



Suriname: Reconciling agricultural development and conservation of unique natural wealth[☆]



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ABSTRACT

National and transboundary adverse effects of competition for land are being increasingly recognized by researchers and decision-makers, however the consideration of these impacts within national planning strategies is not yet commonplace. To estimate how increasing agricultural production can be conciliated with protection of natural resources at the national scale, we analyzed current land use in Suriname, and investigated opportunities for, and constraints to developing a sustainable agricultural sector.

Suriname is a remarkable case study. To date, Suriname has retained most of its natural resources with forest areas covering over 90% of the country. Surinamese forests combine extremely high levels of both biodiversity and carbon, making them top priority from a global ecosystem services perspective. Among other national and international pressures from increased demand for agricultural products, the country is also considering significant expansion of agricultural output to both diminish imports and become a 'bread basket' for the Caribbean region, which collectively may pose risks to natural resources.

In this study, combining locally-obtained primary data, expert consultation and secondary data from the Food and Agriculture Organization we analyzed a range of scenarios, we show the complexities associated with current land management and we discuss alternatives for developing a sustainable agricultural sector in Suriname. We show that Suriname can increase the production of rice, which is the most important agricultural activity in the country, without expanding rice area. Rather, future increase in rice production could be promoted through an increase in rice productivity, and the employment of more environmentally-favorable management methods, in order to both diminish pollution and avoid encroachment of the agriculture into pristine areas. Further, we show a potential to both contribute to greening of the agricultural sector and to higher economic returns through expanding the production of 'safe food' and through possible development of organic agriculture in Suriname.

If Suriname develops a 'greener' agricultural sector, it may both increase economic returns from the agricultural sector and benefit from continuing protection of natural resources. Because most of Suriname forests present top levels of carbon and biodiversity, the country could benefit from so-called 'early-action' Reducing Emissions from Deforestation and Forest Degradation (REDD) finance, which is already being paid mostly through bilateral agreements. Further, by adopting land-use planning that protects natural resources, Suriname may be in extraordinary position to benefit from both improved-quality agricultural production and from incentives to conserve forest carbon and biodiversity, such as payments for ecosystem services. Given the high stakes and the severe lack of both primary data and applied analyses in Suriname, further research focused on better informing land-use policies would be a valuable investment for the country. Although this analysis was performed for Suriname, conclusions drawn here are transferrable and may assist formulation of policy recommendations for land use elsewhere.

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Introduction

Over the next few decades land resources are forecasted to continue to be subject of competition from a range of uses (Alexandratos and Bruinsma, 2012; Harvey and Pilgrim, 2011; Smith et al., 2010). According to the Food and Agriculture Organization (FAO, 2009), one of the main drivers of this competition stems from the anticipated growth in global population from seven to nine billion by 2050. Not only will these additional billions need to be fed, they also want to be fed well (Smith et al., 2010). With higher purchasing power comes higher overall consumption and the global appetite is projected to increase also with respect to other commodities, such as fuel or timber (Smith et al., 2010; Tilman et al., 2009). Furthermore, land degradation intensifies competition because it depletes the available pool of land for production while a share of land is additionally set aside for conservation purposes (Smith et al., 2010).

Competition for land is transboundary (Lambin and Meyfroidt, 2011; Strassburg et al., 2013), meaning that although increased demand occurs in one part of the world, pressure to provide commodities may be shifted elsewhere, given the economic benefits for commodity-providing countries and the globalization of agricultural markets. The World Bank (2011) demonstrated that there were about 45 million ha covered by large-scale land acquisitions, mostly in developing countries, with the production of food and biofuel in these areas destined for exports. These large-scale land acquisitions are also sometimes referred to as 'land grabs' (World Bank, 2011; Friis and Reenberg, 2010) and represent the adverse effects of demand displacement (Lambin and Meyfroidt, 2011). Notwithstanding the potential positive aspects of facilitated international land acquisitions, including poverty alleviation, improvements in infrastructure or job creation, in practice, these kinds of transactions are often accompanied by negative in-country effects. Loss of livelihoods and displacement of local population may occur, with the poorest being usually the first to lose their land (Zoomers, 2010).

Agriculture has historically been the greatest force of land transformation (Lambin and Geist, 2006). Cropland area expanded from 3–4 million km² in 1700 to 15–18 million km² in 1990, a loss of 12–14 million km² of natural areas (Ramankutty, 2004). Gibbs et al. (2010) also showed that tropical forests were primary sources of new agricultural land in the 1980s and 1990s. Throughout the tropics, between 1980 and 2000 more than 80% of new agricultural land came at the expense of intact and disturbed forests (Gibbs et al., 2010). According to forecasts, global land under crop cultivation may increase by some 70 million hectares by 2050, mostly in developing countries (Alexandratos and Bruinsma, 2012).

On account of the future population projections, increasing demand and environmental degradation, and with the recent figures showing Food Price Index up by 1.4% as a result of fears of food shortages following poor harvests (FAO, 2012a), there has been increasing interest in research and implementation toward more sustainable land management (de la Rosa et al., 2009; EC, 2012; FAO, 2012b; Ingram and Morris, 2007; ORC, 2012; Powlson et al., 2011; Reidsma et al., 2011; Sutherland et al., 2012). For instance, sustainable intensification of agriculture – that is producing more food from the same area of land while reducing the environmental impacts (Royal Society of London, 2009) – has been indicated as paramount to meeting growing demands from a growing global population while simultaneously protecting the remaining natural resources of the planet and ecosystem services they provide (Foley et al., 2011; Foresight, 2011; Godfray et al., 2010; Mueller et al., 2012; Tilman et al., 2011, 2002). Global-scale estimates demonstrate spatially 'yield gap' between observed yields and those attainable in a given region (Licker et al., 2010; Mueller et al., 2012) and recent studies have investigated alternatives to sustainably

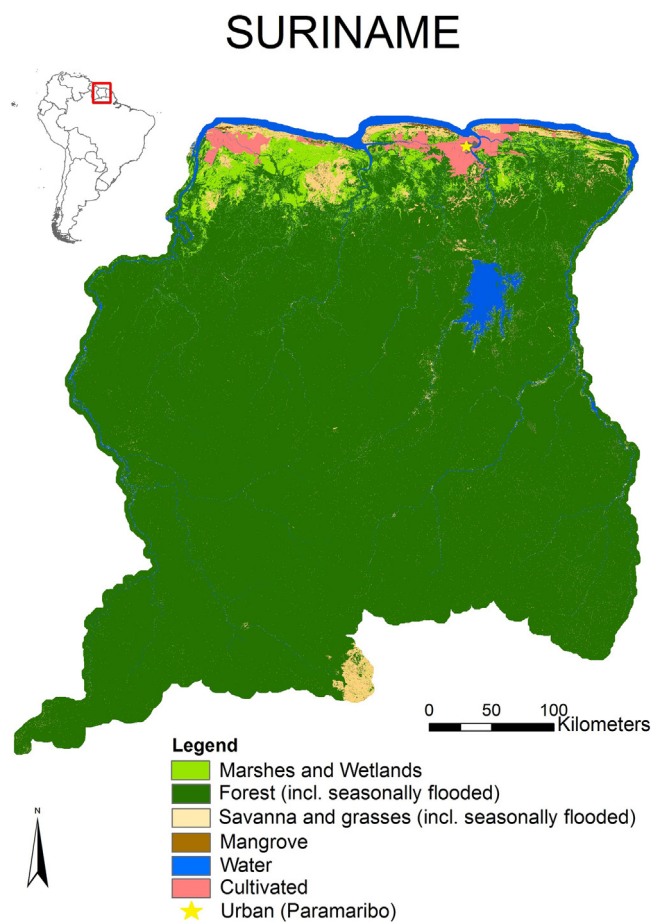


Fig. 1. Land use in Suriname. Data source: Conservation International Suriname.

close this gap (Licker et al., 2010; Mueller et al., 2012; Tilman et al., 2011). However, in practice, it is the local land-management policy and socio-economic constraints determining whether a sustainable intensification and conservation path is pursued by under-yielding nations (e.g. Mueller et al., 2012).

In order to form a better view on how intricate factors, such as local socio-economic circumstances, play a role within the broader concept of sustainable intensification and protection of natural resources, we analyzed available data and policies, and investigated possibilities for developing sustainable agriculture in Suriname. Suriname is an interesting case study when considering competition for land and development that simultaneously protects natural environment. Suriname is the smallest sovereign South-American country, with a total land area of approximately 164,000 km² (ATM, 2013) situated in northeastern part of the continent (Fig. 1). It has a tropical climate, with an average daily temperature of 27 °C in the coastal region and an annual average rainfall of 1900 and 2700 mm for the coastal areas and the central part of the country, respectively (ATM, 2013). Suriname retained most of its forest resource (Griscom et al., 2009), with forest land covering over 90% of the country including pristine tropical rainforest of the Amazon (ATM, 2013; Country Strategy Paper – CSP, 2008). There are multiple factors that historically contributed to low deforestation rates. Suriname is a low populated country (currently just over 500,000 and the population density of approximately 3 inhabitants per square kilometer), with the majority living along the coast in urban and peri-urban areas (ATM, 2013). Its colonial history influenced establishment of coastal plantations in vicinity of ports to facilitate shipping of agricultural products to Europe. Historically, lacking infrastructure and the presence of a significant population

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