



Offsetting legal deficits of native vegetation among Brazilian landholders: Effects on nature protection and socioeconomic development



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ABSTRACT

The Brazilian native vegetation supports essential ecosystem services and biodiversity for the global society, while land use competition may intensify around the increasing needs for food, fibre and bioenergy. The Brazilian Forest Act of 2012 amplified a market-based mechanism for offsetting native vegetation deficits in private farmlands. This mechanism enables a large-scale trading system allowing landholders to offset their own deficits of native vegetation by purchasing certificates associated with a surplus of native vegetation from other landholders. This mechanism is an alternative for the more expensive restoration of native vegetation on own land. The launching of the mechanism now depends on specific regulations at state level, which may include geographical restrictions for offsetting deficits. The aim of this study is to evaluate the effects in nature protection and socio-economic development of different offsetting implementation alternatives. Our findings suggest that in a business-as-usual scenario the offsetting mechanism may have little or no additional effects on protection of native vegetation, because most of the offsetting is likely to take place where native vegetation is already protected by prevailing legislations. We concluded that it is possible to maximise environmental and socio-economic returns from the offsetting mechanism without undermining productive land. This would be possible if regulations ensure additionality in nature protection while enabling a self-sustaining mechanism for income generation for small-scale family farmers in the poorest region of Brazil, protecting biodiversity and counteracting major trade-offs between ecosystem services.

1. Introduction

The Brazilian native vegetation is among the world's largest carbon storages (Hansen et al., 2013; Harris et al., 2012; Nogueira et al., 2015; Zarin et al., 2016). It supports a wide array of ecosystem services and is home to more than 10% of the known species on Earth, many of which are endemic and endangered (Lewinsohn, 2006). Thus, it has global importance for ecosystem services and biodiversity, and increasing pressure on land for food, fibre and bioenergy may lead to goal conflicts among related sustainability goals. Despite effective policy interventions to reduce deforestation, the Brazilian gross forest loss is the second highest in the world (Hansen et al., 2013). These losses take place mostly in private land (Richards and VanWey, 2015; Sparovek et al., 2010), where 54% of the Brazilian native vegetation is located (Sparovek et al., 2015).

1.1. Changes brought about by the new Forest Act

In 2012, the Brazilian parliament revised the most important law for native vegetation protection on private land, the Forest Act (Brasil, 2012). This revision was strongly supported by the agribusiness sector (Silva et al., 2011) that considered compliance with the previous version of the Forest Act (Brasil, 1965) unfeasible since it would result in significant reduction of productive farmland (Diniz and Ferreira Filho, 2015). The revision can be seen as controversial (Ferreira et al., 2014; Sparovek et al., 2012) as it largely reduced the need to restore native vegetation on private land, amnestying illegal deforestation prior to 2008 and, therefore, facilitating the compliance with the previous Forest Act (Alarcon et al., 2015; Soares-Filho et al., 2014; Sparovek et al., 2012).

The Forest Act covers the total Brazilian territory and protects

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native vegetation on geographically delimited areas regarded most environmentally sensitive, e.g. riparian floodplains, steep slopes, and high altitudes (Areas of Permanent Protection), and further requires that a variable percentage of private farmland is preserved, under conservative management, with native vegetation as Legal Reserves (LR). These LRs are crucial for biodiversity conservation through the protection of natural habitats, and for the provision of ecosystem services such as carbon storage, soil protection, water flow regulation, and water quality protection (Banks-Leite et al., 2014a; Harris et al., 2012; Lapola et al., 2014; Nazareno and Laurance, 2015). The concept of native vegetation in the Forest Act does not only include forest habitats, but any kind of native habitat type (e.g. wetlands of the Pantanal biome, meadows of the South-Brazil Pampas biome, and savannahs of the Cerrado biome).

1.2. Environmental reserve quotas

A large share of Brazilian landholders does not meet the LR requirements. They may comply with legislation through active native vegetation restoration or ensuring natural regeneration. Alternatively, landholders may offset their LR deficit by leasing areas under environmental easement or by donating areas located within conservation units in the process of tenure regularization. Another option is to offset LR deficits by acquiring certificates through the Environmental Reserve Quota mechanism (CRA, Portuguese acronym). CRA certificates can be offered by those landholders that have more native vegetation land in their farm than what is legally required. Offsetting was already an option in the previous legislation (Brasil, 1965), but with rules that substantially reduced the supply of areas and led to high transaction costs. These transactions therefore never reached a large scale or significant market interest.

Under the revised Forest Act, the up-scaling of the CRA mechanism is promoted as an important pathway to facilitate legal compliance, while keeping down the conversion of productive farmland into native vegetation restoration areas. At the same time, this may incentivize native vegetation conservation in farms that hold larger native vegetation areas than what is legally required. The surplus areas over the legal requirement of the Forest Act can be legally claimed for conversion to agricultural land through a licensing system. In this case, offsetting would provide additional nature conservation benefits (Nunes et al., 2016), and this was the rationale advocated during the new Forest Act discussion in the parliament to justify the offsetting mechanism.

From an economic point of view, offsetting may be the most feasible compliance option to the largest portion of landholders with LR deficits, considering opportunity costs of productive farmland, the substantial increase of land prices after deforestation or conversion of any type of native vegetation to agricultural land (Reydon et al., 2014), and the high native vegetation restoration costs (Banks-Leite et al., 2014b; May et al., 2015). However, this is not necessarily the case from an environmental point of view (Banks-Leite et al., 2014a,b; May et al., 2015).

The CRA mechanism is a potential multi-billion trading system (Soares-Filho et al., 2016), which is widely accepted as an important mechanism to harmonize agricultural development and nature conservation objectives (Gibbs et al., 2015; May et al., 2015; Soares-Filho et al., 2014). There are markets already anticipating trade by offering CRA certificates on the future stock market, even before the mechanism was fully implemented (BV-Rio, 2015). However, the effectiveness of the CRA trading system depends on how the implementation and monitoring mechanism will unfold (Bernasconi et al., 2016; May et al., 2015; Silva and Ranieri, 2014). The new Forest Act enables offsetting of two kinds: the LR deficits can be offset through (i) acquiring CRA certificates associated with native vegetation land that is already protected through command and control regulations within the Forest Act or other nature conservation laws; (ii) protecting of previously

unprotected native vegetation land that can be legally converted to agricultural land. With respect to additionality there is an obvious difference between these two offsetting alternatives (Brito, 2017; Freitas et al., 2016; Rajão and Soares-Filho, 2015). Both alternatives eliminate obligations for native vegetation restoration and regeneration on productively used farmland, but only the latter alternative expands the total native vegetation area under protection. The first alternative will not provide additional native vegetation protection, and simply allow legal compliance without increasing the area of native vegetation under legal protection.

The potential social and economic effects of the CRA mechanism will differ depending on trading preferences and distribution of the benefits from the trade. Despite the impressive reduction of Brazilian poverty rates in the last decades, the country remains one of the most unequal countries concerning income and land distribution (Lapola et al., 2014; Reydon et al., 2015). The last agricultural census (IBGE, 2006) showed that the top 20% among landholders holds about 90% of the private land in Brazil, while the lower 50% holds less than 3% of the land. These large inequalities create economic inefficiency and can be seen as major contributors to many socio-economic issues faced by the Brazilian society such as poverty, malnutrition and criminality (World Bank, 2014). The CRA payments may generate a relatively small income increase to large landholders, but could provide important income for vulnerable Small-Scale Family Farmers (SSFF).¹

A large share of the Brazilian SSFF are located in regions where vulnerability to climate change impacts is high, such as the semi-arid region in the northeast of Brazil (Burney et al., 2014; Sim & es et al., 2010), where food security and livelihoods of SSFF are highly dependent on climate and where most of the Brazilian poverty is concentrated. SSFF are at the same time responsible for over 70% of the food consumed by Brazilians (Graeub et al., 2015; Silva et al., 2010). The potential benefits of CRA trade for SSFF have not yet been addressed in research, or the likelihood of SSFF becoming primary CRA suppliers.

The new Forest Act decentralizes formulation, monitoring and supervision of the implementation and regulation process relative to farms in no-compliance with the new Forest Act (Brasil, 2012). For this reason, each of the 27 Brazilian States is formulating their own Environmental Regularization Programme (PRA, Portuguese acronym). Several States have already concluded the PRAs (Government of Bahia State, 2014; Government of Mato Grosso do Sul State, 2014; Government of Mato Grosso State, 2016; Government of Para State, 2015; Government of Paraná State, 2014; Government of São Paulo State, 2015); however, this process is still ongoing for most States and expected to be completed in 2017. The State PRAs are important instruments for the implementation and enforcement of the Forest Act. It contains the set of measures and actions to be taken by farmers in no-compliance with the Forest Act that intend to comply (Brasil, 2012, 2014).

An important instrument of the PRAs is the rural environmental registry, a mandatory electronic registration of private farmland, expanded from state to national level, and introduced with the new Forest Act as a tool to improve land use governance (Gibbs et al., 2015; Soares-Filho et al., 2014; Sparovek et al., 2012). The rural environmental registry is the first comprehensive georeferenced registry of private farmland in Brazil, closing the gap of the most important constraint for governing land use (Reydon et al., 2015). It enables transparent monitoring of native vegetation conservation and restoration, facilitating

¹ Small-scale family farmers (SSFF) is defined by the Brazilian legislation as the rural land farm smaller than four fiscal modules, where the family is responsible for most of the farming activities. The fiscal module is the unit adopted by the Brazilian Government to classify farm sizes in different groups. The area of one fiscal module is calculated for each municipality considering the predominant crops and the income from these activities. The purpose of this unit is to represent the minimal viable area for economic exploitation, which can vary from 5 to 110 ha depending on the region of Brazil.

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