

# Governance of the emerging bio-energy markets

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## Abstract

Despite its promising prospects, a growing global bio-energy market may have sustainability risks as well. Governing this market with respect to installing safeguards to ensure sustainable biomass production might reduce these risks. Therefore, proposals for governance systems for bio-energy are discussed in this article. The proposals are based on comparative case study research on the governance of comparable commodities. By assessing the governance system of global coffee trade, fair trade coffee, the global and the EU sugar market and Forest Stewardship Council (FSC) wood, strong and weak points of governance systems for commodities are discerned. FSC is selected as the best performing case study and serves as the proposal's basis. FSC's weaknesses are minimized by, among others, using the lessons learned from the other case studies. This results in a system consisting of two pillars, a bio-energy labelling organization (BLO) and a United Nations Agreement on Bio-energy (UNAB). Although consulted experts in the research process are critical about this system they do suggest several conditions a governance system for bio-energy should meet in order to be effective, such as a facilitative government, professional monitoring and using progressive certification combined with price premiums. These conditions have been taken into account in the final proposal.

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## 1. Introduction

Bio-energy is a promising tool for achieving a sustainable development. Using bio-energy can help to mitigate greenhouse gas emissions, as bio-energy can be a climate neutral source of energy. In order to lessen the dependence on fossil fuels, bio-energy can increase the supply diversity and security of energy. Bio-energy is also increasingly becoming more cost-competitive, compared to other sources of energy. Furthermore, bio-energy may help to alleviate rural poverty especially in developing regions, when bio-energy production is stimulated (WWI, 2006). Driven by these potentials, governments, but also private parties (e.g. utility/fuel companies, NGOs), are increasingly interested in using bio-energy as an alternative source of

energy (Faaij et al., 2003, p. 4). Production and trading volumes are already rapidly growing. Faaij et al. (2003, p. 4) argue that bio-energy markets may eventually evolve into a global bio-energy commodity market with linkages to other markets and related financial services within near future.

Despite the opportunities of bio-energy, there are concerns about the sustainability of bio-energy. It is feared that the production and trade of bio-energy may put great pressure on the Earth's natural resources, socio-economic conditions of producing regions and local food and energy availability. Table 1 shows the sustainability concerns that are identified by Lewandowski and Faaij (2004), emphasizing the potential threats of bio-energy. The concerns are grouped in four areas of concern.

Although some of these concerns are "traditional" to biomass production, other concerns can be explained by the unique characteristics of a (future) bio-energy market.

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Table 1  
Bio-energy's sustainability concerns (based on Lewandowski and Faaij, 2004)

Area of concern	Sustainability concern
Land use patterns	Deforestation Unsustainable harvest regimes and yields Natural habitats and landscape destruction Regional food and energy supply shortages Leakage effects (shift of unwanted activities)
Natural resources and pollution	Soil degradation Use of GMOs instead of native species Unsustainable agricultural production methods Water scarcity
Socio-economic conditions	Child labour is involved Insufficient production remuneration Poor perspectives for producers Land tenure conflicts Welfare of producing regions
Others	Environmental additionality Traceability Opportunities for local energy supply development

First of all, virtually any agricultural and forestry biomass may end up as bio-energy. Therefore, feedstocks supplying the potential bio-energy market are extremely versatile. Secondly, both supply and demand potentials of bio-energy are huge. The availability of bio-energy in an extreme scenario could supply up to 50% of the global primary energy demand by 2050 (Hoogwijk et al., 2003), while energy demand may double by 2050, compared to 2000 levels (Goldemberg and Johansson, 2004, p. 36). This future availability is uncertain as it depends on several factors, such as the future demand for food, livestock and open trade, the productivity of food production and forests and energy crops and availability of degraded land (Goldemberg and Johansson, 2004, p. 36). Despite these uncertainties, it is expected that the trade in energy crops will dominate the currently dominant trade in bio-energy from residues, as the supply potentials of energy crops are much larger than from residues (Faaij et al., 2003; Hoogwijk, 2004). Thirdly, trading patterns are expected to be extremely diversified, because the biomass for bio-energy may be produced anywhere. Fourthly, trading patterns are further complicated by alternative links of biomass to other markets, such as the food, fodder and timber markets. And, fifthly, raising end-user awareness on the sustainability of bio-energy may be more difficult, because all bio-energy ends up as fuel, electricity or heat, irrespective of the used feedstock. Food and timber products, for example, are more feedstock-recognizable and quality-valued products by end-users. These characteristics indicate that the potential scale and complexity of a (future) bio-energy market may be far greater than any agricultural market.

Palm-oil production is already an example of increased pressure on natural resources and local communities, because the rapid historic and future growth is accommodated solely through the expansion of large, mono-crop plantations at the cost of tropical forests (ProForest, 2003; Buckland, 2005). Questions can be raised not only about the environmental additionality of this practice (i.e. release of greenhouse gases from land use conversion), but also about its sustainability in a broader sense, relating to the concerns mentioned in Table 1. For instance, land tenure conflicts may arise when local communities are pushed from their lands and livelihoods by companies seeking expansion of their plantations. Forestry could become problematic as well, because the dominant production is expected to shift from Northern silviculture forests to Southern plantations in the coming decades (FAO in WWF, 2000). Some concerns of this development are that more natural habitats are lost, water scarcity is enhanced, land tenure conflicts arise, while local welfare improves little.

Despite these practices, developments and concerns, the use of bio-energy is promoted by most governments. The EU, for example, has set the goal that 12% of the primary energy supply has to be met by renewable energy sources by 2010 (EC, 2001, p. 3). In the EU transportation sector, the use of bio-fuels has to be 5.75% of the total fuel consumed by 2010 (EC, 2003a). In most countries, bio-energy plays a dominant role in attaining the renewable energy objectives and bio-energy is, therefore, promoted by national policies and using various (financial) incentives (Lewandowski and Faaij, 2004).

When these concerns are not secured, bio-energy could turn into a threat instead of an opportunity for sustainability. This is also recognized by the Dutch government who has commissioned the Cramer Commission, to propose sustainability criteria for bio-energy production. These criteria are then incorporated in Dutch renewable energy policies. At the international level, however, there is currently no specific regulatory framework (or governance system) for the production and trade of bio-energy (WWI, 2006). We presume that a global governance system for bio-energy is needed to minimize the sustainability concerns, because of the potential scale of production, global trading patterns and potential risks of bio-energy. Governance should minimize possible negative impacts and maximize benefits.

Following Midttun (1999, 2004) three generic governance models for markets can be discerned. These models describe the relations between government, civil society and industries (or market). The main differences between the neo-liberal, welfare state and corporate social responsibility (CSR) model are summarized in Table 2.

The neo-liberal model is presented as a mainly decoupled style of governance, in which market forces dominate societal dynamics. Governments in this model have a minimalist role and civil society is mainly a "source" of an individualistic workforce and consumers. The Keynesian

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