possibilities and interests into consideration. The control mechanisms are open and responsive to different groups of interest. There are no requirements or control mechanisms that go beyond what the involved actors are able or capable of doing.

V. REFLECTIONS ON THE SECOND LEVEL OF CONTROL: CONTROL WITHIN THE EU MEMBER STATES OF THE FULFILLMENT OF THE SUSTAINABILITY CRITERIA

Control of the fulfillment of the sustainability criteria at the national level is a complex and challenging issue. The process, through which the fulfillment of sustainability criteria can be transformed into implementation practices, is complicated [13]. It should be possible for the involved actors to control the fulfillment of the legislated sustainability criteria at different stages of the production process.

A. *Reflections on the First Type of Rules on Control for All the Sustainability Criteria (Box A in Figure 2)*

a) *Reflections on the Obligations of the Member States towards Economic Operators*

The content of Article 18.1 and 18.3 in Directive 2009/28/EC can be interpreted in such a way that control of the fulfillment of the EU sustainability criteria requires that the Member States ask economic operators to do three types of actions: to submit the required information, to arrange for an adequate standard of independent auditing and to use the mass balance system [14].

The concept “economic operators”, which was not clearly defined in Directive 2009/28/EC [15], requires further explanations. As an example, a group of private actors from France defined “economic operators” as a legal entity that owns biofuels and/or intermediate related products concerned by biofuel processing and supply chain [16]. It can be argued whether this interpretation is consequent with the meaning and purpose of Directive 2009/28/EC.

Groups of actors that can function as economic operators and can be involved in the control mechanisms according to Article 18 can be numerous [17]. These groups should be specified more clearly. Otherwise there is a risk that individual interpretations of this term, made by the Member States or private actors, engaged in a biofuel production chain, will create misunderstandings. Possibly, the term “economic operators” can even include actors that create and work at legally binding frameworks and voluntary sustainability standards for biofuels.

Economic operators can be in demand of different control mechanisms, as long as they work under different circumstances and conditions. As an example, there can be difference in control approaches and mechanisms for a multi-national company and a small local farmer in a developing country. There are also different possibilities for using independent auditing and the mass balance system. This should be taken into consideration.

b) *Reflections on the Chain of Custody*

It is difficult to define precisely the chain of custody for biofuels, especially if they are produced in and imported from countries outside EU. For example, the chain of custody for biofuels of an agricultural origin must be counted from the clearance of the land to the consumption of biofuels. It is very difficult to distinguish each stage in the production chain in this case. It is even more difficult, almost impossible, to control what happens at each stage of the production chain.

Thinking about the perspective of the involved actors, it is doubtful whether the practical possibilities of economic operators to define the chain of custody were taken into consideration.

c) *Reflections on the Mass Balance System*

The concept “the mass balance system” and its meaning with regards to biofuel production was not clearly defined in Directive 2009/28/EC. This can be seen as a drawback of the legal framework, because it is not apparent what exactly the legislators meant.

A weakness of the mass balance system in the case of biofuels is that it is hardly possible to have control of all elements in the chain of custody [18]. Here, the same problem with control can be observed as with the rest of

the EU control mechanisms for biofuels: reports of economic operators on the mass balance system and the fulfillment of the sustainability criteria should be checked by specially established controlling bodies. This control system requires many resources of different kind. The work of a controlling body should, in its turn, be supervised and controlled.

B. Reflections on the Second Type of Rules on Control Concerning the First Sustainability Criterion (Box B in Figure 2)

The first sustainability criterion for biofuels that concerns GHG emission savings is clearly formulated. However, the calculation methodology for this criterion, suggested in Directive 2009/28/EC, is far from being simple or easy to implement. Calculating and controlling the data, got with the help of this methodology, can take much effort from the side of the involved actors. Slight variations in calculation parameters can lead to completely different results, not to say about misses of performance values within a production chain.

A general impression of the EU GHG calculation methodology is that it is rather a start of the development than a fully developed methodology. This methodology includes only a limited number of the default values required to calculate GHG savings of biofuels. It only provides the average specific GHG emissions related to the production and utilization of biofuels, as well as global average and very rough sizes of carbon stocks in wet ecosystems, forests, grassland and agricultural areas (686, 275, 181 and 82 tons C/ha respectively). Other GHG emission factors and specific emissions, for example industrial processes, fuels and fertilizers, are lacking. The presented default values are neither detailed nor referenced, and are for this reason not transparent [19]. What is more, no calculation methodology is included, for example calculation of N_2O emissions, calculation of CO_2 and N_2O emissions from soils or net CO_2 emissions related to changes in vegetation. N_2O emissions should be taken into account, but it is not clear how this should be done [20]. In the report, commissioned by Greenpeace, the available inventory of default values was regarded as insufficient to allow utilization of the existing calculation methodology as a tool [21].

Calculations of an actual value of GHG emissions, specifically created for assessing emissions from biofuels (Annex V in Directive 2009/28/EC), do not provide enough details for the reporting calculations to avoid differences in interpretation, and were commented not to be practical for use in a legal context [22].

Another complex issue is that GHG emissions from converting land types must also be taken into account. Calculations for biofuels must be able to reflect all changes in GHG emissions that take place when

biofuels are produced and used. This needs a lot of knowledge, time and procedure, and may end up as a very expensive process that would have a negative impact on the development of the market of sustainable biofuels [23]. There are various models and reports on predicting GHG emissions from direct and indirect land use changes, primarily with the focus on the production of biofuels of an agricultural origin [24]. They are mostly under elaboration and were not practically tested at a large scale. GHG emissions during transportation of biofuels need also to be factored, which is difficult to achieve practically.

The BioGrace consortium, in the feature of a non-governmental actor, was engaged in checking and development of the calculation methodology for the first sustainability criteria for biofuels. Contribution of the BioGrace was positively assessed. Suggestions of the BioGrace were considered transparent. They provided more precise and detailed information on emission factors from Directive 2009/28/EC [25].

To conclude this section, the control mechanisms for the first sustainability criterion in Directive 2009/28/EC are too vague and complicated to be practical. It is not easy to evaluate and control, if this sustainability criterion is fulfilled. The suggested calculation methodology does not allow for a standardized and systematic calculation approach for GHG emissions. It does not provide sufficient information about the methodology used to calculate the biofuel default values that were proposed [26].

Much development and justifications of this methodology are needed, along with comprehensible definitions of the concepts "co-products", "by-products" and "wastes", because their different interpretations have influence on calculation results. Homogeneous and simplified calculation methods and control mechanisms for GHG performance of biofuels should be introduced, possibly separately from the main body of Directive 2009/28/EC. Further commentaries and guidelines are desirable. Suggested methods or mechanisms should be user-friendly; they should not require the involved actors "to hire multiple contractors to do multiple calculations" [27]. A clear and easy-to-use methodology is essential before GHG emissions within the whole production chain can be assessed [28]. Transparent default values can be recommended, so that it is possible to find more detailed information about them in openly published reference material [29]. Other, more suitable methods to calculate GHG emissions should be suggested.

C. Reflections on the Third Type of Rules on Control Concerning the Use of Land (Box C in Figure 2)

The potential conversion of large areas of native ecological systems for biofuel plantations is one of major concerns for the production of biofuels. The assessment

of risks that biofuel projects can cause deforestation or other land damages is referred to the concepts "land use" and "land use change (LUC)". This issue and the fact that it can be extremely difficult to restore destroyed lands have much relevance for the achievement of sustainability. Sustainability criteria that regulate land use should be included in legal frameworks on biofuel production [30].

The sustainability criteria for biofuels that deal with land use are clearly formulated in Directive 2009/28/EC, but there are practical difficulties in how the fulfillment of these criteria should be controlled [31]. Directive 2009/28/EC and related policy documents contain references on independent auditing as the major control mechanism, which is carefully analyzed in the next section. However, independent auditing in the case of land use should be completed with other means of control, such as aerial photographs, satellite observations of the Earth, maps, registers of data on land use and farming processes, data acquisition and regular field surveys. The European approach to use high-resolution satellite imagery for control of the implementation of the Common Agriculture Policy can serve as a learning experience [32].

Thinking about the perspective of the involved actors, it should be considered to what extent it is possible for them to establish the required control mechanisms, and how much time it can take to develop the efficient function of these mechanisms. Practical limitations of small-scaled producers in developing countries should be taken into account especially. No doubt, such control mechanisms as regular aerial photographs and registers of land use and farming processes would require much technical knowledge and expertise, as well as substantial economic and administrative costs. Satellite observations of the Earth with the purpose to control land use are more of a hypothetical character and cannot be seriously relied upon at present. It is uncertain how the above named control mechanisms for land use can be efficiently applied for the control of the requirements in Directive 2009/28/EC in the short perspective.

In the long perspective, identification, mapping and continuous monitoring of biologically sensitive areas at the local, regional and international levels are of much importance to safeguard the quality of land that can be used for agricultural purposes. International agreements on the protection of these areas can significantly contribute to controlling land use and sustainability [33]. It can be important to work out a list of no-go areas for farming and other agricultural practices, agreed upon by the most relevant environmental actors [34].

For the EU sustainability criteria on land use, it can be recommended that a system of clearly formulated indicators and other supplementary tools should be developed, which will help to assess and control the

fulfillment of these criteria. As the situation is now, there are problems caused by inconsistent definitions of land categories and land use types across the existing legal frameworks and voluntary sustainability standards [35]. This makes the classification of the commonly accepted approaches to land use problematic and contested.

The primary difference between direct (dLUC) and indirect (iLUC) land use change caused by the biofuel production should be observed. If farming of crops for biofuels is started on uncultivated land, it will result in direct land use change [36]. If crops for biofuels are farmed on existing arable land instead of food crops, it will cause indirect land use change because of the necessity to replace the food production [37]. With other words, indirect land-use change occurs when the production of crops for biofuels in a given land pushes the previous agricultural activity to another location [38]. Attention should be paid to difficulties and differences in controlling direct and indirect land use change. There is an opinion that even thoroughly designed legal frameworks and voluntary sustainability standards are not sufficient alone to mitigate direct and particularly indirect land use change [39]. Other policy instruments should be involved.

Indirect land use change is more difficult to detect. Unlike direct land use change, which is openly attributable to biofuel producers, the outcomes associated with indirect land use change are difficult to link to a specific group of actors [40]. In many cases, impacts associated with indirect land use change might not occur until many growing seasons after a biofuel crop is planted [41]. Such factors as the lack of homogeneously agreed definitions of terms "deforestation" and even "forests", simultaneous use of biofuel feedstocks for food, feed and fuels, and geographical disconnections between where planting and deforestation occur complicate the situation even more [42].

Existing legal frameworks and voluntary sustainability standards for biofuels mainly address direct land use change, which is achieved through limiting the types of land, on which the production of crops for biofuels may be established [43]. There are several examples, when the issue of indirect land use change was included in sustainability standards, such as the US EPA's Renewable Fuel Standard and the Brazilian Cane Ethanol and UNICA approach [44]. These examples are in demand of further research.

The EU policy on biofuels does not deal with indirect land use change. The position of EU is that indirect land use change should not be included as a sustainability requirement in any of the reporting methodologies, because it is difficult to calculate, predict and validate [45]. It is desirable that the EU Commission undertakes further attempts to address and control this issue [46].

Indirect land use change in governance regimes created a great deal of opposition, primarily from industry actors, who meant that they were “being penalized for actions that were beyond their control” [47]. This argument should be seriously analyzed, when the perspective of the involved actors is considered, because it should be possible for local producers to control the fulfillment of sustainability criteria.

A study that investigated internationally existing methodologies to calculate the impacts of indirect land use change on GHG emissions showed that there were major discrepancies, when the methodologies were applied at different biofuel production processes. The study, compiled by BeCitizen (2009), which is a French environmental consultancy [48], concluded that negative or positive impacts of biofuels on GHG emissions could vary a lot depending on the crop and zone of production, and asserted that the existing research showed a low level of robustness [49]. The five methodologies reviewed in the study included those elaborated by the researchers Searchinger, T., Fritsche, U. and Fargione, J., and the organizations Ecofys and Friends of the Earth. The methodologies were analyzed according to the assessment criteria identified by the EU Commission that are:

- the percentage of land displaced per hectare of biofuel planted;
- the type of land and the country where the substitution takes place; and
- the GHG emissions linked to indirect land use change.

Further, the chosen methodologies were reviewed according to eight sub-criteria: the total value of given biofuels' by-products, the level of yield, integration of biofuels produced from wastes and by-products, the type of land affected by indirect land use change, the carbon stored by the new crop, the timescale of carbon balance calculation, evolving carbon emissions, and the source data for calculating emissions. The consultancy stressed that an in-depth research should be conducted in order to develop a robust methodology, incorporating all the above factors [50].

D. Reflections on Independent Auditing as a Control Mechanism

Independent auditors are becoming important actors in the environmental arena. Their participation and competence play a significant role for environmental sustainability. From the content of Directive 2009/28/EC and related policy documents, it can be judged that independent auditing is aimed to play a significant role as a control mechanism in the EU policy for biofuels. It can be used to control the fulfillment of all the EU sustainability criteria in Directive 2009/28/EC and within the voluntary sustainability standards benchmarked by the EU Commission. Independent auditing can also be applied as a control mechanism in bilateral and

multilateral agreements, though this opportunity was not widely investigated.

In the mentioned above cases, the use of independent auditing implied that much initiative was given to private, non-governmental actors [51], some of whom were located outside EU and did not have any natural connection to the EU governing bodies. This solution received critical remarks [52]. Donnelly (2007) described that it could be erroneous to assume that delegation to private actors would “enhance efficiency and effectiveness”. Instead delegation to private actors might “only enhance efficiency and effectiveness, when it was accompanied by a complex array of favorable conditions, such as a strong, supervisory framework and satisfactory market conditions” [53].

Quite a long list of disadvantages can be made, when the EU delegation of control to private actors in the form of independent auditing is analyzed. Thus, there can be a reduction in the EU autonomy, when some of its controlling functions are delegated to private actors. Private actors often have their own requirements and agenda, and it can be difficult for EU to find out if the private actors are pursuing their own interests at the expense of the EU framework for biofuels [54].

Basing on the results of the research (2011 – 2012) of Lin, it can be speculated that EU in its feature of the delegator is not able to have a better understanding of the private actors' interests, actions and needs than the private actors themselves [55]. A combination of information asymmetry and different, sometimes competitive interests of EU and independent auditors can result in an undesirable behavior from the side of the latter. There is a probability that the private actors will act according to the EU policy for biofuels only if it is advantageous for them to do so. In some situations, the private actors might lack incentives to ensure correctness of the reported information. This indicates that the use of independent auditing as a control mechanism requires careful considerations and appropriate design, in order to obtain the right balance between the discrepancy of interests [56] and to be protected against fraud.

Some researchers highlight that independent auditors and their reports on environmental impacts are less independent than they ought to be, if the auditing is paid by private companies that hire this type of services [57]. While the auditors are independent from the fulfillment of the sustainability criteria, they can be hired by those who are in need of the audits and are interested in positive results in sustainability. Under these conditions, judgments of auditors can be subjective [58].

Delegation of control outside EU can restrict the ability of the private actors to respond effectively to changes and cause inflexibility. The proliferation of new rules can lead to their vague and inconsistent implementation, which

will frustrate the achievement of sustainability goals [59]. It can also be difficult to transpose the EU regulations and policy guidelines on control to local conditions, especially in countries with weak infrastructure and underdeveloped legal order.

The checks of independent auditors should include a clear identification of the whole production chain, as well as visits and examinations of production places. When they are applied, there is always uncertainty to what extent EU can rely on their results, without double checking the internal work of all the involved private actors. Another issue for consideration is how much initiative EU should give to independent auditors and other private actors. This is important, because some sustainability aspects are difficult to evaluate at the level of separate private actors, since environmental impacts can occur far beyond the limits of the biofuel production areas [60]. An environmental impact connected to a sustainability criterion can be beyond the responsibility of a single producer.

Some researchers warn that independent auditors during their sparse checks might only see narrow pictures of production processes. In cases when producers may be cheating, independent auditors might deal with how they maintain their own credibility. Besides, auditing procedures have to resolve the tension between providing their services at a reasonable cost, and maintaining a system that is enough safe against fraud [61].

Reliability of independent auditing can be influenced by how regularly independent controls on the spot and checks of reported documents are made. This issue deals primarily with the quality of control, and is based on considerations how much economic and administrative resources can and should be put in. It is possible to organize controls annually. However, to be more satisfactory, controls on the spot and checks of reported documents should be made more often, and the requirements to their content should be more detailed in each particular case.

It is significant that independent auditing is carried out with the highest degree of professional competence and a broad range of expertise [62]. Independent auditors have to be updated about developing practices and technologies. They should be capable of identifying environmental problems, and, what is often more complicated, suggest solutions [63]. It can be difficult to find individuals, whose knowledge corresponds to environmental and technical issues that are embraced by the EU sustainability criteria for biofuels. In some cases, auditing firms can hire technical experts, or invite auditors with the necessary background from other areas. Both of these solutions can considerably increase the costs of independent auditing [64].

According to the EU recommendations, companies that import or produce biofuels should bear expenses for controlling sustainability for this type of a product. It can be presupposed that costs of the private actors for this procedure can be essential. The expenses will additionally increase in situations, where there are no adequate facilities and equipment in the region, and necessary controls and tests have to be made in other regions. Lack of infrastructure, required for control, should also be considered. The importance of linking the fulfillment of the sustainability criteria with conditions for independent auditing, testing laboratories, assessment and other control instruments, in order to reduce costs for sustainability expertise, should be discussed [65].

To conclude this section, a question can be highlighted about how EU aims to control the work of independent auditors, because their work cannot be left without control. This issue that can be ironically called "who will control the controller?" might be one of the weakest points in the EU approach to biofuels. Another sensitive question refers to how much administrative personal should be engaged in independent auditing, because their number should be reasonable and economically sustainable. As the EU system of control is planned now, there should be many specialists of different qualifications involved in numerous control procedures.

E. Reconsideration of the Fulfillment of the Sustainability Criteria

The decision-makers should be able to get information about the achieved results [66], in order to make necessary reconsiderations and improvements. In the case of the EU framework for biofuels, this need is fully satisfied through the reporting obligations of the involved actors, expressed in Directive 2009/28/EC. The concept "reconsideration" is not used in Directive 2009/28/EC. Its importance is not specifically explained there. However, much attention in the EU framework is paid to the analysis of the achieved results, their evaluation and the improvement of the future development. This implies that the issue of reconsideration of how the EU sustainability criteria for biofuels are fulfilled functions in the EU policy for biofuels as it should and develops in line with its aims.

VI. REFLECTIONS ON OTHER APPROACHES TO CONTROL THE FULFILLMENT OF THE EU SUSTAINABILITY CRITERIA

The traditionally used top-down approach [67] to control the fulfillment of requirements in a legal framework showed to have certain implementation difficulties. The need to test other forms of establishing control, or their elements, became urgent. A search for new forms of control mechanisms that are efficient in regard to their purpose, and are administratively least expensive is an on-going process. This process is occurring not only at the national or international levels, or in the sector of biofuels. It embraces different governmental and non-

governmental initiatives, as well as different spheres of production.

In these circumstances, it is interesting to discuss less traditional approaches to control that EU applied, and namely meeting bilateral and multilateral agreements, and using the existing voluntary sustainability standards. Reflections on these approaches are made below.

A. Reflections on Meeting Bilateral or Multilateral Agreements

The EU control mechanism of meeting bilateral and multilateral agreements did not get a thorough and detailed regulation in Directive 2009/28/EC. There were no practical examples of its use at the moment of preparing the article. The idea to meet bilateral or multilateral agreements with the purpose to safeguard the fulfillment of the legislated sustainability criteria seems efficient and productive. Much depends, however, on the implementation of this idea in each particular case and on the harmonization of the requirements in concluded agreements. This can be a broad field for further research.

B. Reflections on Using Existing Voluntary Sustainability Standards

The EU approach to control the fulfillment of the sustainability criteria through using the existing voluntary sustainability standards is internationally distinctive. It demonstrates an increasing collaboration of legal and voluntary initiatives, as well as a growing reliance on voluntary sustainability standards. It was described as a new form of establishing control, in which a group of over-national governmental actors drive norms and behaviors related to the quality of products and their production methods that would have large environmental impacts [68]. Similar approaches to control can be met in simplified forms in voluntary sustainability standards, which address single technical issues like GHG-emissions, and in more elaborated forms, like comprehensive meta-standards, which incorporate multiple critical aspects [69].

The EU control mechanism, based on using the existing voluntary sustainability standards, when binding regulations for the Member States and private governance are combined, was called in literature "a new form of steering transnational processes, which reflected a new relation between states, market and society" [70]. It has its own strong sides and weaknesses that are analyzed below.

a) Strong Sides of the EU Approach to Use Existing Voluntary Sustainability Standards

The EU willingness to rely on the chosen voluntary sustainability standards can become an indirect promotion of these standards at the regional and international markets. This can also contribute to the

reorganization, consolidation and harmonization [71] of the existing voluntary sustainability standards for biofuels and similar products. In such a way, the quality of the applied control mechanisms can gradually be improved. Learning from other control approaches, sharing experience and further harmonization of control mechanisms should be advocated.

Warnings were made that the co-existence of voluntary sustainability standards caused producers and economic operators concerns about costs associated with multiple certifications. These costs can have a disproportionate effect on small-scaled producers, and on how voluntary sustainability standards fit into legal frameworks [72]. According to some researchers, the EU approach to use the existing voluntary sustainability standards helps to solve these problems and to avoid duplicative efforts [73]. It allows getting benefit from the already established sources, and saves time and costs, taking into consideration that the development of a new sustainability standard through a multi-stakeholder process can take several years and is not low-priced. What is more, the existing sustainability standards usually have producer acceptance, and their use delimits situations, when producers have to be certified in accordance to multiple standards [74].

Using the existing voluntary sustainability standards has the potential to develop the most functional list of sustainability criteria for biofuels through collecting growing technical knowledge of alternative sustainability requirements [75]. At the same time, the EU approach can encourage the existing voluntary sustainability standards to improve compliance with the EU regulations on biofuels and to work out more efficient control mechanisms. The EU approach may also urge the establishment of new, better designed sustainability standards. It can be expected that an economic operator will choose the most efficient, complete and flexible voluntary sustainability standard, in order to avoid practical complications. Voluntary sustainability standards will probably seek full compliance with the EU sustainability criteria to be more competitive.

The requirements of voluntary sustainability standards do not normally contradict international trade rules. The EU approach to use the existing voluntary sustainability standards reduces the possibility of coming into conflict with the WTO rules, which prohibit the use of technical regulations as nontariff trade barriers and discriminatory treatment of imported products [76].

Private actors engaged in voluntary sustainability standards may be more flexible and productive than public actors in carrying out governance and control, because they are less bureaucratic and must work more, in order to survive in a competitive environment [77].

An impression was got that the EU approach to use the existing voluntary sustainability standards is convenient

and stable under circumstances of constant changes, due to its ability to incorporate various self-governed sustainability standards. It is relatively easy to be updated, because not the whole system should be changed, but only its separate components. This approach helps to keep up with the global rapid development of the biofuel sector. It suits much to regulate and govern such broad and complex issues as the fulfillment of sustainability criteria under different technical, geographic and judicial conditions. In total, the EU approach promotes the development of sustainable biofuel industry.

b) Weak Sides of the EU Approach to Use Existing Voluntary Sustainability Standards

The EU control mechanisms rely much on other voluntary sustainability standards that can be developed by industry, business alliances, environmental NGOs and inter-governmental organizations [78]. This originates challenges that have to be resolved. For example, the benchmarked voluntary sustainability standards are based on different types of sustainability criteria for biofuels [79], which can lead to situations where products with different quality characteristics are treated as the same product. This can be seen as a significant weakness of the EU approach.

While voluntary sustainability standards have an important role to play in promoting and safeguarding sustainable development, there are limitations in what they can achieve [80]. Control of the sustainability criteria for biofuels is a process that addresses problems, which range from global to very local. It is often unclear how the benchmarked sustainability standards function in various local conditions [81], and whether their contribution makes local biofuel production sustainable.

When the benchmarked voluntary sustainability standards are applied, activities of independent auditors and other involved actors are one more step removed from the supervision of the EU Commission. This may add difficulties to control procedures, because EU does not have much influence on how the benchmarked voluntary sustainability standards function. According to Directive 2009/28/EC, the Commission may revoke or suspend the recognition of a voluntary sustainability standard. However, the Commission does not directly test or control biofuels for compliance with the EU sustainability criteria. It is questionable how the quality of the benchmarked voluntary sustainability standards and control of their function could be ensured.

The Corporate Europe Observatory (CEO), a European-based research and campaign group [82], questioned the entire idea of voluntary sustainability standards being efficient [83]. One of its critical arguments was that the majority of the existing voluntary sustainability standards

did not presuppose sufficient stakeholder involvement at the local level [84].

Concerns were expressed that relying too much on voluntary sustainability standards could bring about tensions and uncertainty about the reliability of the applied control mechanisms [85]. It could give rise to cheating at different stages of a control chain [86], because it would be too difficult for private actors to maintain appropriate control of the whole production process, including land-use changes and complex industrial procedures. Commentaries were made that this factor could become a significant weakness in the EU approach [87], because the role of EU in this situation could not be described as strong or powerfully supervising. General critique towards EU in this respect was rather comprehensive [88].

c) Harmonization of Existing Sustainability Standards for Biofuels

Lack of harmonization or a homogeneous approach to the existing sustainability standards for biofuels is the reality of today [89]. When the EU sustainability criteria for biofuels are discussed together with various voluntary sustainability standards and national sustainability requirements, it is questionable whether the same sustainable quality of biofuels is meant. The development of interchangeable sustainability standards, with different sustainability criteria and indicators can lead to inconsistent standardization with loose performance parameters [90].

For the sustainability criterion that deals with GHG emissions, there can be different calculation methodologies in different sustainability standards. For the sustainability criteria that deal with land use, different accounting systems can be applied. Different monitoring and control mechanisms can lead to different sustainability results, different levels of reliability and lack of coherence between initiatives [91]. This inconsistency can cause difficulties and increase the risk of differentiation in treating sustainability for the same type of a product. The assessment of whether a sustainability criterion was fulfilled or not could be highly dependent on which calculation methodology, accounting system or control mechanism was used. Such differences could have a significant influence on which sustainability standard should be chosen, and what actual impacts on sustainability this would have [92].

Kaditi (2009) highlighted that because specific frameworks tended to be misused and misinterpreted, an internationally accepted sustainability standard for biofuels would perhaps be the only instrument that could improve the situation. Schubert and Blasch (2010) pointed out that only an international, legally binding biofuel sustainability standard would prevent exporting countries from diverting their bioenergy exports to countries that have weak or non-existent minimum

import standards, with the associated negative environmental consequences [93].

Mol (2007), on the other hand, argued that harmonization, standardization, certification and globalization of biofuel production might end up empowering the largest and better organized actors, or favor developed countries at the expense of developing countries [94]. Hennenberg (2010) added that it was "naive" to think that legal frameworks or voluntary sustainability standards for biofuels could, or should, adopt a uniform set of sustainability criteria, because each framework or standard seemed to serve at a specific stage of the production chain and for a particular feedstock [95]. Buchholz (2009) underlined that a single fixed set of sustainability criteria might not be an advisable approach for biofuels [96].

A recommendation can be given to achieve more harmonization of the existing legal frameworks and voluntary sustainability standards for biofuels, as well as to work out more homogeneous and efficient mechanisms to control their fulfillment.

VII. SUMMARIZING REFLECTIONS ON THE MECHANISMS TO CONTROL THE FULFILLMENT OF THE SUSTAINABILITY CRITERIA IN DIRECTIVE 2009/28/EC

The system of mechanisms to control the fulfillment of the EU sustainability criteria promoted in Directive 2009/28/EC contains certain unsolved issues and weaknesses. This creates doubts whether the EU sustainability criteria for biofuels can be implemented, as anticipated [97]. For example, it is unclear what the most efficient methods and mechanisms to measure the EU sustainability criteria are, and how their fulfillment should be adjusted to local conditions [98]. Some developing countries that are producers and exporters of biofuels might lack legal and technical basis to control the fulfillment of the EU sustainability criteria. Poor local law enforcement, underdeveloped policy measures and absence of infrastructure may lead to the reduced efficiency of the EU framework for sustainable biofuels, as well as require additional control efforts from the side of EU. What is more, the use of different mechanisms to control the fulfillment of the same sustainability criterion can lead to uncertainty, local differences in the achieved results and insecurity. The consequences of this can go so far, that there will be different sustainability requirements for biofuels at different production places.

A potential weakness of the EU approach to the sustainability criteria for biofuels is that the involved actors, who should provide evidence of compliance with the EU sustainability criteria, have no real motivation to ensure control of their fulfillment [99]. The conduct of these actors, who include economic operators, independent auditors and representatives of voluntary sustainability standards, can be influenced by potential conflicts of interest originated by profit-making motives

[100]. This issue is not sufficiently regulated in Directive 2009/28/EC. In contrast, the process of benchmarking voluntary sustainability standards that was undertaken by the EU Commission seems to be one of the most carefully controlled components in the EU approach to the sustainability criteria [101].

An impression was got that the EU system of control in the case of biofuels relies much on independent auditing. However, the use of independent auditing is not free from practical difficulties. It requires a large amount of auditors, who should possess an appropriate qualification and should be certified. If independent auditing takes place at an international level, requirements for the auditors' qualification should be harmonized. The results of the auditors' work should be checked, which suggests a multi-checking approach. It should be discussed to what extent the standards of independent auditing might differ between the EU Member States, and what consequences for the sustainable quality of biofuels this would have. The identified difficulties are not easy to solve. Not many alternative control mechanisms have been discussed or proposed.

The use of the perspective of the involved actors highlights that some aspects of independent auditing and other control mechanisms promoted by EU deal with areas that are beyond what the involved actors are able and capable of achieving. It can be recommended that practical possibilities of the involved actors are thoroughly considered in relation to the suggested control mechanisms. Otherwise it can be difficult for the involved actors to find ways to follow and fulfill the sustainability criteria. The EU approach calls apparently for the development of self-control mechanisms within each company that is engaged in sustainable production of biofuels. This solution can be combined with risks and uncertainty. Arguments can be made that self-control is not a fully reliable method for a legal framework to be built upon. It is important that the chosen control mechanisms are potentially free of fraud and transparent to the public.

It can be encouraged that the regulatory basis for the whole control system in the EU approach to the sustainability criteria for biofuels should be safer and easier to use. The existing mechanisms should possibly be complemented with efficient methods to control undesirable side effects at the global and local levels, such as indirect land use and competition with food production. The development of technology aimed at sustainable production of biofuels should be a separate subject of control. These issues are not specifically regulated in the present EU framework for biofuels.

According to personal reflections, it is uncertain whether the control mechanisms suggested by EU in the area of biofuels would function efficiently. The whole system of control mechanisms needs further reconsideration,

research and development. Alternative and complementary control mechanisms should be worked out.

VIII. SUGGESTIONS FOR THE DEVELOPMENT OF THE EU APPROACH TO THE SUSTAINABILITY CRITERIA IN DIRECTIVE 2009/28/EC

Establishing a legal framework with sustainability criteria is a learning process [102] that should be constantly improved. This includes making approaches and mechanisms for control more efficient, raise the level of control standards, as well as find and elaborate solutions for the most challenging issues. Judging from the EU experience with biofuels, it can be pointed out that sustainability criteria and frameworks for their use should be supported by practical guidelines, proficient explanations to each criterion and strategies to measure their fulfillment [103], together with other supplementary tools that facilitate implementation and enforcement of the sustainability criteria.

Preferences for a globally harmonized approach to sustainability criteria for a particular product and homogeneous control mechanisms for their fulfillment should be highlighted. A globally harmonized approach would provide uniform requirements for the involved actors, eliminate the need for multiple legal frameworks and voluntary sustainability standards [104], and minimize efforts for overlapping certification. In the case of biofuels, Schlegel and Kaphengst (2007) underlined that "only one credible worldwide sustainability standard that would be efficiently enforced and would cover the majority of biofuel types had a chance of making difference" [105] in the coming sustainable development of this industry.

Schlegel and Kaphengst explained further that sustainability of biofuel production and supply is an issue of an international concern [106]. In this connection it is desirable that the same sustainability criteria for biofuels are applied internationally. Scarlat and Dallemand (2010) pointed out that a harmonized international approach to sustainability criteria would have high potential to gain credibility for the biofuel industry, which would lead to broader market opportunities and reduced costs. The implementation of harmonized sustainability criteria at a global scale, based on an internationally approved framework, might be an option to secure different direct and indirect environmental effects of biofuel production [107]. On the contrary, lack of a homogeneous approach of an international character to sustainability criteria for biofuels could lead to increasing costs and high administrative burden [108].

Schlegel and Kaphengst (2007) meant that the development of the EU policy on sustainable biofuels and harmonization of voluntary sustainability standards approved by the EU Commission need to be related to the international context. This process should be closely

coordinated with other sustainability initiatives for biofuels in the world that are either in place or in development [109]. Partzsch (2009) added that difficulties for EU in controlling the fulfillment of the sustainability criteria in the co-existing voluntary sustainability standards suggested a collective solution at a transnational level, i.e. these difficulties could not be solved by a single national state, or by the market and voluntary actions of civil society alone [110]. This is especially true regarding control of the second sustainability criterion. Approaches for transnational control and monitoring mechanisms should be worked at.

A realistic point of view should, of course, be preferred. Creation of a global sustainability system for biofuels is very complicated [111]. It should include many components that at present are unclear. It will demand much time for negotiations and deep technical expertise. It will be expensive economically. It is questionable when an agreement satisfying all involved parties can be concluded, and how demanding it will be. In the situation with biofuels, it is unclear whether a harmonized international approach to sustainability criteria is possible, because biofuels as a product are not homogeneous: they can be produced from different materials and in different geographical conditions. As far as the issue of control is concerned, it can be discussed what control mechanisms are possible and realistic in a global sustainability system for biofuels.

Lin (2010) suggested that a multilateral agreement that incorporated a variety of comprehensive and mandatory sustainability standards in the form of a meta-standard model might be a solution [112].

Matus (2010), on the basis of the analysis of the biofuel sector, highlighted that frameworks with sustainability criteria should possibly find a balance between the need for clear binding regulations, which were particularly desirable from the side of industries, for example to plan investments, and the need of flexibility to keep pace with technological and market development [113].

There is an opinion that to function efficiently, a system of controlling land use should apply to all agricultural crops regardless their final use, such as fuels, food, fodder, fiber, bio-materials and so on. Suggestions were made that farming sustainable biofuels should not be regulated separately. Relevant regulations could be of a general character, including general principles for sustainable agriculture, sustainable biofuel production and sustainable forest [114]. Preventing indirect effects of biofuel production could require control of the effects that biofuel production has at a transnational level, based on indicators of economic, environmental and social performance in relation to other issues, such as increased food and feed demands caused by diet changes, growing prosperity in developing countries and population growth.

Discussing specifically the EU approach to biofuels, the sustainability criteria in Directive 2009/28/EC deal with environmental concerns that are largely important today. It is necessary to reevaluate and reconsider the wisdom of extensive reliance on independent auditors and voluntary sustainability standards as the dominating control mechanisms [115]. These mechanisms can be treated as supplementary or temporary measures. Other, more efficient solutions may be required, which are both economically effective and environmentally sound [116]. Lin (2010) argued that a parallel effort could be made to promote multilateral agreements on mandatory sustainability standards for biofuels. She saw entrusting environmental protection to voluntary sustainability standards as a risky opportunity [117]. I personally agree with these conclusions.

Another interesting suggestion to the EU approach is to slow down the development of the legal framework for biofuels [118], evaluate its possible effects and results, and analyze aspects that need further elaboration. An opinion was expressed that the mandatory 10 % target for renewable energy set in Directive 2009/28/EC ought to be reexamined, until more appropriate solutions to manage sustainability concerns were found [119]. It is probably late to argue this way, because the implementation of the EU framework on sustainable biofuels and its central legal act Directive 2009/28/EC is in full progress.

Moreover, the EU sustainability criteria should not be fulfilled only for the sake of the binding 10 % target. Following the sustainability criteria should take into consideration the perspective of the involved actors, and favor local management and local conditions at production places [120]. Local development and winnings, based on the sustainable production of biofuels, should be encouraged. It can be advised to prepare beforehand a list of local critical issues that need to be improved or solved during the process of sustainable biofuel production. This list can be used for adjusting enforcement of the sustainability criteria, for controlling the progress made, and for the reconsideration of the achieved results. This experience can later be shared by other similar branches.

Monitoring systems, which are aimed to control the fulfillment of the EU sustainability criteria, might represent a substantial burden for the local management, because managers might be requested to carry out research activities that are costly, and for which they do not have appropriate staff and financial means. To reduce these negative effects, a strong partnership between local management units and research institutions can be recommended. This would help to collect the required information grounded in long-term research that is carried out by professional and independent scientists. This type of partnership should be promoted. Global consultations that preserve focus

on the development at the regional and local levels are also desirable. NGOs' monitoring of the fulfillment of the EU sustainability criteria should be encouraged. Efficient control mechanisms within the EU Member States should be thoroughly elaborated. To provide evidence of compliance, such measures as field visits, control in the field, inquiries with workers, employers and managers, as well as checks of documentation, for example management and safety plans, can be recommended [121].

Data availability and its quality remains a challenge, especially in developing countries and for small holders along the whole supply chain [122]. Among the suggestions that can be made to small-scale producers, there are to certify their management systems locally on the farm, as opposed to certifying the feedstock crops or final products [123], or to become a part of a "group certification" that can reduce certification costs [124]. These suggestions are not free from practical problems.

Much work in the future should be directed at reconciling laws and regulations that may have conflicting or overlapping provisions [125]. The need for better transparency [126] for legal frameworks with sustainability criteria and voluntary sustainability standards should be underlined. It can be necessary to combine sustainability standards and sustainability criteria with other tools, because sustainability standards have it difficult to address macro-level impacts, such as the influence on food prices [127].

The importance of consensus for legal frameworks with sustainability criteria and voluntary sustainability standards for biofuels in questions of providing evidence, calculation methodologies and default values [128] should be emphasized. Growing competence of independent auditors, who are expected to develop much practical experience, can be used as a valuable resource [129], when newly proposed sustainability criteria are tested and assessed.

Among other useful pieces of advice for the future, it can be recommended that different groups of the involved actors work together to develop common frameworks, definitions, approaches and methodologies for sustainable biofuels. Common solutions have the potential to reduce costs of implementation. For example, it will be easier to organize training of independent auditors [130].

Certain issues connected to the fulfillment and control of sustainability criteria are still waiting for solutions. Among them, difficulties in measuring distant and secondary impacts of sustainability criteria can be named, as well as lack of methodologies and data for this type of analysis. Some impacts, as was explained earlier, can be beyond what certain groups of biofuel producers or suppliers are able to achieve. These

impacts should be addressed through other means, such as various non-binding policy measures.

Efforts to improve and develop frameworks with sustainability criteria should be systematic and continuous. There is a need to move from general and theoretical discussions about sustainability criteria [131] and their use in a framework, to the research of more practical issues, including reliable and efficiently functioning control mechanisms. Difficulties, which various groups of the involved actors can experience, when trying to follow the established regulations should be investigated and minimized.

IX. CONCLUSIONS ON THE ANALYSIS OF THE MECHANISMS TO CONTROL THE FULFILLMENT OF THE EU SUSTAINABILITY CRITERIA IN DIRECTIVE 2009/28/EC

In this article, the EU control mechanisms for the fulfillment of the sustainability criteria for biofuels, initially outlined and explored in the article E. Pavlovskaja (2013) "Controlling the Fulfillment of the EU Sustainability Criteria for Transport Biofuels", published in RELP 4/2013, were thoroughly analyzed and reflected upon. Following the structure elaborated in the first article, two main levels of control of the EU sustainability criteria were distinguished: (a) control of the EU Commission of the Member States and (b) control within the Member States of the fulfillment of the sustainability criteria. The second level of control got more attention in the research.

It can be summarized that the first level of control by the EU Commission of the Member States is efficiently organized, and there are no complications with it. The same cannot be said about the second level of control, which deals with control within the Member States. At the second level of control, major difficulties to establish an appropriate quality of control of the fulfillment of the sustainability criteria could be detected. This was unfortunately true in regard to almost all suggested control mechanisms.

Among the central problems of the EU legislation, it can be pointed out that EU does not have sufficient control of the different methods to fulfill the sustainability criteria. There is a number of voluntary sustainability standards, benchmarked by the EU Commission, that basically function on their own. What is more, the EU approach to control suggests too much reliance on independent auditors. The results of their work are not double-checked by the Commission. This can give rise to cheating possibilities at any stage of the production chain, which is also difficult to define.

Looking into the future, there is, on the one hand, a hope that the development of the EU approach to biofuels and the suggested control mechanisms can improve the situation. This optimism can particularly refer to the control of the first sustainability criterion on GHG emissions from biofuels. Much work is going on at present to improve, simplify and make clearer the

promoted calculation methodology for GHG emissions. It can be anticipated that more efficient and user-friendly solutions will be found. The same can be thought about the harmonization of the co-existing sustainability standards, which have a potential to be benchmarked by the EU Commission, and the elaboration and clarification of the benchmarking procedure.

On the other hand, the analysis of the control mechanisms underlined a number of aspects that are not easy to make better practically. Among them there are difficulties to control how the EU sustainability criteria are fulfilled, when biofuels are produced outside EU and exported from there, which is a natural practice for the biofuel production. The EU approach suggests much paper work to prove compliance with the legislated sustainability criteria and field visits of independent auditors, which are not easy to organize. It is not clear how production chains for biofuels should be defined, how this information should be controlled, and who will control the work and competence of the engaged independent auditors. A repeating question is that it is problematic how all companies involved in the biofuel production and supply can practically be identified and then controlled.

Control of the sustainability criterion on the use of land presupposes the existence of a regime that functions beyond state boundaries, and is continually supervising land use in different parts of the planet. There is no such a regime or its elements at present, and it is doubtful whether it will be created in the future. It is very desirable that the development of the EU approach to biofuels will provide answers to this and other challenging questions. Various methods for transnational control and monitoring mechanisms should be examined.

More sustainable solutions for the existing voluntary standards should be encouraged. Voluntary sustainability standards can be more preferable than binding legal frameworks with sustainability criteria, because they are more flexible and more open for adjustment. Investment into research on efficient accompanying indicators and measuring mechanisms for biofuels can be advised. To achieve more efficient results, the development of the EU approach to biofuels should be closely coordinated with other sustainability initiatives for biofuels in the world.

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REFERENCES

- [1] From the environmental perspective it is expected today that manufactured products are "green" and that their production technologies are ecological. Mangra, M. G., Cotoc, E. A., Traistaru, A. (2013) highlighted that sustainable development requires that the society should satisfy consumer demand of its members by increasing the productive potential without depletion of natural resources and without going beyond the limits of affordability and regeneration of the ecosystems; see Mangra, M. G., Cotoc, E. A., Traistaru, A. (2013), Sustainable Economic Development Through Environmental Management Systems Implementation, *Journal of Studies in Social Sciences*, 2013, 6/1, pp. 3 – 4. The research of Osorio, J., Romero, D., Betancur, M., Molina, A. (2014) shares similar ideas, see Osorio, J., Romero, D., Betancur, M., Molina, A. (2014), Design for sustainable mass-customization: Design guidelines for sustainable mass-customized products, *Engineering, Technology and Innovation (ICE)*, 2014 International ICE Conference, IEEE, pp. 1 – 9.
- [2] The development of these ideas can be found in the report Börjesson, P., Ericsson, K., di Lucia, L., Nilsson, L., Åhman, M. (2008), *Hållbara drivmedel – finns de?*, report N. 66, November 2008, Lund University, Sweden, which was written by a group of Swedish researchers, p. 91; Pelkmans, L., Devriendt, N., Goovaerts, L., Schouwenberg, P. (2012), Prospective study: Implementation of sustainability requirements for biofuels and bio-energy and related issues for markets and trade, the final report, IEA Bioenergy, 2012/TEM/R/043, p. 35.
- [3] Schlegel, S., Kaphengst, T. (2007), Explorations in Biofuels Economics, Policy, and History. European Union Policy on Bioenergy and the Role of Sustainability Criteria and Certification Systems, 5/2 (2007), *Journal of Agricultural and Food Industrial Organization*, Article 7; Pelsy, F. (2008), The European Commission 2008 Directive Proposal on Biofuels: A Critique, 4/2 Law, *Environment and Development Journal*, 2008; Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010; Lin, J. (2012), Governing Biofuels: A Principal-Agent Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law* 24/1, 2012; Romppanen, S. (2012), The EU's Biofuels: Certified as Sustainable, RELP 3/2012; Lin, J. (2013), Transnational Environmental Law in action: The European Union's sustainable biofuels experiment, University of Hong Kong Faculty of Law Research Paper, 2013/034, p. 18.
- [4] Pelkmans, L., Devriendt, N., Goovaerts, L., Schouwenberg, P. (2012), Prospective study: Implementation of sustainability requirements for biofuels and bio-energy and related issues for markets and trade, the final report, IEA Bioenergy, 2012/TEM/R/043, p. 4; Romppanen, S. (2012), The EU's Biofuels: Certified as Sustainable, RELP 3/2012, pp. 174, 179; Goh, C., Junginger, M., Joudrey, J., Luc Pelkmans, V., Smith, B., Stupak, I. et al. (2013), Task 3: Impacts of sustainability certification on bioenergy markets and trade, a study commissioned by IEA Bioenergy, pp. 5 – 6; Hunsberger, C., Bolwig, S., Corbera, E., Creutzig, F. (2014), Livelihood impacts of biofuel crop production: Implications for governance, *Geoforum*, 54, p. 255; Larsen, R., Jiwan, N., Rompas, A., Jenito, J., Osbeck, M., Tarigan, A. (2014), Towards "hybrid accountability" in EU biofuels policy? Community grievances and competing water claims in the Central Kalimantan oil palm sector, *Geoforum*, 54/2014, p. 296.
- [5] Schlegel, S., Kaphengst, T. (2007), European Union Policy on Bioenergy and the Role of Sustainability Criteria and Certification Systems, *Journal of Agricultural & Food Industrial Organization*, 2007, vol. 5, article 7.
- [6] Pelsy, F. (2008), The European Commission 2008 Directive Proposal on Biofuels: A Critique, 4/2 Law, *Environment and Development Journal* (2008).
- [7] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 3.
- [8] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 6.
- [9] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 6.
- [10] Westerlund, S. (2003), *Miljörettsliga grundfrågor 2.0*, Institutet för miljöretts (IMIR), Björklinge.
- [11] Doornbosch, R., Steenblick, R. (2007), Biofuels: Is the Cure Worse than the Disease?, a paper prepared for the OECD Round Table for Sustainable Development, OECD, Paris, 11-12 September 2007; Pelsy, F. (2008), The European Commission 2008 Directive Proposal on Biofuels: A Critique, 4/2 Law, *Environment and Development Journal*, 2008, pp. 131 – 132.
- [12] Pelsy, F. (2008), The European Commission 2008 Directive Proposal on Biofuels: A Critique, 4/2 Law, *Environment and Development Journal*, 2008, p. 130.
- [13] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 4.
- [14] European Commission (2010), Application of the Sustainability Criteria to the Harvest of 2010, ENER/C1/ED/ssD (2010) 879712, Brussels, 25 November 2010, p. 3.
- [15] Romppanen, S. (2012), The EU's Biofuels: Certified as Sustainable, RELP 3/2012, p. 178.
- [16] Biomass, Biofuel Sustainability, 2BSvs (2011), Biomass biofuel, sustainability voluntary scheme.
- [17] Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 20; Lin, J. (2012), Governing Biofuels: A Principal-Agent Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law* 24:1, 2012, p. 56; Lin, J. (2013), Transnational Environmental Law in action: The European Union's sustainable biofuels experiment, University of Hong Kong Faculty of Law Research Paper, 2013/034, p. 18.
- [18] In the recently conducted research, Sikkema, R., Junginger, M., van Dam, J., Stegeman, G., Durrant, D., Faaij, A. (2014) analyzed the weaknesses of the mass balance approach in the context of using wood for biomass production; see Sikkema, R., Junginger, M., van Dam, J., Stegeman, G., Durrant, D., Faaij, A. (2014), Legal Harvesting, Sustainable Sourcing and Cascaded Use of Wood for Bioenergy: Their Coverage through Existing Certification Frameworks for Sustainable Forest Management, *Forests*, 2014, 5/9, p. 2182, p. 2186.
- [19] Whittaker, C., McManus, M., C., Hammond, G., P. (2011), Greenhouse gas reporting for biofuels: A comparison between the RED, RTFO and PAS2050 methodologies, *Energy Policy*, 39/10, p. 5953.
- [20] Croezen, H., Kampman, B. (2008), Calculating greenhouse gas emissions of EU biofuels. An assessment of the EU methodology proposal for biofuels CO2 calculations, a report CE Delft, p. 15.
- [21] Croezen, H., Kampman, B. (2008), Calculating greenhouse gas emissions of EU biofuels. An assessment of the EU methodology proposal for biofuels CO2 calculations, a report CE Delft, summary.
- [22] Whittaker, C., McManus, M., C., Hammond, G., P. (2011), Greenhouse gas reporting for biofuels: A comparison between the RED, RTFO and PAS2050 methodologies, *Energy Policy*, 39/10, p. 5953.

- [23] Pelsy, F. (2008), The European Commission 2008 Directive Proposal on Biofuels: A Critique, 4/2 Law, Environment and Development Journal (2008), p. 132.
- [24] Dehue, B., van de Staij, J., Chalmers, J. (2009), Mitigating Indirect Impacts of Biofuel Production: Case Studies and Methodology, Ecofys, Netherlands; COM (2010) 811 final, Report from the Commission on Indirect land-use change related to biofuels and bioliquids, 22 December 2010; Whittaker, C., McManus, M., C., Hammond, G., P. (2011), Greenhouse gas reporting for biofuels: A comparison between the RED, RTFO and PAS2050 methodologies, Energy Policy, 39/10.
- [25] Whittaker, C., McManus, M., C., Hammond, G., P. (2011), Greenhouse gas reporting for biofuels: A comparison between the RED, RTFO and PAS2050 methodologies, Energy Policy, 39/10, p. 5953.
- [26] Croezen, H., Kampman, B. (2008), Calculating greenhouse gas emissions of EU biofuels. An assessment of the EU methodology proposal for biofuels CO2 calculations, a report CE Delft, p. 15.
- [27] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, in Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 11; Sikkema, R., Junginger, M., van Dam, J., Stegeman, G., Durrant, D., Faaij, A. (2014) also warned against complex bookkeeping methods in the case of calculating GHG emissions during biomass production from wood; see Sikkema, R., Junginger, M., van Dam, J., Stegeman, G., Durrant, D., Faaij, A. (2014), Legal Harvesting, Sustainable Sourcing and Cascaded Use of Wood for Bioenergy: Their Coverage through Existing Certification Frameworks for Sustainable Forest Management, Forests, 2014, 5/9, p. 2187.
- [28] Eickhout, B., van den Born, G., J., Notenboom, J., van Oorschot, M., Rös, J., P., M., van Vuuren, D., P., Westhoek, H., J. (2008), Local and global consequences of the EU renewable directive for biofuels. Testing the sustainability criteria, MNP Report 500143001 / 2008, p. 23.
- [29] Whittaker, C., McManus, M., C., Hammond, G., P. (2011), Greenhouse gas reporting for biofuels: A comparison between the RED, RTFO and PAS2050 methodologies, Energy Policy, 39/10, p. 5959.
- [30] Guariguata, M., R., Masera, O., R., Johnson, F., X., von Maltitz, G., Bird, N., Tella, P., Martínez-Bravo, R. (2011), A review of environmental issues in the context of biofuel sustainability frameworks, CIFOR, p. 10.
- [31] As an example, Sikkema, R., Junginger, M., van Dam, J., Stegeman, G., Durrant, D., Faaij, A. (2014) pointed out that stakeholders from the UK meant that the required evidence to demonstrate compliance with the EU sustainability criteria on the use of land was difficult and costly to obtain, and had little relevance for ensuring that forests and woodlands were managed sustainably, see Sikkema, R., Junginger, M., van Dam, J., Stegeman, G., Durrant, D., Faaij, A. (2014), Legal Harvesting, Sustainable Sourcing and Cascaded Use of Wood for Bioenergy: Their Coverage through Existing Certification Frameworks for Sustainable Forest Management, Forests, 2014, 5/9, p 2171.
- [32] Communication (2010/C 160/02) on the practical implementation of the EU biofuels and bioliquids sustainability scheme and on counting rules for biofuels, p. 4.3; Astrand, P., J., Wirnhardt C., Biagini, B., Weber, M., Hellerman, R. (2004), Controls with remote sensing of (CAP) arable and forage area-based subsidies — a yearly more than 700 images and 3 m euro affair; Scarlat, N., Dallemand, J.-F. (2010), Recent developments of biofuels/bioenergy sustainability certification: A global overview, Energy Policy, March 2011, vol. 39, issue 3.
- [33] Scarlat, N., Dallemand, J.-F. (2010), Recent developments of biofuels/bioenergy sustainability certification: A global overview, Energy Policy, March 2011, vol. 39, issue 3.
- [34] Biomass Technology Group, BTG (2008), Sustainability Criteria & Certification Systems for Biomass Production, final report, project No. 1386, the Netherlands, p. 10.
- [35] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 15.
- [36] Greenery Perspectives (2010), Indirect Land Use Change from Biofuels, p. 3; Hiederer, R., Ramos, F., Capitani, C., Koeble, R., Blujdea, V., Gomez, O., Mulligan, D., Marelli, L. (2010), Biofuels: a New Methodology to Estimate GHG Emissions from Global Land Use Change, A methodology involving spatial allocation of agricultural land demand and estimation of CO2 and N2O emissions, p. 3.
- [37] Edwards, R., Mulligan, D., Marelli, L. (2010), Indirect Land Use Change from Increased Biofuels Demand, comparison of models and results for marginal biofuels production from different feedstocks, Luxembourg, Publications Office of the European Union, EUR 24485 EN, p. 13, these researchers point out that the distinction between direct and indirect land use change is not always clear. If one is talking about the land use implications of a policy or a certain overall production of biofuels, there is just one land use change effect (p. 13, p. 113); Lin, J. (2012), Governing Biofuels: A Principal-Agent Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, Journal of Environmental Law 24:1, 2012, pp. 48 – 49; Allen, B., Kretschmer, B., Baldock, D., Menadue, H., Nanni, S., Tucker, G. (2014), Space for energy crops – assessing the potential contribution to Europe's energy future, a report produced for BirdLife Europe, European Environmental Bureau and Transport & Environment, IEEP, London, p. 3.
- [38] Turner B., T., Plevin R., J., Hare M., Farrell A. (2007), Creating markets for green biofuels: Measuring and improving environmental performance, p. 52; ValBiom (2010), The iLUC factor: A solution for indirect land use changes associated with biofuel production?, p. 2; Borowski, F., Golisz, E., Izdebski, W. (2014), Changes in the legal conditions of transport biofuels in Poland on the background of the European Union, Technology Audit and Production Reserves, 2014, 1/2, 15, p. 47.
- [39] Hennenberg, K. et al. (2010), Better Use of Biomass for Energy, a Background Report to the Position Paper of IEA RETD and IEA Bioenergy, Delft/Darmstadt, July 2010, p. 37, pp. 87 – 96; Guariguata, M., R., Masera, O., R., Johnson, F., X., von Maltitz, G., Bird, N., Tella, P., Martínez-Bravo, R. (2011), A review of environmental issues in the context of biofuel sustainability frameworks, CIFOR, p. 12; Larsen, R., Jiwan, N., Rompas, A., Jenito, J., Osbeck, M., Tariqan, A. (2014), Towards “hybrid accountability” in EU biofuels policy? Community grievances and competing water claims in the Central Kalimantan oil palm sector, Geoforum, 54/2014, p. 296.
- [40] Bailis, R., Baka, J. (2011), Constructing Sustainable Biofuels: Governance of the Emerging Biofuel Economy, Annals of the Association of American Geographers, 101/4, p. 832.
- [41] Bailis, R., Baka, J. (2011), Constructing Sustainable Biofuels: Governance of the Emerging Biofuel Economy, Annals of the Association of American Geographers, 101/4, p. 832.
- [42] Gao, Y., Skutsch, M., Masera, O., Pacheco, P. (2011), A global analysis of deforestation due to biofuel development, working paper 68, CIFOR, Bogor, Indonesia.
- [43] Guariguata, M., R., Masera, O., R., Johnson, F., X., von Maltitz, G., Bird, N., Tella, P., Martínez-Bravo, R., (2011), A review of environmental issues in the context of biofuel sustainability frameworks, CIFOR, p. 10.
- [44] Sugarcane Industry Association, Brazil, UNICA (2008); Desplechin, E. (2010), The Brazilian Sugarcane Ethanol Industry's Approach to Certification; Bailis, R., Baka, J. (2011), Constructing Sustainable Biofuels: Governance of the Emerging Biofuel Economy, Annals of the Association of American Geographers, 101/4, pp. 832 – 833.
- [45] COM (2010) 811 final, Report from the Commission on Indirect land-use change related to biofuels and bioliquids, 22 December 2010.
- [46] COM (2010) 811 final, Report from the Commission on Indirect land-use change related to biofuels and bioliquids, 22 December 2010; Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels

- Certification Regime and the Clean Development Mechanism, Oxford University Press, 2011, p. 16.
- [47] Bailis, R., Baka, J. (2011), Constructing Sustainable Biofuels: Governance of the Emerging Biofuel Economy, *Annals of the Association of American Geographers*, 101/4, p. 832.
- [48] BeCitizen, a Strategic Consultancy firm leader in the creation of products, business models and profitable financial vehicles that contribute positively to society and the environment.
- [49] Euractiv, EU News and policy debates (2009), EU biofuel sustainability criteria "inconsistent".
- [50] Euractiv, EU News and policy debates (2009), EU biofuel sustainability criteria "inconsistent".
- [51] For example, Donnelly, C. (2007), *Delegation of Governmental Power to Private Parties: A Comparative Perspective*, Oxford University Press, 2007; Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011.
- [52] Romppanen, S. (2012), The EU's Biofuels: Certified as Sustainable, *RELP* 3/2012, p. 181; Lin, J. (2013), *Transnational Environmental Law in action: The European Union's sustainable biofuels experiment*, University of Hong Kong Faculty of Law Research Paper, 2013/034, pp 21 – 22.
- [53] Donnelly, C. (2007), *Delegation of Governmental Power to Private Parties: A Comparative Perspective*, Oxford University Press, 2007, p. 75; Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, pp. 27 – 28; Lin, J. (2012), *Governing Biofuels: A Principal-Agent Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism*, *Journal of Environmental Law* 24/1, 2012, p. 60.
- [54] A similar opinion on the disadvantages of the principal's delegating to an agent can be found in Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 28.
- [55] Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 28; Lin, J. (2012), *Governing Biofuels: A Principal-Agent Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism*, *Journal of Environmental Law* 24/1, 2012, pp. 60 – 61.
- [56] Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, pp. 28 – 29.
- [57] Lin, J. (2010), *The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development*, Working Paper 011, December 2010, p. 10.
- [58] Matus, K. (2010), *Assessing Challenges for Implementation of Biofuels Sustainability Criteria*, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 8; discussions of possible problems, connected with independent auditing as a control mechanism, can be met in other spheres of law, for example in the financial sector. Further references can be given to Shapiro, A. (2005), *Who Pays the Auditor Calls the Tune?: Auditing Regulation and Clients' Incentives*, Vol. 35, *Seton Hall Law Review* 1029; Lin, J. (2012), *Governing Biofuels: A Principal-Agent Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism*, *Journal of Environmental Law* 24/1, 2012, p. 66. In general, challenges of relying on private auditors and possible drawbacks of this approach have been discussed much in literature.
- [59] Bamberger, K., A. (2006), *Regulation as Delegation: Private Firms, Decision making, and Accountability in the Administrative State*, 56 *Duke Law Journal* 377, 2006, pp. 387 – 388; Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 29.
- [60] Scarlat, N., Dallemand, J.-F. (2010), Recent developments of biofuels/bioenergy sustainability certification: A global overview, *Energy Policy*, March 2011, vol. 39, issue 3.
- [61] Matus, K. (2010), *Assessing Challenges for Implementation of Biofuels Sustainability Criteria*, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 8.
- [62] Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 23.
- [63] Matus, K. (2010), *Assessing Challenges for Implementation of Biofuels Sustainability Criteria*, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 10.
- [64] Matus, K. (2010), *Assessing Challenges for Implementation of Biofuels Sustainability Criteria*, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 8.
- [65] Matus, K. (2010), *Assessing Challenges for Implementation of Biofuels Sustainability Criteria*, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 8.
- [66] Sannerstedt, A. (2001), *Implementering: hur politiska beslut genomförs i praktiken*, p. 29, in Rothstein, B., red. (2001), *Politik som organisation, förvaltningspolitikens grundproblem*, 3:e upplagan, Stockholm, SNS.
- [67] "Top-down" is a commonly used approach to law making, which implies the imposition of rules by the state. These rules govern the practices and behavior of those they are addressed to, see for example Levit, J., K. (2007), *Bottom-Up Lawmaking through a Pluralist Lens: The ICC Banking Commission and the Transnational Regulation of Letters of Credit*, *Emory Law Journal*, vol. 58, 2007, p. 8.
- [68] Bailis, R., Baka, J. (2011), *Constructing Sustainable Biofuels: Governance of the Emerging Biofuel Economy*, *Annals of the Association of American Geographers*, 101/4, p. 827.
- [69] Bailis, R., Baka, J. (2011), *Constructing Sustainable Biofuels: Governance of the Emerging Biofuel Economy*, *Annals of the Association of American Geographers*, 101/4, p. 828; more information about voluntary sustainability standards can be found in Komives, K., Jackson, A. (2014), *Introduction to Voluntary Sustainability Standard Systems*, pp. 3-19; and Gaebler, M. (2014), *Recognition of Private Sustainability Certification Systems for Public Regulation (Co-Regulation): Lessons Learned from the EU Renewable Energy Directive*, pp. 99 – 112, both in eds. Schmitz-Hoffmann, C., Hansmann, B., Schmidt, M., Palekhov, D. (2014), *Voluntary Standard Systems, a Contribution to Sustainable Development*, Springer Berlin Heidelberg, ISBN 978-3-642-35715-2.
- [70] Partzsch, L. (2009), *The legitimacy of biofuel certification, Agric Hum Values* (September 2011), vol. 28, issue 3, pp. 413 – 425, Springer Science, Business Media B.V.
- [71] Lin, J. (2010), *The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development*, Working Paper 011, December 2010, p. 5; Lin, J. (2011), Is your

- biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 25.
- [72] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 5.
- [73] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 9; Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 24; Goh, C., Junginger, M., Joudrey, J., Luc Pelkmans, V., Smith, B., Stupak, I. et al. (2013), Task 3: Impacts of sustainability certification on bioenergy markets and trade, a study commissioned by IEA Bioenergy, p. 38.
- [74] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 9; Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 24.
- [75] Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 19.
- [76] Endres, J. (2010), Clearing the Air: the Meta-standard approach to ensuring biofuels environmental and social sustainability, *Virginia Environmental Law Journal*, 28/2010, pp. 108 – 111; Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 9; Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 2.
- [77] Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 27.
- [78] Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 16.
- [79] Larsen, R., Jiwan, N., Rompas, A., Jenito, J., Osbeck, M., Tarigan, A. (2014), Towards “hybrid accountability” in EU biofuels policy? Community grievances and competing water claims in the Central Kalimantan oil palm sector, *Geoforum*, 54/2014, p. 302.
- [80] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 11.
- [81] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 6.
- [82] The Corporate Europe Observatory (CEO); the official web-site can be found at <http://corporateeurope.org/>, last accessed 09-09-2014.
- [83] Biomass Technology Group, BTG (2008), Sustainability Criteria & Certification Systems for Biomass Production, the final report, project No. 1386, the Netherlands, p. 17.
- [84] Biomass Technology Group, BTG (2008), Sustainability Criteria & Certification Systems for Biomass Production, the final report, project No. 1386, the Netherlands, p. 18.
- [85] Mansfield, B. (2004), Rules of privatization: Contradictions in neoliberal regulation of north Pacific fisheries, *Annals of the Association of American Geographers* 94/565–84; Hughes, A. (2006), Geographies of exchange and circulation: Transnational trade and governance; Bailis, R., Baka, J. (2011), Constructing Sustainable Biofuels: Governance of the Emerging Biofuel Economy, *Annals of the Association of American Geographers*, 101/4, p. 831.
- [86] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 12.
- [87] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 5; Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 4.
- [88] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 11.
- [89] Goh, C., Junginger, M., Joudrey, J., Luc Pelkmans, V., Smith, B., Stupak, I. et al. (2013), Task 3: Impacts of sustainability certification on bioenergy markets and trade, a study commissioned by IEA Bioenergy, p. 38.
- [90] Pelkmans, L., Devriendt, N., Goovaerts, L., Schouwenberg, P. (2012), Prospective study: Implementation of sustainability requirements for biofuels and bio-energy and related issues for markets and trade, the final report, IEA Bioenergy, 2012/TEM/R/043, p. 32.
- [91] Scarlat, N., Dallemand, J.-F. (2010), Recent developments of biofuels/bioenergy sustainability certification: A global overview, *Energy Policy*, March 2011, vol. 39, issue 3.
- [92] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 7.
- [93] Guariguata, M., R., Masera, O., R., Johnson, F., X., von Maltitz, G., Bird, N., Tella, P., Martínez-Bravo, R. (2011), A review of environmental issues in the context of biofuel sustainability frameworks, CIFOR, p. 17.
- [94] Guariguata, M., R., Masera, O., R., Johnson, F., X., von Maltitz, G., Bird, N., Tella, P., Martínez-Bravo, R. (2011), A review of environmental issues in the context of biofuel sustainability frameworks, CIFOR, p. 17.
- [95] Hennenberg, K. et al. (2010), Better Use of Biomass for Energy, a Background Report to the Position Paper of IEA RETD and IEA Bioenergy, Delft/Darmstadt, July 2010.
- [96] Buchholz, T., Lazardis, V., A., Volk, T., A. (2009), Sustainability criteria for bioenergy systems: results from an expert survey, *Journal of Cleaner Production*, 17.
- [97] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 12.
- [98] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and UN Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, pp. 8 – 9.
- [99] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 11.
- [100] Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism,

- Journal of Environmental Law, Oxford University Press, 2011, p. 35.
- [101] Lin, J. (2011), Is your biofuel affixed with an approved seal?: A Comparative Analysis of the European Union Biofuels Certification Regime and the Clean Development Mechanism, *Journal of Environmental Law*, Oxford University Press, 2011, p. 42.
- [102] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 9.
- [103] Guariguata, M., R., Masera, O., R., Johnson, F., X., von Maltitz, G., Bird, N., Tella, P., Martínez-Bravo, R. (2011), A review of environmental issues in the context of biofuel sustainability frameworks, *CIFOR*, p. 12.
- [104] Scarlat, N., Dallemand, J.-F. (2010), Recent developments of biofuels/bioenergy sustainability certification: A global overview, *Energy Policy*, March 2011, vol. 39, issue 3.
- [105] Schlegel, S., Kaphengst, T. (2007), European Union Policy on Bioenergy and the Role of Sustainability Criteria and Certification Systems, *Journal of Agricultural & Food Industrial Organization*, 2007, vol. 5, article 7, p. 12.
- [106] Schlegel, S., Kaphengst, T. (2007), European Union Policy on Bioenergy and the Role of Sustainability Criteria and Certification Systems, *Journal of Agricultural & Food Industrial Organization*, 2007, vol. 5, article 7, p. 12.
- [107] Scarlat, N., Dallemand, J.-F. (2010), Recent developments of biofuels/bioenergy sustainability certification: A global overview, *Energy Policy*, March 2011, vol. 39, issue 3.
- [108] Scarlat, N., Dallemand, J.-F. (2010), Recent developments of biofuels/bioenergy sustainability certification: A global overview, *Energy Policy*, March 2011, vol. 39, issue 3.
- [109] Schlegel, S., Kaphengst, T. (2007), European Union Policy on Bioenergy and the Role of Sustainability Criteria and Certification Systems, *Journal of Agricultural & Food Industrial Organization*, 2007, vol. 5, article 7, p. 12.
- [110] Partzsch, L. (2009), The legitimacy of biofuel certification, *Agric Hum Values*, September 2011, vol. 28, issue 3.
- [111] Lin, J. (2013), Transnational Environmental Law in action: The European Union's sustainable biofuels experiment, *University of Hong Kong Faculty of Law Research Paper*, 2013/034, p. 25.
- [112] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 5.
- [113] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 16.
- [114] Scarlat, N., Dallemand, J.-F. (2010), Recent developments of biofuels/bioenergy sustainability certification: A global overview, *Energy Policy*, March 2011, vol. 39, issue 3; Pelkmans, L., Devriendt, N., Goovaerts, L., Schouwenberg, P. (2012), Prospective study: Implementation of sustainability requirements for biofuels and bio-energy and related issues for markets and trade, the final report, *IEA Bioenergy*, 2012/TEM/R/043, p. 20, p. 25.
- [115] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 5.
- [116] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 11.
- [117] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 12.
- [118] Compare with the opinion of Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 11.
- [119] Lin, J. (2010), The Sustainability of Biofuels: Limits of the Meta-Standard Approach, the Governance of Clean Development, Working Paper 011, December 2010, p. 11; Levidow, L. (2013), EU criteria for sustainable biofuels: accounting for carbon, depoliticising plunder, *Geoforum*, 44 /2013, p. 219.
- [120] Levidow, L. (2013), EU criteria for sustainable biofuels: accounting for carbon, depoliticising plunder, *Geoforum*, 44 /2013, pp. 220 – 221; Larsen, R., Jiwan, N., Rompas, A., Jenito, J., Osbeck, M., Tarigan, A. (2014), Towards “hybrid accountability” in EU biofuels policy? Community grievances and competing water claims in the Central Kalimantan oil palm sector, *Geoforum*, 54/2014, pp. 302 – 303.
- [121] Lewandowski, I., Faaij, A., P., C. (2006), Steps towards the development of a certification system for sustainable bio-energy trade, *Biomass and Bioenergy* 30, 2006, p. 99.
- [122] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 17.
- [123] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 13.
- [124] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 17.
- [125] Kafka, S., Endres, J., Chapter 20: Are Local, State, and Federal Government Bioenergy Efforts Synchronized?, an affiliation to the Department of Plant Sciences and Director, California Biomass Collaborative, p. 339.
- [126] Kafka, S., Endres, J., Chapter 20: Are Local, State, and Federal Government Bioenergy Efforts Synchronized?, an affiliation to the Department of Plant Sciences and Director, California Biomass Collaborative, p. 342; Liska, A., J., Cassman, K., G. (2008), Towards Standardization of Life-Cycle Metrics for Biofuels: Greenhouse Gas Emissions Mitigation and Net Energy Yield, *Journal of Biobased Materials and Bioenergy*, 2.
- [127] Schlegel, S., Kaphengst, T. (2007), European Union Policy on Bioenergy and the Role of Sustainability Criteria and Certification Systems, *Journal of Agricultural & Food Industrial Organization*, 2007, vol. 5, article 7, p. 12.
- [128] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 7.
- [129] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 8.
- [130] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 12.
- [131] Matus, K. (2010), Assessing Challenges for Implementation of Biofuels Sustainability Criteria, Inter-American Development Bank and United Nations Environment Program, Seminar on Assessing the Challenges for Implementation of Biofuels Sustainability Criteria, 25 – 26th January, 2010 – IDB Washington D.C., UNEP, p. 17.