Ecological Economics 136 (2017) 53–61

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Brazil's National Environmental Registry of Rural Properties: Implications for Livelihoods

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ARTICLE INFO

Article history:
Received 22 July 2016
Received in revised form 1 December 2016
Accepted 1 February 2017
Available online 20 February 2017

Keywords:
Cadastro Ambiental Rural (CAR)
Impact
Livelihood
Forest Code
Assets

ABSTRACT

In Brazil, the Cadastro Ambiental Rural (CAR) is currently being implemented. This policy aims to geo-reference all properties and promote monitoring of, and compliance with, natural vegetation conservation requirements. Scholarly efforts and policy attention have so far concentrated on possible environmental impacts hereof, while the attention devoted to how the CAR might affect farmers' livelihoods has been limited. In this paper, we evaluate potential livelihood impacts of the CAR and programs that facilitate CAR registration. We do so by developing a conceptual framework and using evidence from semi-structured interviews with key stakeholders including farmers, governments, and funding agencies. We find that while the CAR and programs facilitating CAR do not have explicit livelihood impact goals, they nonetheless affect livelihoods, both positively and negatively, depending on the initial amount of natural vegetation on farmers' properties, farmers' access to credit and infrastructure, and changing market conditions. We argue that environmental interventions and policies need to consider potential livelihood impacts, especially if the policy intervention area has high poverty rates.

1. Introduction

Brazil faces major challenges in the implementation of the 2012 Forest Code which relaxes the previous code from 1965 (Kröger, 2016). Deforestation in many areas, such as the Legal Brazilian Amazon, has been on the rise since 2013 and prospects for the future are not good as political appointments are sending anti-environmental signals (Fearnside, 2015, Fearnside, 2016a, Ferreira et al., 2014). However, one potentially promising mechanism of the new Forest Code is the Cadastro Ambiental Rural (the Rural Environmental Registry – CAR) (Soares-Filho et al., 2014). With the CAR, it is mandatory for all rural properties to be registered and caps have been set on the proportion of natural vegetation that can be legally cleared on any rural property (as low as 20% in the Amazon). The CAR also lays out guidelines for which areas should be permanently preserved. The implementation of the CAR requires geo-referencing and identification of property boundaries, Legal Reserves (LR), and Areas of Permanent Preservation (APP).

The CAR is primarily expected to enhance the ease of monitoring and enforcement of the Forest Code and other environmental legislations. This may in turn directly or indirectly affect what activities landowners can conduct on their land and subsequently impact landowners' livelihoods. For example, to achieve compliance with the Forest Code, reforestation may be required or landowners may need to pay taxes that they did not have to pay previously because their property was not registered in the state registry system (Kröger, 2016). Therefore, enforcement of the CAR is likely to affect not only the natural vegetation but also the livelihoods of private property owners through changes in land use, monitoring, and resulting changes in the provision of ecosystem services, such as water purification.

While many studies have evaluated the impacts of environmental conservation programs such as protected areas on local livelihoods (e.g., Andam et al., 2010; Clements et al., 2014; Ferraro and Hanauer, 2014; Miranda et al., 2016), and of large scale infrastructure as well (Fearnside, 2016b), few studies have systematically evaluated the impacts of the CAR on local livelihoods. Both scholarly and policy efforts have concentrated on environmental aspects (Azevedo and Saito, 2013; Gibbs et al., 2015; L'Roe et al., 2016) with little assessment of how livelihoods (the capabilities, assets, and activities required for a means of living (Scoones, 1998)) may be affected. Although livelihood impacts may not be an intentional objective of the CAR, some agencies, such as the Brazilian Development Bank that manages funds to facilitate CAR registration, do expect livelihood impacts to occur, albeit the specific nature of such impacts remain unknown (BNDES, 2015). Notably, the Brazilian Development Bank has been open to engage in additional or new activities that can specifically help farmers compensate for

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http://dx.doi.org/10.1016/j.ecolecon.2017.02.004

potential income losses (BNDES, 2015). This underscores an urgent need to devote attention to the multitude of ways in which farmers' livelihoods may be affected by the CAR.

In this paper, we investigate theories of change in livelihoods as a result of the CAR and CAR related programs. CAR related programs are defined as programs that either a) facilitate registration in the CAR by helping farmers to geo-reference their properties; and/or b) build capacity among farmers on how to be in compliance with the Forest Code, which includes knowledge on the CAR and how to restore degraded areas. Examples of such programs are the International Climate Fund (ICF), the Amazon Fund and the German Development Bank's state CAR programs (Amazon Fund, 2015; KfW, 2015) and the Responsible Soy Project by The Nature Conservancy and Cargill (TNC, 2015). We note that there is a difference between the outcomes of the CAR as such and the outcomes of CAR related programs. Wherever possible, we aim to tease out those differences but with the caveat that the CAR and CAR related programs are deeply entangled as the latter are a necessity for smallholder farmers to register - that is, farmers most often lack the knowledge and the means to register by themselves and the programs provide services which offset registration costs and teach farmers how to ensure that their property is in compliance with the Forest Code. Measuring actual, causal impacts of the CAR and CAR related programs is not yet possible because national implementation of CAR began only after the revision of the Forest Code in 2012 and is still underway, and because livelihood impacts may take a while to unfold and be detectable. Rather, we develop theories of change that may underpin potential livelihood impacts of the CAR and CAR related programs. Establishing theories of change is an essential, yet undervalued, first step to any program evaluation and as such we see this work as valuable for future assessments of the CAR and CAR related programs.

We first outline the multiple pathways through which the CAR and CAR related programs may affect livelihoods of rural households by modifying Ellis' framework for micro policy analysis of rural livelihoods[2] (Ellis, 2000) and adopting a Sustainable Livelihood Approach (SLA) (DFID, 1999). Second, we apply the framework to two biomes in Brazil to assess plausible livelihood impacts using information collected through semi-structured interviews with farmers and other stakeholders involved in the CAR and CAR related programs. Finally, we argue that future environmental interventions and policies need to more substantially consider potential livelihood impacts.

We use the Amazon and Cerrado biomes as case areas because these biomes provide a high value of ecosystem services and have higher poverty rates than the rest of Brazil - thus, the change processes are important from both an environmental and a livelihood perspective. The Amazon biome includes some of the states with the highest CAR participation. For example, in Pará, the first state to initiate CAR registration in 2007 before it became mandatory, 99% of the area that is subject to CAR registration was registered as of October 2016 (Brazilian Forest Service, 2016). The Cerrado biome has much less legal protection than the Amazon; it is one of Brazil's agricultural hotspots, with only 7% of the area preserved as protected areas and the potential for 40 ± 3 Mha to be legally converted for agricultural production (Soares-Filho et al., 2014). This makes the consideration of livelihood impacts of the CAR particularly critical because it is likely to directly impact how farmers manage their natural vegetation.

Through these cases, we provide an analysis of how the CAR and CAR related programs have affected and may affect livelihoods. In the following sections, we summarize the revision of the Forest Code in 2012, introduce our conceptual framework, describe our methods and data collection strategy, and then use the framework and data to illustrate theories of change in terms of livelihood impacts of the CAR and CAR related programs. Finally, we use the presented findings to refine existing theorizations of the linkages between the CAR and livelihood outcomes.

2. Material and Methods

2.1. Background

Farmers, many agricultural corporations, and their representative political parties have criticized the Forest Code (originally enacted in 1934 and first revised in 1965) for limiting economic growth through expansion of agricultural production because of the law's high level of restrictions. Efforts by agribusinesses to weaken the regulations of the Forest Code, along with a fall in deforestation rates since 2004, led to a revision of the Forest Code (law 12615/2012) in 2012 (Soares-Filho et al., 2014). The revised Forest Code has weakened some regulations while strengthened and added others and it remains to be seen just how transparent the CAR is for evaluating compliance with the Forest Code through linking landowners to land use on a particular property (Gibbs et al., 2015). However, enforcement of the Forest Code has been hindered by insecure land tenure, large remote areas, and lack of monitoring and enforcement capacity. Overall, the CAR is foremost a governance instrument that aims to achieve improved environmental outcomes.

There are two main regulations in the Forest Code that apply to farmers and that are specifically related to the CAR and CAR related programs. First, farmers and ranchers must preserve Areas of Permanent Preservation (APP) that include environmentally sensitive lands. APPs are set aside because of their value for protection of freshwater and conservation of areas for freshwater recharge (Sparovek et al., 2010). APPs include areas adjacent to rivers, natural or artificial reservoirs, river sources or headwater, lakes, land above 1800 m^2, mangroves, dune vegetation and forests, the border of plateaus and mesas, wetlands, hilltops, and hillsides with a slope steeper than 45°. Second, farmers and ranchers must maintain a certain percentage of their land as protected forest preserves, called Legal Reserves (LR). The percentage of LR varies depending on the type of vegetation and geographic location of the property. The LR percentage is lowest (20%) for lands in the Atlantic Forest, the Cerrado outside of the Amazon region, and the Caatinga (tropical dry forest in the northeastern region of Brazil), while it is higher in the Amazonian Grasslands (35%) and the highest (80%) in the Amazon. Finally, the 2012 Forest Code includes a number of specific changes in regulations related to the CAR as follows:

- Land owners are required to participate in the rural environmental registration (CAR) system, which was voluntary before 2012.
- Illegal deforestation carried out before July 22, 2008 might be pardoned if the land owner registers in the environmental registry system (CAR) and in the state's Program for Environmental Regularization (Programa de Regularização Ambiental - PRA).[3] Land owners that have cleared areas for construction, plantations, pastures, and fallow land to increase soil fertility in violation of the Forest Code before July 22, 2008 do not have to reforest as long as they meet the new standards for protection.
- Land owners are allowed to count all APPs, such as forests along rivers and hillsides, as part of their LR under certain conditions. Before the amendment APP restrictions were in addition to the LR requirement.
- LR in forest regions of the Amazon can be reduced to 50% in states

[2] A rich literature posits a dynamic relation between different types of assets and livelihood opportunities (Bebbington, 1999; Ellis, 2000; Scoones, 1998). While these approaches share many similarities in relation to the capitals required for a means of living, Ellis (2000) places particular emphasis on the mediating character of institutions and social relations both in regard to livelihood strategies adoption and access to capital assets.

[3] Each state is supposed to have PRA that includes technical details on recovery of APPs and LRs as well as criteria for compensating LRs from properties that have more LRs than those required by the Forest Code (Environmental Reserve Quota - Cotas de Reserva Ambiental (CRA)) (Duchrow and Alencar, 2015).