

# Hastened deforestation as a potential outcome of environmental regulation? KPI-3 Forests and Livelihoods: Research Evidence Report 2

By

International Forestry Resources and Institutions Network

## Introduction

Brazil's 2012 Forest Code (Federal Law 12,615/2012) sets mandatory caps on the proportion of native vegetation that can legally be cleared on any rural property. It has been criticized because it relaxed the 1965 Forest Code (Kröger 2016). But one promising mechanism of Brazil's new Forest Code is the *Cadastro Ambiental Rural* (the Rural Environmental Registry – CAR) program (Soares-Filho et al. 2014). The CAR requires geo-referencing and identification of property boundaries, Legal Reserves (LR), and Areas of Permanent Preservation (APP). The primary goal of the environmental registry of rural properties is to reveal and systematize information about properties, and monitor and plan the land use in different properties (Vital 2016).

This note, based on Rasmussen et al. 2017, examines whether the CAR may be incentivizing smallholders to forego deforestation or to increase it. The limited empirical evidence of the effects of CAR on deforestation behavior is worrying because the provision covers millions of hectares of land with forest and native vegetation cover in the Amazon and the Cerrado areas of Brazil. Indeed, the CAR is one of the largest environmental conservation programs in the world and is supported by many donors, including the International Climate Fund (ICF). Thus its success (or failure) is globally important.

## Methods

We collected household data from April-July 2016 on farm characteristics, income and expenditures, agricultural production, problems and opportunities associated with registering for the CAR, and intended behavioral changes following CAR registration. The research covered 11 municipalities in the States of Bahia and Piauí in the Cerrado biome (see Figure 1).



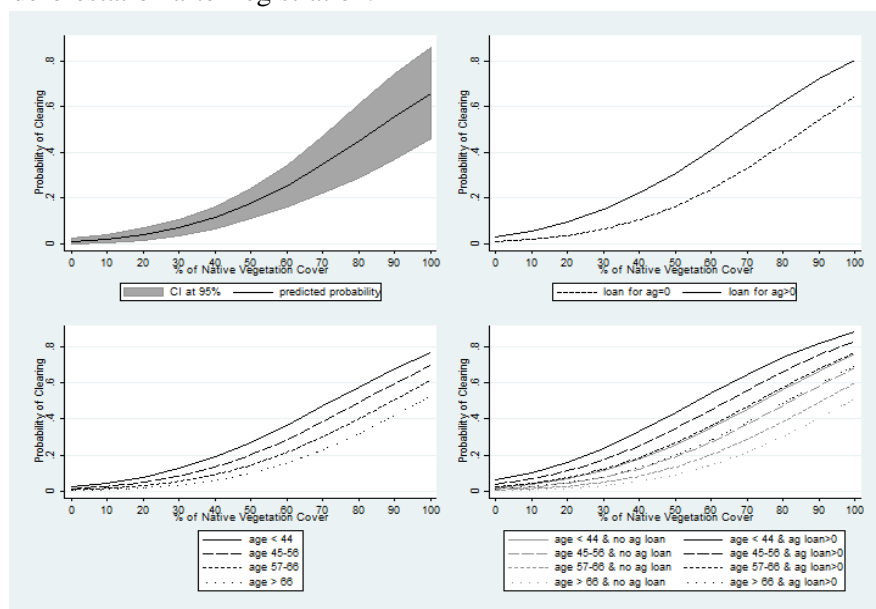
Figure 1. Map of Brazil showing the two states, Bahia and Piauí, where data was collected. For the studied municipalities, small properties are less than 260 ha in Bahia and 280-300 in Piauí. Quantitative surveys were conducted with 1,177 smallholders (n=851 across 5 municipalities in Bahia and n=326 across 6 municipalities in Piauí). We randomly selected participants with the help of technicians from the ProCerrado program supported by the ICF. We also conducted semi-structured interviews with randomly selected respondents in the quantitative survey (20 in Bahia and 22 in Piauí).

## Findings

We find that CAR may lead to deforestation at the property level. Of those respondents who had more native vegetation than the legal requirements, 36% in Bahia and 41% in Piauí reported that they will clear the excess area and begin cultivating the land. Other respondents with excess area of native vegetation, however, did not intend to alter their deforestation behavior following (or preceding) CAR registration. Our semi-structured interviews indicate that lack of resources and/or money as well as presence of sufficient cultivation area were the main reasons for not clearing more land.

Using probit regression models, we found that 1) A high percentage of existing native vegetation cover on smallholders' properties is positively associated with smallholders' intended deforestation behavior after CAR registration, controlling for all other biophysical, socioeconomic, and demographic variables; 2) Smallholders who have used loans for agricultural purposes in the previous year are more likely to deforest after CAR registration; 3) Livestock production experience and smallholder age are also

factors highly associated with intended deforestation behavior at the 5% level of significance. The more livestock production experience smallholders have and the younger they are; and 4) Use of rural credit for agricultural purposes appears more important than the age of smallholders (see Figure 2). Because one goal of CAR registration is to facilitate increased access to agricultural credit, it may lead to higher deforestation after registration.



**Figure 2.** The probability of expected clearing as a function of the % of native vegetation cover on smallholders' properties (a) with 95% confidence interval (shaded area), (b) conditional on the use of loans, (c) conditional on smallholder age groups, and (d) conditional on smallholder age groups and their use of loans, controlling for other biophysical, demographic, and socioeconomic characteristics

### Conclusion

Additional mechanisms to reduce incentives for deforestation may be warranted in nation-wide environmental registration schemes, like the CAR. These

mechanisms should 1) account for existing land use (e.g. provide incentives to smallholders with more native vegetation and 2) assess feasibility of conditions for credit access, especially to younger smallholders/livestock producers.

### References:

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