

Success factors for standards and certification schemes for biofuels: “Sustainable palm oil” from a small-scale farmer and development perspective

Justus von Geibler^a, Katrin Bienge^a with support of Jana Eichelb^b and Julia Nordmann^a

^aWuppertal Institute for Climate, Environment and Energy, Germany, justus.geibler@wupperinst.org;
katrin.bienge@wupperinst.org; julia.nordmann@wupperinst.org

^bGeographisches Institut, University of Bonn, jeichel@uni-bonn.de

Abstract: *The global demand for bioenergy triggers the development of a booming biomass market with far-reaching ecological and social consequences both in developing and developed countries. Sustainability standards and certification systems are seen as a promising approach to ensure sustainability within value chains. However, how effective are they? To what extent can environmental effects of an increasing demand be addressed through certification approaches? Which interests are represented in the standards? What are the governance structures of the multi-stakeholder processes within the standard initiatives? How well are small-scale producers represented? The paper discusses the effectiveness and legitimacy of bioenergy certification in the case of palm oil. It is structured as follows: Global palm oil use and sustainability concerns are explored regarding global palm oil production and consumption patterns facing increasing demand with Europe as key driver, leading to strong sustainability concerns such as land use and land cover changes. A conceptual framework for the effectiveness and legitimacy of certification schemes is applied to the standard initiative Roundtable in Sustainable Palm Oil (RSPO). Conclusions are drawn regarding the strengths and weaknesses in all stages of the RSPO standard setting process, but not neglecting the early stage of the process. Highlighted are the integration of small-scale farmers and the whole value chain into the approach and indirect effects which decrease the effectiveness. Standards can be seen as part of a policy mix but are no alternatives for an overall strategy. The paper reflects results from ongoing applied sustainability research at the Wuppertal Institute.*

Keywords: *small-scale farmers, sustainability standards, certification, palm oil, value chain, RSPO*

Introduction

In industrial countries, high expectations are set on bioenergy and biomass as they can be seen as an environmental friendly, safe and CO₂-neutral substitute for ceasing fossil fuel stocks. Moreover, developing countries as Brazil, South Africa and Indonesia see chances in them due to their area potentials and low production costs for biomass which would be a way to provide valuable employment opportunities in rural regions as well as high export income.

However, these prospects are complemented with concerns regarding emerging environmental and social risks such as deforestation and the jeopardy of food security. Standards and their certification are seen as a promising approach concerning sustainability within biomass value chains. Taking the globally increasing palm oil trade as an example, the scope of this paper is to analyse the effectiveness and legitimacy of non-governmental standard initiatives as the Roundtable on Sustainable Palm Oil (RSPO) in the light of growing demand, especially concerning implications for small-scale farmers and undesired indirect effects in the producing countries.

This paper first explores the global palm oil use with global palm oil production and consumption patterns and its arising sustainability concerns such as land use and land cover changes facing increasing demand with Europe as a key driver. Then a conceptual framework of standards and certification in value chains is presented, including the perspectives for sustainability in value chains, the standard setting process and the success factors. Subsequently, this framework and experiences from other standard setting processes are used to evaluate the effectiveness of non-governmental standard initiatives in the case study of the RSPO, focussing on its strength and weaknesses as well as

the implication for small-scale farmers and development perspectives and the resulting indirect effects such as mass effects. Conclusions are drawn regarding the integration of small-scale farmers and value chain actors as well as the consideration of indirect effects which decrease the effectiveness, keeping in mind the development stage of the process. It is furthermore emphasised that standards cannot be seen as an alternative for an area-wide conservation system but as a part of a "policy mix" while an overall strategy and further policy frameworks are still needed.

Global palm oil use and sustainability concerns

Palm oil is one of the most important plant oils in worldwide production and it is globally in great demand. It is the first agricultural commodity for which a global certification scheme for sustainability has been developed and is also a very controversial product due to several sustainability concerns. To understand the palm oil debate as well as the need for palm oil standards, this section provides an overview on global palm oil production and consumption patterns and key sustainability concerns in global social and environmental systems.

Among all vegetable oils, palm oil stands at the top. Its global production accounted for about 45 million tonnes (mtoe) and 32% of global vegetable oil production (USDA, 2009). The world production of palm oil was mainly produced in Malaysia (18.5 mtoe) and Indonesia (20.8 mtoe) (USDA, 2009:13). Together, these countries accounted for 87% of the global production of palm oil and were the main exporters of palm oil and palm kernel oil in 2009. The main import regions and countries were the EU, China, India and Pakistan. Their share on the global import accounts for 58% (USDA, 2009: 13). The import of pure plant oil (PPO) - especially palm oil from Malaysia and Indonesia – gained importance due to high productivity per hectare and low production and labour costs (Geibler and Biengen, 2010).

The EU is one of the main consumers of palm oil. In 2009/10 the total consumption of palm oil amounted 4.8 mtoe (USDA, 2009: 13). Most of it was used for food production. Energetic use of palm oil in Europe gained increasing importance, e.g. as biodiesel or in combined heat and power plants. European policy makers in different policy fields have acknowledged the benefits of a shift towards a bio-based economy. Key drivers are related to implications from the biofuel debate, such as rising prices for fossil fuels (crude oil), greenhouse gas mitigation for climate protection and the generation of new income for farmers and foresters.

The increasing demand mainly in Europe leads to a number of *sustainability concerns* especially regarding palm oil production. The production of palm oil requires fertile land in tropical regions. This land is, however, limited. Assuming a stable productivity per area, the "rising demand for biomass may only be fulfilled through conversion of agricultural or forestry land" (Bringezu et al., 2007: 25).

Palm oil production and the induced land use and land cover changes (LULCC) result in a variety of economic, social and environmental effects, as the LULCC are linked to ecological and social issues in complex ways. The FAO states that the "use of biomass as a potentially large source of energy in the twenty-first century will have a significant impact in rural, agricultural and forestry development." (FAO, 2006: 4). This impact can be of positive and negative nature.

Employment is a main factor that is impacted by palm oil production. The Indonesian palm oil industry employs approximately 1 million workers (Wakker, 2005). A rising number of direct and indirect employees was detected in Malaysia due to the extension of the palm oil market, so this industry forms a main economic pillar for the population. Important here is the fact that palm oil production involves extensive manual labour, thus employees cannot be easily replaced by machines. Monetary evaluations of effectiveness show that the positive influence of world biomass trade, like economic growth, evolved into an important financial factor for developing countries. Nevertheless, the positive effects for economies of developing countries are not undisputable as it has been shown that their terms of trade towards industrial countries worsen in a long term perspective. Furthermore, the importance of institutional frameworks for the economic growth is highlighted. It was detected that the partially poor work and living conditions of plantation workers as well as the displacement and

cultural uprooting of indigenous populations due to plantation expansions (Pastowski et al., 2007) stand in an opposing position to the positive effects.

Major negative environmental impacts at the global impact scale are biodiversity loss, climate change and aspects like stratospheric ozone depletion. Two-thirds of the current expansion of palm oil cultivation in Indonesia is based on the conversion of rainforests, with one third planted on previously cultivated or fallow land (Grieg-Gran et al., 2007). The loss of biodiversity in these areas is especially alarming as biodiversity holds various economic values and its loss implies economic costs. A key concern relates to the loss of high conservation value forests (HCVF) which are sensitive areas needing appropriate management to maintain conservation values. The management and establishment of plantations also play an important role in sustainability concerns as deforestation and peat-land drainage can result in high GHG emissions and therefore contribute strongly to global warming (Reinhardt et al., 2007).

Relevant issues at the national or local level include pollution of air, water and soil, altered regional and local hydrology, degradation of productive land by soil compaction and erosion or long-term threat to future production of food (Ellis and Pontius, 2007). The international trade of biomass and bioenergy also raises related socio-economic questions of e.g. competition with food supply and material use. Further impact to be addressed are indirect land use changes as an increasing demand for certified biomass products is usually met by using additional areas for their production. Although, if additional demand is met by production in already existing areas, it can nevertheless lead indirectly to an expansion of non-sustainable cultivated area, e.g. into the area of natural forest. This is also possible when the new demand is met by certified cultivated areas (Geibler, 2009).

Standards and certification in value chains: concepts & success factors

According to Kaplinsky and Morris (2001), a *value chain* comprises all activities that are necessary to take a product from first conception over the different phases of production and processing over to the final consumer, including final disposal. This includes flows of material, money, and information between the different phases, each of them embedded in specific structures such as legal or cultural frameworks.

Furthermore, the value chain encompasses the power and governance relationships between different actors within the chains (Altenburg, 2007; Gereffi and Korzeniewicz, 1994). Due to complex structures of value chains, power relationships between actors within the chain (Altenburg, 2007) are often non-transparent and companies with a leading or coordinating function (lead agents or lead firms) are able to change process standards. Governance is a central element for the analysis of value chains and describes the ways of coordination between the actors involved (Gereffi et al., 2001). With the following three questions, Humphrey and Schmitz (2001: 21) defined parameters which typically decide what happens in a value chain:

- 1) What shall be produced? (product standard)
- 2) How shall something be produced? (process standard, e.g. used technique, quality standards, social and environmental standards)
- 3) When, where and how much shall be produced by whom? (logistic parameter)

The value chain perspective is useful for the analysis of ecological and fairness aspects in global trade as it opens the eyes for consideration of natural resources used from production to consumption of a product, indicating spots of intensive resource use, environmental impact and differentiated social standards along the value chain.

In global value chains, resource extraction and production take place geographically displaced from consumption, leading to the threat of a geographical dislocation of environmental impacts, e.g. in developing countries which serve as resource supplier for consuming industrial countries. This means that value chains are controlled by demand. Increasing demand can lead to problematic mass effects which pose a basic barrier for global reduction of resource use as increased resource productivity is annihilated by these effects (Geibler, 2007).

Sustainable value chains therefore have to meet certain principles. These include an extensive quality control integrating the whole life cycle of a product and eco-fair prices for the product. Furthermore, long-term development perspectives should be provided, meaning collective development and learning processes of different stakeholders. Additionally, the use of frameworks for sustainability is needed in order to prevent value chains from crossing certain social and ecological thresholds.

Standards and certification in value chains are an option to ensure sustainability as they can integrate sustainability aspects in logistic parameters, meaning when, where and how much shall be produced by whom. Here the question arises how to reduce or avoid non-sustainable impacts of value chains in general and of the palm oil economy in particular. One approach is the certification according to sustainability standards. Overall, standards are distinct quality characteristics that define the carrier of the characteristics (process, product), the quality (measuring specification) of the characteristics (criteria), and the requested performance of the characteristics (indicators) (Burger and Mayer, 2003). Standard initiatives concerning biofuels and palm oil are efforts of organisations to concretise and oblige the principle of sustainable development concerning biomass production, trade and use with the help of standards. To substantiate and implement the sustainability principle a number of steps in the framework of standard setting are necessary. These are standard development, standard implementation and, finally, the influence on the institutional framework.

In the standard development process, the objective of sustainability is transferred into several principles that lead to a definition of controllable indicators based on available knowledge and a decision-making process. These indicators are then defined and in the process of standard revision practically tested and evaluated with the opportunity for refinement. In the phase of standard implementation, specific mechanisms are developed, meaning certification, accreditation and labelling. As a result of these two phases the influence on the institutional framework sets in, steered through the „non-state market-driven“ governance (Cashore et al., 2007) with certain characteristics concerning development and regulation processes within the standard framework (Geibler, 2009).

To determine *success factors for standards and certification*, a conceptual framework was developed by Geibler (2009), based on the structuration theory of Giddens. It includes an impact assessment for sustainability standards and the derivation of success factors. A classification scheme was developed which allows a differentiated illustration and evaluation of research results on the impacts of sustainability standards on biomass value chains. For this approach, the structuration theory was on the one hand transferred to networks of value creation and standard setting processes. On the other hand it was integrated into the systemic context of the natural environment through resource use within these networks. Based on this, direct effects (immediate impacts, e.g. like the combustion of fossil fuels which are no longer available afterwards), indirect first-order effects (mass and substitution effects, e.g. the negative impact of the expansion of bioenergy crop cultivation on food supply) and indirect second-order effects (discursive and regulative effects, e.g. learning effects resulting from the reflexion on environmental impacts of bioenergy) were distinguished (Geibler, 2009).

These success factors for the effectiveness of sustainability standards for value chains as identified by Geibler (2009) integrate the knowledge on limitations of standard setting resulting in direct and indirect effects (first- and second-order) as well as recent knowledge gaps. The success factors are arranged according to their occurrence in the standard setting process. This means they are assigned to the different phases of standard development, standard implementation and establishment of institutional framework. Table 1 gives an overview of these action-oriented success factors for standard setting (for further details see Geibler, 2009).

Table 1. Success factors for standard setting (Geibler, 2009: 197).

phase of standard setting	success factors for standard setting
standard development	<ul style="list-style-type: none"> • individual cost-value ratio • precise sustainability goals and timetables • participative and transparent development • guaranteed balance between different stakeholders • capability to reach a consensus and trust within the committee
standard implementation (certification)	<ul style="list-style-type: none"> • liability for implementing actors • balance between stringency and practicability • control concerning mass and substitution effects • coverage of the whole value chain
establishment of institutional framework	<ul style="list-style-type: none"> • scientific proof for the effectiveness of the certification • resources for organisational learning processes • complementarity to legal regulations • harmonisation of certification- and evaluation systems

Effectiveness of non-governmental sustainability standards in biomass trading – case study Roundtable on Sustainable Palm Oil (RSPO)

In the following, the standard setting initiative of the Roundtable on Sustainable Palm Oil (RSPO) is described and investigated concerning its strengths and weaknesses.

The Roundtable on Sustainable Palm Oil (RSPO) is an example for a standard setting process and the most comprehensive palm oil multi-stakeholder initiative. The RSPO was established in 2004 based on initiatives by World Wide Fund for Nature (WWF), Unilever, Migros, Aarhus United Ltd. Karlshamns and the Malaysian Palm Oil Association (MPOA) (RSPO, 2004). The aim of the RSPO is to enhance the cultivation and use of sustainable palm oil through cooperation of actors in the value chain and stakeholder dialogues, e.g. with environmental and social organisations. For this, criteria were developed for a sustainable palm oil economy as well as a certification system that testifies the production under the criteria of the standard. Oil mills are used as the unit of certification. Independent external experts regularly check the cultivation and management methods. In September 2008 the first certified palm oil was available on the market produced according to the RSPO criteria. This makes the RSPO the first certification scheme for an agricultural commodity (Geibler 2009). In order to address small-scale producers in particular and include them into the standard setting processes, a new certification standard is currently being developed by the RSPO (RSPO, 2010).

Based on the conceptual framework and success factors for standards and certification developed by Geibler (2009), the potential effectiveness in terms of strengths and weaknesses of the RSPO was analysed. The results are summed up in Table 2 and illustrated below.

From a general perspective, the membership structure is most relevant for the standard development process. The Roundtable is based on members from seven different categories of the entire palm oil supply chain: oil palm growers, palm oil processors and traders, consumer goods manufacturers, retailers, institutions from the finance sector as well as environmental and social/development organisations. Constitutive for the initial acceptance and success of the RSPO was the integration of stakeholders especially the oil palm growers (de Man and Juranics, 2002). A main strength of the RSPO standard setting is the integration of large producers in Indonesia and Malaysia and other important stakeholders from different sector-specific standard initiatives. The RPSO constitutes the only global standard initiative in the palm oil sector. The standard development is fairly transparent and appears participative in the sense of North-South balance, e.g. a balanced participation of developing and developed countries.

Table 2. Potential effectiveness of non-governmental standards – strengths and weaknesses of the RSPO (Geibler, 2009: 236).

phase of standard setting	strengths	weaknesses
standard development	<ul style="list-style-type: none"> • involvement of large producers and important stakeholders from other sector-specific standard initiatives • widely participative and transparent development of standards • North-South balance of interest • small-scale farmers initiative 	<ul style="list-style-type: none"> • indistinct goals, e.g. no temporal aims • dominated by large companies, missing integration of final consumers • lack of direct integration of small-scale farmers and local stakeholders
standard implementation	<ul style="list-style-type: none"> • enclosure of many sustainability concerns of palm oil production • simple system for evaluation of effectiveness with external verification and for further standard development • improved contributions towards sustainability can be expected in certified areas 	<ul style="list-style-type: none"> • missing integration of mass effects and indirect land use competitions • limited coverage of the whole value chain, criteria focussed on production, positive climate balance or resource efficiency not requested • missing credibility through certification of plantation subareas • time needed for implementation due to hindered practicability in smallholder structures and along the value chain (costs, bureaucracy)
establishment of institutional framework	<ul style="list-style-type: none"> • proof for the practicability of sustainable palm oil production and marketing • initiation of learning and innovation processes through stakeholder interaction and the institutionalisation of this (through meta-standards) • current complementarity to implementation of legal regulation • commitment to agenda setting for sustainable palm oil production on developing countries 	<ul style="list-style-type: none"> • missing commitment to scientific proof for effectiveness • long-term perspective not ensured as market-based system is dependent on consumer's willingness to pay or the governmental bioenergy promotion • voluntary certification is no alternative to an area-wide conservation system or a comprehensive resource protection regime

Central to management and performance evaluation is the compilation of a set of principles and criteria for a sustainable palm oil production by the RSPO. In total, eight principles and 39 criteria have been defined. Most of above mentioned sustainability concerns have been picked up during the standard development in a network of 25 selected working group members with different motivations, intentions and resources to agree on a common international valid definition about sustainable palm oil.

Based on these principles and criteria, management plans aiming at maintenance and protection of endangered species, threatened ecosystems and high conservation values in the surrounding of existing plantations have to be prepared and implemented. The mitigation of greenhouse gas emissions is addressed in pollution prevention plans (including the assessment, monitoring, reduction plans) and a zero burning policy for land preparation or waste disposal to prevent forest fires (except in particular situations). The establishment of new plantings should be avoided on extensive peat soils greater than three meters (Geibler and Bienge 2007).

The criteria are focussed on palm oil cultivation and cover a variety of sustainability aspects. Through this in combination with external verification, chances are high that the certified palm oil plantations lead to improved sustainability contributions on site, which are important in the light of impeding rain forest destruction, potential climate impairment and the partially missing or non-effective governmental regulations. Nevertheless, the credibility is questioned due to the certification of plantation subareas, allowing the production of non-sustainable palm oil on other areas of the same plantation (Greenpeace 2010).

The analysis also demonstrates the dominance of companies within the standard development process and the governance structure that leads to a decline in the standard demands. Although several companies (trade and processing industry) promoted the stringency of the standard to a large extent, the actual criteria do not demand a positive climate balance and indirect land use competitions are

not integrated. Thus, negative effects might evolve despite certification and due to increasing demand for bioenergy.

It also becomes obvious that the implementation of the standard is hindered by various barriers and many effects of the certification unfold with temporal delay. The barriers include especially the hindered implementation in smallholder structures and along the whole value chain due to costs, bureaucracy, missing knowledge and openness to changes.

Despite all limitations the voluntary standard setting possesses an important significance for the development and implementation of governmental regulations in producing countries. Even though the demand for certified palm oil has been relatively small so far and its marketability thus limited, positive indirect effects of the standard setting process and the certification, particularly the initiation of learning and innovation processes through stakeholder interactions as well as agenda setting for sustainable palm oil production in producing countries, can assume a special function for the legal regulation respectively the development of more ambitious standards. As existing legal regulation instruments are not sufficient or not implemented in a sufficient manner, sustainability certification of palm oil through the RSPO could serve as an important step towards the development of further frameworks for an ecologically oriented and socially compensating biomass trade. To enhance credibility of the RSPO an increased engagement for scientific proof of efficiency is suggested (Geibler 2009).

In the following, the challenges for the RSPO standard are highlighted concerning two points, the implications of this standard for small-scale farmers as well as the importance of mass effects.

From a perspective for small-scale farmers, the implications of standards are an important point in the effectiveness analysis. Recalling strengths and weaknesses of the RSPO, it can be said that the usage of oil mills as a base for certification can be seen as a chance for the integration of small-scale farmers, as this covers the majority of smallholder producers supplying the mills. Nevertheless, small-scale farmers often have serious problems with the implementation of standards (compare e.g. Burger and Mayer, 2003). Studies indicate that the amount of standards leads to confusion and increases production costs for small scale-farmers. In the case of the RSPO, the question arises on the degree of support which is given by the oil mills to small-scale farmers. There is no guaranteed price for the certification within the RSPO, furthermore, the increasing demand for palm oil will hamper the integration of small-scale farmers, as more stakeholders will demand for palm oil, leading to additional biomass producers in the market and therefore increasing competition.

Aiming to address some of these problems, the RSPO is currently developing a new standard for small-scale farmers. The consultation draft "Guidance for Independent Smallholders under Group Certification" gives recommendations on how to overcome major obstacles for small-scale farmers preventing them from gaining access to the market of RSPO-certified palm oil. So far, compliance with the RSPO standard and providing proof thereof as well as auditing costs seem to be such major obstacle. Therefore, this new standard offers a group certification approach in which small-scale farmers can get certified as a group and thus share these costs with other farmers. In this case, the oil mill would not be the certified unit any more. Each group would have to elect a group manager, who would be responsible for compliance with the RSPO standard of each group member (RSPO Standard for Group Certification) as well as continuous improvement in key areas of activity.

Another point for criticism is the practicability of principles and criteria for protection measures for High Conservation Value Forests (HCVF) as well as rare and threatened species on existing plantations and the integration of these measures into the management plans. Small-scale farmers are often missing appropriate knowledge for these measures and usually contribute very different capabilities and knowledge on cultivation systems (e.g. soil erosion reductive cultivation, handling of toxic matter, seeds/breeding) (Colchester et al., 2006). Within the RSPO system, there are no resources to improve this and to establish an area-wide HCVF evaluation process.

From a development perspective, positive impacts on the site level can be expected. However, as a consequence of an increasing demand for palm oil, the indirect effects of certification, such as mass effects, have been highlighted in literature. Mass effects arise on a macro scale from the concurrence

of resource use in the considered value chains. As already mentioned, biomass trade can have short-term positive effects for producing companies, e.g. the generation of economic income. In a long-term view, strong negative effects could occur. An empirical study on socio-ecological effects of agricultural exports in developing countries shows that the expansion of agricultural production due to international agricultural trade not always implies positive regional socio-economic effects. The effectiveness is especially influenced through the type of the agricultural product, macroeconomic factors and governance structures in the producing country (Kessler et al., 2007).

Due to negative competitive relationships implied by limited land availability, undesired price effects on other products such as food are likely (Both ENDS, Stichling Natuur En Milieu and COS Nederland, 2006: 24). Furthermore, substitution effects can emerge, that is improvement within the certified area but negative changes of land use in the surroundings. Quantification of these effects is difficult but they can be largely excluded when the expansion of the production takes place on unutilised fallow land or through improved productivity per hectare.

From an environmental perspective, environmental degradation is a strong negative development effect, which also reduces the positive economic effects, as ecosystems and biodiversity possess an economic value, which is e.g. described in the report "The Economics of Ecosystems and Biodiversity". From a development perspective, the excessive use of resources can lead to further economic costs, e.g. necessary conservation and renaturation costs, which can reduce the primary economic benefits largely but are not included in profit calculations.

Scientific research concerning indirect mass effects is still at the beginning, first results are yet available on greenhouse gas emissions due to indirect land use competition or food security (Geibler, 2009). An option to reduce indirect mass effects is the exclusive sale of certified palm oil to all consumers. For this, import countries need to advocate a sustainable palm oil economy.

Conclusion

The effectiveness and legitimacy of the standard initiative of the RSPO was examined and evaluated in the three phases of the standard setting. In all phases, strengths and weaknesses were found, especially concerning the integration of small-scale farmers and the development perspective. The first issue, integration of small-scale farmers, is addressed by the new group certification approach of the RSPO; a promising approach that should be observed in its further development. Moreover, the implementation of the RSPO is still in a relatively early development stage and is constantly revised, which hampers a final evaluation. Besides the revision process of the RSPO itself, it has to strengthen and monitor the standard and its implementation on an ongoing basis.

Concerning the topic of standard development, it was highlighted in this paper that especially this phase exhibits an outstanding significance for the effectiveness of the standard. Due to path dependency, future possibilities for development are hindered respectively enhanced. The RSPO's main strength in the standard development lies in the integration of large producers in Indonesia and Malaysia and other main stakeholders from different standard initiatives, representing the only global standard initiative in the palm oil sector. Further strengths include transparency of the standard development, an integrated approach concerning North-South participation with focussed criteria on palm oil production, covering a multitude of sustainability effects.

Moreover, this phase is crucial for small-scale farmers and mass effects. Here its weaknesses lie mainly in the company dominance, the disregard of indirect effects and the hindered practicability for small-scale farmers along the value chain due to costs, bureaucracy, missing knowledge and openness to changes. The consideration of indirect effects has not yet reached this stage, thus in combination with increasing demand, these can largely reduce the effectiveness of the standard.

Regarding the standard implementation, the RSPO shows strengths in its evaluation system and external verification. This can lead to positive sustainability effects in certified areas. The weakness of the RSPO, which can also be found in other already established standards, is the missing integration of the whole value chain. This means that the certification only covers parts of the value chain and

the market and negative mass and substitution effects cannot be eliminated. It becomes obvious that certification for single value chains is no alternative for mandatory area-wide protection systems for natural resources such as biodiversity, water or climate. Without such a system the expansion of palm oil plantation into natural forests continues, non-certified value chains are expanded on the costs of natural forests and their various functions and services.

In the stage of the establishment of the institutional framework, it can be said that learning and innovation processes have been initiated but that a scientific proof for their effectiveness is missing and a long-term perspective is not ensured.

Using the RSPO standard setting process as an example, it was shown why the RSPO as a global sector-specific sustainability initiative is only partly effective. The prospects are good that the certified palm oil plantations will lead to improved sustainability contributions on the certified site. Main problems, however, lie in the process of the standard development, the reference of the standard only to cultivation and production as well as the missing integration into politics. The analysis also points out a missing participation of small-scale farmers and stresses the mass effects as limits of the steering of value chains through sustainability standards. Even if the whole amount of palm oil and its derivatives would be produced and traded within the framework of a non-governmental (or also governmental) sustainability certificate, undesired impacts would still occur outside the value chains due to increasing demand without a global restriction of energy and resource use and without a social balance between industrial and developing countries.

A single controlling tool alone cannot determine and regulate the negative consequences of complex interactive systems in global value chains. Different approaches and synergy effects are necessary to promote the area-wide implementation of a sustainable economic manner. Despite their weaknesses, non-governmental standards are still important in a "policy mix" for sustainable development. The development of an overall sustainability strategy for biomass that integrates area and resource relating land use competitions, the different stakeholders, the diverse demand from different political fields as well as the entirety of the political controlling instruments in different levels is still needed.

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