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Theory and context in analyzing livelihoods, land use, and land cover: Lessons from Petén, Guatemala

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ABSTRACT

Most studies on the causes of deforestation have sought to link the phenomenon to specific economic, political, or demographic factors, usually through statistical or spatial-statistical modeling. However, generalizations about the link between deforestation and specific variables or classes of variables are of questionable validity. Another approach, one that is receiving growing attention, seeks instead to identify particular contexts or situations, as created by an array of interacting factors, which encourage forms of land use or other economic activity that can generate deforestation pressure. Such an approach was used in this study to explore recent trends and dynamics in the Petén region of northern Guatemala. The research found a number of regional and national scale factors that in combination have led to a process of de-agrarianization and dispossession among smallholders, while large scale, commercial activities in agriculture, ranching and plantation forestry increasingly dominate. Rapid land concentration, in conjunction with limited employment generation through emergent activities, is intensifying pressure on remaining areas of forest. A focus on two distinct areas within Petén reveals how broader-scale trends and features can have differing outcomes at the local level, with contrasting socioeconomic and environmental effects. Finally, the paper explores the implications of recent dynamics in Petén for both policy and theory in relation to deforestation, agrarian change, and regional development. Key factors and questions are highlighted that should be considered when exploring influences on regional socioeconomic and environmental conditions.

Introduction

In light of its implications for biodiversity, climate change, and human welfare, the issue of deforestation has received a great deal of attention in recent decades – from the public, from policymakers, and from researchers. The latter have sought, in particular, to identify the nature, extent, and causes of deforestation and, more broadly, of land use and land cover change (LULCC). Excellent overviews of this research can be found in works by Kaimowitz and Angelsen (1998), Geist and Lambin (2002), Rudel (2005), Williams (2006), Boucher et al. (2011), and Hosonuma et al. (2012), among others.

As these observers make clear, most studies on deforestation/LULCC have sought to identify the factors that drive deforestation, usually through statistical or spatial-statistical modeling. Some such analyses have led to economic explanations for deforestation (Utting, 1991; Reed, 1992; Stonich and Dewalt, 1996; Gbetnkom, 2005; Walsh et al., 2008; Barona et al., 2010) that are related, for example, to income levels, commodity market conditions and market access, national debt, or trade liberalization. Others have concentrated on political variables (Barraclough and Ghimire, 1990; Jones, 1990; Dorner and Thiesenhusen, 1992; Southgate and Whitaker, 1992; Kaimowitz, 1995; Koyuncu and Yilmaz, 2008), such as agricultural policies, land tenure insecurity, institutional weaknesses, and corruption, or on demographic factors (e.g. Allen and Barnes, 1985; Carr, 2004; Sydenstricker-Neto, 2012), like population growth and density, migration, household composition and life cycles.

It appears increasingly, however, that explanations that purport to link deforestation to specific variables or even classes of variables, such as those within demographic, infrastructural, economic, or other categories, are of limited accuracy and utility. Kaimowitz and Angelsen (1998), for instance, examined over 150 quantitative models of deforestation, developed mainly during the 1990s. These collectively analyzed some 115 variables for their possible influence on deforestation but the authors found that "the direction and magnitude of their effect on deforestation remain uncertain" (Kaimowitz et al., 2002, p. 41). Similarly, a review of numerous studies in Latin America on the link between population and LULCC

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(Carr et al., 2009, p. 241) led to the conclusion that a "key lesson…is the difficulty of identifying a signature Latin American population-land use nexus." In other words, it is difficult if not impossible to generalize about the nature of the link between population-related variables and LULCC due to variation in "demographic, agro-ecological, and institutional contexts."

Based on a review of the causes of deforestation described in 152 sub-national case studies, Geist and Lambin (2002, p. 143) concluded that the "correlation between deforestation and multiple causative factors are many and varied, revealing no distinct pattern." Instead of lending support to any of the dominant theories of deforestation, the authors assert (p. 149) that "analysis of these studies shows that tropical forest decline is determined by different combinations of various proximate causes and underlying driving forces in varying geographical and historical contexts." Hence while it is clear that any analysis of the causes of deforestation must distinguish between direct (or proximate) causes and indirect (or underlying) causes, those that emerge and, more importantly, how they combine to influence conditions on the ground, can vary tremendously from one region to the next.

In this regard, Geist and Lambin (2002, p. 143) refer to "identifiable regional patterns of causal factor synergies…" Such synergies or combinations among causes within particular regions also are highlighted by Rudel (2005, p. 7) who writes that in "any given situation, several different causal factors combine to cause land use change. Statistical analyses, intent on identifying the most important variables, miss these patterns of conjoint causation…" They therefore fall short with regard to synthesis. Rudel (2005, p. 20) also emphasizes the limitations of agent-based models, such as linear programming or decision tree analysis, because the simplification required in developing such models "comes at a high empirical price."

A number of investigators, therefore, are taking an alternative, situational approach, aimed at teasing out the array of factors, usually at multiple scales (Manson, 2008), that conjointly influence land use and land cover dynamics in a particular context. As early as the mid-1990s Moran (1996) emphasized that the factors driving deforestation in Amazonia vary from place to place within the region. Similarly, Rudel (2005) calls for using "middle scale" analyses that seek to determine "Where and when…particular explanations for deforestation apply" and to identify "differences between contexts in the configuration of causes that explain tropical deforestation" (p. 22). He identifies particular types of sub-regions within the Amazon wherein forest cover dynamics are linked to distinct collections of factors.

Chavez and Perz (2012) compare three sub-regions within the Amazon to gain insight on the combined effects of differences in national land use policies, infrastructure, property tenure, availability of training, farmer characteristics, etc. Hecht (2005) writes about the "neoliberal frontier" that has emerged within Bolivia's Amazon lowlands, with features that make it distinct from most other parts of the Amazon. Van Vliet et al. (2012) look at the array of factors that come together in particular forest frontier regions to influence whether reliance on swidden cultivation is expanding or contracting. Of course, as many investigators have shown (e.g. Hecht, 2005; Rudel et al., 2009; Chavez and Perz, 2012), the collection of factors that drive modifications in land use and land cover in a particular area changes over time, and can do so dramatically and rapidly.

This paper seeks to contribute to this growing body of literature that explores LULCC/deforestation not in terms of its link to specific types of variables, but rather, in terms of how it relates to particular situations and trends, as created through a number of factors working in combination. It does so in relation to one of Mesoamerica's main agricultural frontiers, the Petén region of northern Guatemala, which has attracted hundreds of thousands, perhaps a million, in-migrants since the 1960s. The purpose of the paper is first, to describe the region's characteristics and trends in relation to land use, socioeconomics, and the environment, mainly since the mid-1990s, when a marked shift in the drivers of deforestation began to occur. Second, it examines how, and under what circumstances, these characteristics and dynamics combine in ways that generate deforestation pressure. And finally, it describes the implications of the Petén situation for both policy and theory on land use change and regional economic development.

The article is based primarily on field work conducted in Petén by the author since 1996, and most recently in 2011. This work has consisted of farm household surveys and interviews in various parts of the department, numerous visits to agricultural plots, participant observation, and discussions and interviews with key informants in non-governmental and governmental agencies, industry, and community organizations. Further details on these methods are provided where warranted in subsequent sections.

I begin in the next section with some relevant background information about Petén and an overview of general trends unfolding therein. This is followed by sections devoted specifically to agriculture, and to forest management and conservation. I then discuss conditions at the community level in two of four areas in Petén in which I have undertaken detailed field work and surveys, since 1996 in one case (Study Area 1 in Fig. 1), and since 2001 in the other (Study Area 2). The main emphasis here is on describing the contrasting influences that have led to distinct livelihood strategies and land distribution patterns in each area, and the deforestation pressures these create. Finally, in a concluding section I reflect on the implications of recent dynamics in Petén for both policy and the development of theory. With respect to the latter, I highlight key factors and questions that should be considered when exploring influences on regional socioeconomic and environmental conditions.

The Petén region – background and general trends

Petén is the largest of Guatemala's departments (i.e. states), covering some 35,000 ha or about one-third of the country's territory (Fig. 1). Following the collapse of the Classic Maya civilization around the 9th century A.D. (Rice and Rice, 1990; Curtis et al., 1998; Wahl et al., 2006), the region remained a sparsely populated backwater, until quite recently. Its population in 1965 was estimated at a mere 25,000 (Schwartz, 1990) but road-building and land distribution programs initiated in the late 1950s led to substantial in-migration and population growth. The current (2012) population of the department is estimated at 662,779 (INE, 2010), which equates to a population density of about 18/km^2, the lowest of any department in the country (MAGA, 2011). However, some officials and researchers in the region believe the census estimate is too low, and that the actual population level is higher, perhaps close to 1 million.

Regardless of the actual numbers, the in-migration of so many people seeking land on which to work led, not surprisingly, to considerable deforestation, especially in light of the extensive land uses, such as shifting cultivation and cattle ranching, that remain dominant in the region. In 1970, 70–80% of the department was densely forested (Schwartz, 1990), but by the late 1990s, half of it had been cleared (Sever, 1999). Analyses conducted by the Centro de Monitoreo y Evaluación de CONAP (CEMEC) in 2011 (cited in SEGEPLAN, 2011, pp. 92–93) concluded that only 40% of the overall department remains forested and that the annual net loss of forest over the previous eight years averaged 316 km^2, equivalent to about 1% per year.