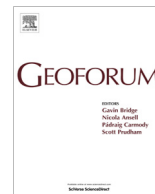




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## Livelihood impacts of biofuel crop production: Implications for governance

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### ABSTRACT

While much attention has focused on the climate change mitigation potential of biofuels, research from the social sciences increasingly highlights the social and livelihood impacts of their expanded production. Policy and governance measures aimed at improving the social effects of biofuels have proliferated but questions remain about their effectiveness across the value chain. This paper performs three tasks building on emerging insights from social science research on the deployment of biofuel crops. First, we identify livelihood dimensions that are particularly likely to be affected by their cultivation in the global South – income, food security, access to land-based resources, and social assets – revealing that distributional effects are crucial to evaluating the outcomes of biofuel production across these dimensions. Second, we ask how well selected biofuel governance mechanisms address livelihood and equity concerns. Third, we draw insights from literature on non-energy agricultural value chains to provide one set of ideas for improving livelihood outcomes. Our analysis demonstrates that biofuel policies treat livelihoods as a second-degree problem, specifying livelihoods as an afterthought to other goals. We suggest integrating livelihoods into a multi-criteria policy framework from the start – one that prioritizes equity issues as well as overall outcomes. We also show that the instruments with strongest provisions for safeguarding livelihoods and equity appear least likely to be implemented. Together, shifting both the priorities and the relative hierarchy of biofuel governance instruments could help produce strategies that more effectively address livelihood and equity concerns.

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### 1. Introduction

Three main interests have motivated the recent wave of policies encouraging biofuel production and use. Concern over greenhouse gas (GHG) emissions raised interest in biofuels as a climate change mitigation strategy; fluctuating oil prices and uncertainty over future supplies drove interest in biofuels as an energy security strategy; and a desire for economic growth in the agriculture sector supported investment in biofuels as a rural development strategy (Franco et al., 2010; Howarth et al., 2009). The belief that biofuels could promote all three of these goals was partly based on analyses of the economic and climate change mitigation potential of biofuel production – analyses that paid little attention to other social and environmental considerations. For example, the Special Report on Renewable Energy Sources (SRREN) (IPCC, 2011), one of the most

important attempts to assess the potential role of biofuels in the future global energy mix, focuses primarily on greenhouse gas reduction potential (in line with the report's mandate) and mentions other sustainability considerations only briefly. Social and livelihood outcomes have been conspicuously absent from global bioenergy assessment reports despite their importance to the overall question of whether and in what circumstances biofuels can be considered sustainable (Creutzig et al., 2012b).

'Sustainable biofuels' is a concept that warrants unpacking. Biofuels have been the subject of much ideological contestation (Fast, 2009). The ability to control biofuel discourses – including what counts as 'sustainable' biofuel – is a key form of power that can influence decisions with on-the-ground consequences for farmers and ecologies (Hunsberger, 2013; Kuchler and Linnér, 2012). In the economic literature and reports such as SRREN, 'sustainable' biofuels are typically considered to have low life-cycle GHG emissions and sometimes to provide other benefits, such as an income for rural communities. By contrast, the Roundtable on Sustainable

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Biomaterials (RSB, formerly Roundtable on Sustainable Biofuels) identifies 12 principles underlying the sustainability of biofuels, including land rights and local food security (RSB, 2010). Like the RSB, we believe that a wider range of (interrelated) social and ecological factors than GHG and income is necessary for biofuel production to be considered sustainable. In this paper we examine a range of possible livelihood impacts and their uptake in international biofuels regulation.

Recent research has critically examined social and environmental problems related to biofuels development. Social science research draws attention to the local social outcomes of biofuel production, particularly in the global South (e.g. German et al., 2012; Hodbod and Tomei, 2013; McMichael and Scoones, 2010). Research on indirect land use change has simultaneously challenged the view that biofuels necessarily produce climate mitigation benefits (Fargione et al., 2008; Hertel et al., 2010; Searchinger et al., 2008), results that were until recently insufficiently integrated into global assessment models (Creutzig et al., 2012a). Other environmental dimensions have also come under scrutiny, including effects on biodiversity (Fargione et al., 2010) and water resources (Larsen et al., this issue; Woodhouse, 2012).

Alongside these shifts, policy amendments and new governance initiatives have emphasized the social and environmental dimensions of biofuels. Several countries that had already implemented biofuel use targets modified their policies by adding sustainability requirements, including the US, the EU and the UK (Creutzig et al., 2011; EU, 2009; Renewable Fuels Agency, 2010). Some producer countries introduced new conditions on where biofuel production could take place, for example Indonesia (USDA Foreign Agricultural Service, 2011), or took steps to slow biofuel investments and allow more time to assess their implications, as in Tanzania (Browne, 2009). Meanwhile, new certification systems, multi-stakeholder 'roundtables' and voluntary guidelines have encouraged governments and the private sector to pursue environmental and social benefits across the value chain (Bailis and Baka, 2011; Lee et al., 2011). But how effective are these measures? Recent appraisals suggest that biofuel certification schemes have significant shortcomings, including weak attention to social criteria (German and Schoneveld, 2012), high barriers to participation (Lee et al., 2011), and a lack of guidance on governance practices with the result that 'business-friendly' schemes tend to dominate (Ponte, this issue).

Improving the governance of biofuels faces political challenges. Environmental and social policies remain under-enforced in many countries, while states and investors lack incentive to implement voluntary measures that contradict their own interests. Biofuel developments have increased already intense competition for arable land and in many cases have been associated with 'land grabs' (Borras and Franco, 2012; Borras et al., 2011) or 'green grabs' (Fairhead et al., 2012) that alter patterns of land use and property relations. Two ongoing trends complicate matters further: the basis of land governance appears to be shifting away from approaches based on territory toward ones based on flows of goods and resources; and non-state actors are assuming a more prominent role in land governance (Sikor et al., 2013). The goal of protecting and enhancing rural livelihoods in the context of biofuel production thus depends on the difficult task of designing and implementing governance mechanisms that are robust and resilient, while simultaneously confronting deeply entrenched power relations.

This paper asks how fully and in what ways biofuel governance initiatives seek to protect and enhance livelihoods at sites of production and along the value chain, particularly in developing countries, and how they could be strengthened in this regard. We systematically analyze a set of governance mechanisms chosen to reflect a variety of types of initiatives as well as an evolution of strategies over time. While we see social and environmental

dimensions of sustainability as closely intertwined, in this paper we focus on livelihood and equity considerations because we believe they have been insufficiently taken up in global assessments of biofuels to date (Creutzig et al., 2013), and are likely also under-represented in policies and strategies that have been informed by such assessments. In Section 2 we explain our interpretation of livelihoods and equity, review recent research on the local impacts of biofuel production, and identify key dimensions of livelihoods that are likely to be affected by the expansion of biofuel crops. In Section 3 we examine selected governance instruments, assessing how they address livelihood outcomes and equity. We also make a preliminary assessment of how widely each instrument has been implemented. In Section 4 we identify patterns and trade-offs arising from the analysis and discuss how similar problems have been approached in non-biofuel agricultural value chains. Section 5 offers possible strategies for strengthening biofuel governance efforts and identifies avenues for future research.

## 2. Biofuels, livelihoods and equity

The growth and consolidation of land areas in the global South dedicated to cultivating biofuel crops, including soy, oil palm, jatropha and sugar cane, is changing rural livelihoods in ways that we are still far from systematically understanding. Livelihoods comprise the capabilities, assets, and activities required for a means of living (Scoones, 1998, 2009). The term conveys not only economic factors of survival, such as income, but also non-economic ones such as social relationships, capabilities and institutions that mediate peoples' access to different income flows and other assets (Ellis, 2000). Both natural and socio-economic assets are critical for livelihoods and provide meaning to communities (Bebbington, 1999). Access to land and other natural assets is mediated by tenure regimes, which encompass property rights as well as formal and informal social relations and systems of authority that influence who gets access to and exercises control over land resources (Ribot and Peluso, 2003). Diversity in income streams and assets is a central characteristic of livelihoods in developing countries (Ellis, 2000). A livelihood is considered sustainable when it can cope with and recover from stresses and shocks (i.e. is resilient), and maintain or enhance its capabilities and assets without undermining the natural resource base (Ellis, 2000; Scoones, 1998, 2009).

While case study evidence detailing the place-specific livelihood impacts of biofuel production remains thin (Hodbod and Tomei, 2013), there are parallels between the current expansion of biofuel crops and trends in the production of other cash crops. Analyses of "boom crops" demonstrate that developments driven by strong market demand produce conflicts, winners and losers, particularly at local scale (see for example Gerber, 2011). Reviews of rubber, cocoa, oil palm, coffee and commercial tree plantations, as well as shrimp aquaculture, highlight that a lack of formal property rights has often facilitated their encroachment into customary tenure areas and the subsequent consolidation of formal property rights by migrants or powerful actors (Hall, 2003, 2011; Li, 2002). Reviews of industrial roundwood and rubber plantations suggest that such plantations have facilitated local processes of land ownership concentration, loss of customary rights of resource access, rural displacement, and socioeconomic decline in neighboring communities, with uneven benefits in the form of wage labor (Charnley, 2005; Kenney-Lazar, 2012).

Emerging research on biofuel crop expansion in the global South echoes some of these "boom crop" effects. Regarding income, mounting evidence suggests that the expansion of biofuel crops generates unskilled jobs and increases local farm and/or wage income, though the magnitude and extent of these gains

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