



## Analysis

## Effects of a policy-induced income shock on forest-dependent households in the Peruvian Amazon

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## ABSTRACT

This paper describes how forest-dependent communities in the Peruvian Amazon responded to forest policy changes meant to improve sustainability. These new laws emphasized block-based, collectivized extraction – a strategy incompatible with local communities' logging traditions and technical capacity. Field surveys before and after the policy change revealed a drastic reduction in local logging activities for households at all income levels. Non-Timber Forest Products (NTFPs) subsequently became more important to household cash incomes. However, only some households were able to shift to a more intensive and far-ranging pattern of NTFP harvest, particularly households with boats and motors. Others lost income from both logging and NTFP extraction because for many households, these income sources were interdependent. An increasing Gini coefficient signals potentially escalating household income inequality. Key lessons for biodiversity and forest–carbon interventions in tropical forests include 1) regulations designed to control large-scale extraction can lead to unnecessarily restricted access for small-scale extractors, and 2) potential shifts in extractive pressure should be taken into account when access to forest resources is curtailed.

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## 1. Introduction

Conservationists often seek to improve forest management by modifying or clarifying rules of access. Schemes to pay for avoided deforestation, create new protected areas, or more tightly regulate extractive industries all involve altering forest access regimes at different scales. Optimal rules and incentives at one scale can lead to suboptimal outcomes at non-target scales, as often happens when the entities causing the primary threats to a resource are not the same as those who depend most heavily upon it (Coomes et al., 2004). Trade-offs are sometimes unavoidable, but careful consideration of a wider range of actors can limit unintended policy effects. In the case of forest conservation, good information about vulnerability and adaptability of target and non-target forest users can help inform whether trade-offs are acceptable, whether they are avoidable, and help to prevent unpredicted leakage and knock-on effects.

To better predict vulnerability and adaptability to changes in forest policy, we need to recognize the dynamic nature of forest dependency. There is a growing body of literature on the predictors of forest

dependency (Adhikari et al., 2004; Lepetu et al., 2009; Timko et al., 2010; Vedeld et al., 2007), but we know less about how this dependency changes in response to external shocks. Studies of forest-dependent communities suffering natural disasters or resource depletion suggest that extraction patterns may shift dramatically and some households will be hit harder than others (Coomes, 1995; McSweeney, 2004; Takasaki et al., 2004). Policy changes can also resemble shocks, where forest resources may still be present but legal barriers alter local access. Enforcement may be uneven, some actors may be better able to adapt to the policy changes or work around them, and others may lose access altogether (Larson and Ribot, 2007). Here we present empirical evidence of loss of access and differentiated adaptation using a case study involving the onset of enforcement of logging restrictions in the Peruvian Amazon.

A wave of 'science-based' forestry reforms in South America during the past two decades has curtailed some of the most destructive industrial logging practices, but the impact on local forest-dependent communities has been variable and seemingly unpredictable (Ebeling and Yasué, 2009). New forestry laws helped consolidate forest territory claims for some communities (e.g. Dockry (2012)) and left others in worse poverty (Larson and Ribot, 2007). We examine outcomes of a recent logging reform in Peru with a case study concerning strongly forest-dependent communities in a biodiverse and carbon-heavy region. We first describe how the logging reform resulted in lost access despite intensive efforts by third-parties to facilitate local logging in compliance with the new rules. Next, we test whether households

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<sup>1</sup> Original conception of project and field work performed by J. L'Roe who also wrote majority of text and analyzed data. L. Naughton assisted with study design, analysis, literature review and writing.

adapted to the income shock by shifting to other activities to compensate for lost logging income. Because they are often contrasted in forest-dependence literature (Angelsen and Wunder, 2003), we pay special attention to whether Non-Timber Forest Products (NTFPs) are able to substitute for timber products as primary generators of cash-income for households. Third, we identify characteristics of households that proved to be better able to adapt to logging losses by earning large incomes from NTFPs after the rule change. Finally, because the reforms aimed to improve sustainability, we consider conservation implications of extractive shifts in response to policy reforms.

## 2. Background and Study Site

### 2.1. Timber Sector Reforms

Touted as a radical turn away from previous 'cut and run' toward more sustainable logging practices, in 2000 Peru's Congress approved a new Managed Forest Law (Act No. 27308). The 2000 law required all logging concessions to conform to best-management practices – including feasibility studies, inventories, management plans, and annually authorized harvest areas. Under the previous system, smallholder contracts less than 1000 ha were exempt from many of these requirements. The subsequent abuse of this exemption by well-capitalized companies who circumvented the regulations by acquiring multiple small contracts was so widespread that the loophole was closed in the new law and smallholders were held to the same regulations (Melgarejo et al., 2006; Smith et al., 2006). Opponents claimed that the new law favored large-scale enterprises over smallholder loggers, and implementation was delayed due to intense and even violent civil protest. New logging concessions were auctioned throughout the 2000's but many sustainability requirements of the law were not initially enforced. This changed in 2008 when, in response to conditions of the Free Trade Agreement with the United States and its clause that all

timber exported to the US must be "sustainable," the state government gave the law more teeth by criminalizing informal logging (Sears and Pinedo-Vasquez, 2011). Thus we begin our analysis in 2008, in the Region of Loreto.

The vast northeastern Region of Loreto has been heavily affected by the forestry reforms; half of rural jobs there are in the forestry sector (Fernández et al., 2004) and it contains half of Peru's lowland forests. Loreto also holds the world's highest species richness in several taxa (Gentry, 1988; Vriesendorp et al., 2007) and is home to many indigenous groups, including some that are still quite isolated (Dixon and Aikhenvald, 1999; Napolitano, 2007). In 2003, the national government opened bidding on 4,400,000 ha of new private forest concessions in Loreto (INRENA, 2003; Salo et al., 2011). The sale of large new logging concessions in this biodiverse indigenous homeland in turn spurred a rush to create new parks and reserves (see Fig. 1). Some of the land newly allocated for concessions and reserves was already being formally or informally used by local actors and so to avoid conflict in the region, concessions were granted not only to large or outsider corporations, but also to small local firms and villages with communal title to their land (Salo et al., 2011).

### 2.2. Study Communities

This study describes the impact of new forestry laws on two remote timber-dependent communities who numbered 245 and 190 people. There are many familial ties between these adjacent communities and households sometimes move between them, thus we discuss them together as a single study site. The communities are located in the Nanay River watershed about 150 river-kilometers upstream from Iquitos, the capital of the region and home to a half-million people (Fig. 1). The two focal communities are equally remote and have no road access. Their territories are ~8000 ha each but they also use areas upstream beyond their formal territories including parts of the 970,000-ha Nanay

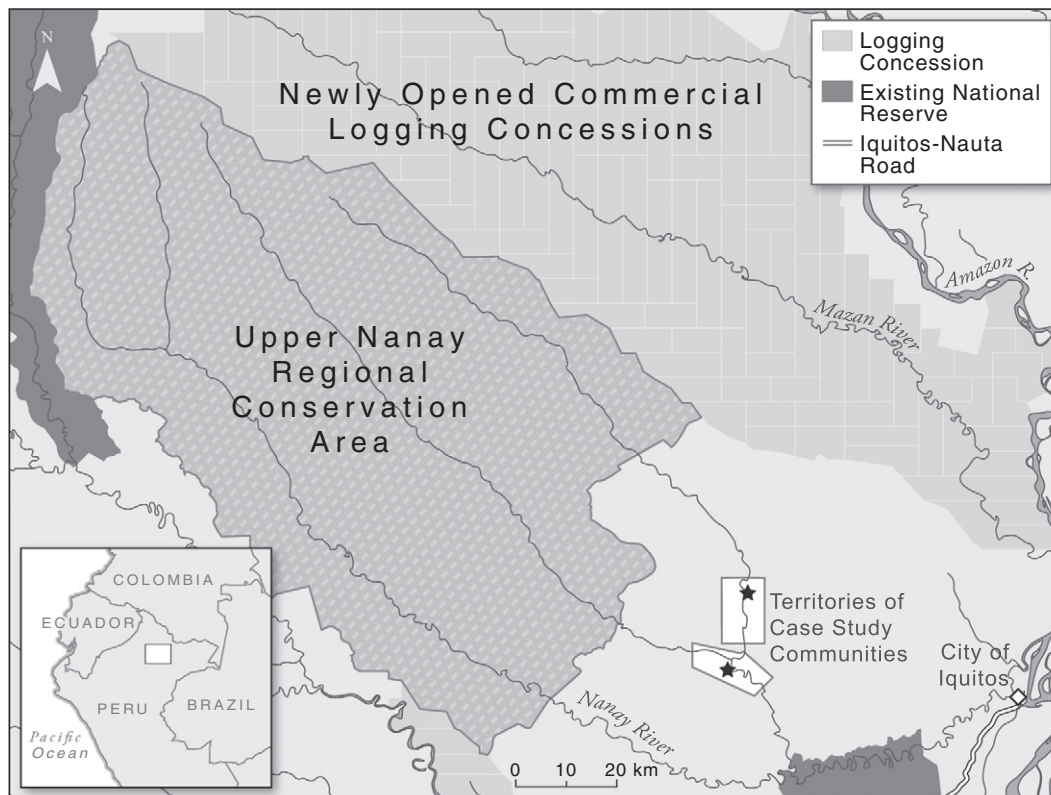


Fig. 1. Map of study area. Wider context of the study communities showing new commercial logging concessions in the neighboring watershed, a recently established conservation area upriver, and the large city of Iquitos downriver.

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