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Analysis

Can't See the Forest for the Trees: Can Declining Deforestation Trends in the Argentinian Chaco Region be Ascribed to Efficient Law Enforcement? [☆]José Norberto Volante^a, Lucas Seghezzo^{b,*}^a Instituto Nacional de Tecnología Agropecuaria (INTA), Estación Experimental Agropecuaria Salta, Ruta Nacional 68 Km 172, 4403 Cerrillos, Salta, Argentina^b Instituto de Investigaciones en Energía No Convencional (INENCO), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Universidad Nacional de Salta (UNSa), Avenida Bolivia 5150, A4408FVY, Salta, Argentina

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ABSTRACT

A national “Forest Law” passed in Argentina in 2007 mandated provincial governments to set up and implement land use planning processes in order to protect their native forests and regulate the expansion of large-scale agriculture. A recent study postulates that observed reductions in deforestation in three provinces of the Argentinian “Dry Chaco” ecoregion (namely Salta, Santiago del Estero, and Chaco) can be attributed to the effective enforcement of this law by provincial governments. Yet a more contextualized analysis of the local situation raises a number of objections to the methods used and the conclusions drawn in that study. Our analysis (and first-hand experience) shows that provincial governments were unable to enforce the Forest Law, since deforestation in protected areas continued or even increased after its approval and implementation. Our criticism can be categorized into five major challenges: (1) declining deforestation trends started before the Forest Law; (2) a province with a substantial increase in deforestation was omitted; (3) only part of one ecoregion was taken into account in the analysis; (4) deforestation percentage by conservation categories is better than hectares by province as an indicator of law enforcement; and (5) assigning zones to land units prior to land use planning processes is questionable. These challenges, and the lack of a more complete and nuanced political analysis of the situation on the ground, calls into question both the reliability of the results and the usefulness of the conclusions in the study. Ambiguous or misleading messages from the academic community can have negative political consequences and hinder local conservation efforts in the short term. We should not be so caught up in our desire to see improvements on the ground that we can't see the forest for the trees.

1. Introduction

In the last two decades, the “Chaco” region of Argentina experienced an intensive process of deforestation and land use change intended to promote industrial agriculture and increase livestock production (Gasparri and Grau, 2009; Grau et al., 2005; Leake et al., 2016; REDAF, 1999, 2012; Volante et al., 2012; Zak et al., 2008). Traditional uses of the forests such as hunting and gathering, subsistence cattle ranching, timber harvest, and small-scale charcoal production, among others, are in jeopardy (Volante et al., 2012). The resulting environmental and social impacts are predominantly affecting small-scale farmers and indigenous peoples who depend on the products and services provided by the forests (Seghezzo et al., 2016). Land use change in Argentina, as in the entire global South, is known to be particularly sensitive to high international prices of agricultural commodities such as soybean (Fehlenberg et al., 2017; Grau et al., 2005). This change was

also driven by other economic variables such as exchange rates and levels of taxation, by the introduction of genetically-modified herbicide-resistant soybean varieties, and by environmental factors such as changes in rainfall patterns in some areas (Volante et al., 2016). The Chaco region is also receiving livestock from the Pampas in central Argentina, where pasture lands are being taken over by the production of more profitable commodities such as soybean and corn (Paruelo et al., 2006). The pattern of expansion of the so-called agricultural “frontier” in the Chaco region has been subject to differing interpretations. Advocates of the “Forest Transition” theory first postulated by A.S. Mather (Mather, 1992; Mather and Needle, 1998) believe that socio-economic development and agricultural intensification in some areas might lead to a process of total or partial forest recovery in other areas that had been previously deforested for agricultural production (Grau and Aide, 2008; Perz, 2007; Rudel et al., 2005; Rudel et al., 2010). Forest transitions or, more generally, “ecological transitions”

[☆] This article is a reaction to Nolte et al. (2017a).

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(since they also happen in ecosystems other than forests), have been reported in several countries (Aide and Grau, 2004; Baptista and Rudel, 2006; Foster, 1992; Grau et al., 2005; Grau et al., 2008; Izquierdo and Grau, 2009; Lambin and Meyfroidt, 2011; Mather, 2007; Mather and Fairbairn, 2000; Mather et al., 1998, 1999; Perz and Skole, 2003; Turner II, 2010). Recent studies have questioned the widespread applicability of the forest transition theory to the Chaco region (Volante and Paruelo, 2015). Agricultural expansion in this region seems to follow an epidemic-like pattern of “poorly selective contagious advance” in which new clearings are mostly associated with their proximity to already-cleared areas (Volante et al., 2016). As a result, new clearings are not always carried out on highly productive soils in which agriculture intensification can easily take place, leaving little room for marginal areas to recover their original forest profile since they are also put under intensive agricultural production.

The role of national or local governments in the Chaco region of Argentina, as in the rest of the country, has been limited in controlling, let alone planning, land use change. Widespread, uncontrolled deforestation has been taking place in this area for more than four decades (Volante et al., 2012). Growing awareness of the environmental and social consequences of deforestation and land use change finally led to the passing of a national “Forest Law” (Law 26,331) at the end of 2007 (Schmidt, 2015; Seghezzeo et al., 2011). This law mandated provincial states to set up and implement specific Land Use Planning (LUP) processes in order to regulate the protection, enrichment, restoration, utilization and management of native forests and the environmental services they provide. According to this law, native forests were to be classified in three categories: I (high conservation value), II (medium conservation value), and III (low conservation value). These categories had to be represented in maps as different “zones” identified with the colors red, yellow, and green, respectively. The process leading to the passing of the Forest Law was complex and contentious and so was the approval of provincial LUP norms and maps, which took between one and several years, depending on the province. Criticisms were related, among other things, to the lack of genuine public participation and the centralized, techno-centric approaches that have been generally followed by provincial administrations (Seghezzeo et al., 2011, 2016).

In a recent paper, Christoph Nolte and co-authors studied deforestation trends in the dry area of the Chaco region (the “Dry Chaco”) in three Argentinian provinces: Salta, Santiago del Estero, and Chaco (Nolte et al., 2017a). After analyzing data from a large number of plots in these provinces, they concluded that large-scale deforestation had reduced significantly in this region, mainly as a direct consequence of the enforcement of the national Forest Law at the provincial (“sub-national”) level. However, as will be described in more detail below, a more contextualized analysis of the same data used by Nolte and co-authors raises a number of fundamental and methodological objections that can be grouped in five major challenges: (1) declining trends in deforestation started several years before the implementation of the national Forest Law at provincial level; (2) a province (Formosa) with a substantial increase in deforestation during the time period under consideration was omitted; (3) only part of one ecoregion (the dry portion of the Chaco region) was taken into account in the analysis, ignoring deforestation in other ecoregions that were also regulated by the Forest Law; (4) deforestation percentage by conservation categories (red, yellow and green zones) is better than hectares by province as an indicator of law enforcement; and (5) assigning zones to land units before actual land use planning processes took place is questionable. Our criticism originates in the striking discrepancies we identified between the conclusions drawn in the paper and our lived experience on the ground where, together with other scholars and activists, we have been confronting poor enforcement of land use planning laws and regulations for more than a decade. As discussed below, there are other, more plausible alternative explanations to declining deforestation trends. The ambiguous message conveyed by Nolte and co-authors has already had some negative political consequences at the local level and

will not help conservation efforts in the short term. Other organizations and non-profits share our impression; the local branch of Greenpeace, for instance, has just released a report in which it denounces that, despite declining trends in overall deforestation rates in recent years, a significant proportion of deforestation took place in areas explicitly protected by the Forest Law (Greenpeace, 2017). The national coordinator of Greenpeace's forest campaign, speaking to highly influential national media, has been quoted saying that “it is clear that, in many cases, government officials are accomplices of this violation of the law”.^{1,2}

2. Challenges

2.1. Declining Deforestation Trends Started Before the Forest Law

After analyzing datasets of observed annual land-clearing transitions in the Dry Chaco from Vallejos et al. (2015),³ Nolte and co-authors claim that deforestation substantially decreased after (and because of) the implementation of the Forest Law around 2009. As indicated in Nolte et al. (2017a), deforestation for the three analyzed provinces indeed decreased over time in terms of hectares deforested. However, this trend started around 2004, well before the passing of the Forest Law in 2007 and the completion of LUP maps around 2009. The reduction in deforestation found afterwards might well be due to a continuing trend. As seen in the trendlines in Fig. 1, this decline is especially noticeable for green zones in the three provinces analyzed. Deforestation in yellow and red zones (medium and high conservation value areas) not only did not drastically decrease after the Forest Law was passed (let alone come to a complete standstill), but continued to occur in all three provinces. In fact, deforestation in yellow zones actually increased in Salta and Chaco, remaining continually much higher than in green zones in Santiago del Estero, as also shown in Fig. 1. Trendlines cover both before and after periods, hence slopes are influenced by both the before and after data.

A different selection of the starting year changes the value of these slopes. Trend analysis of the data using Pearson correlation coefficients (Snedecor and Cochran, 1989) show that there is no clear evidence of a decrease in deforestation in two of the three provinces studied (Salta and Chaco) during the period 2009–2014 (Table 1), but when deforestation data prior to the Forest Law are included in the analysis, the deforestation trend becomes significant in all three provinces. It is also true that there is no statistical evidence of a decrease in deforestation before the implementation of the law (period 2004–2009) for any of the three provinces. A significant deforestation decrease for the three provinces analyzed can only be found by extending the period of analysis to 2004–2014.

The datasets used (from Vallejos et al., 2015:5) included all types of land “transformations”, understood as the “replacement of natural vegetation (forests, grasslands, wetlands, savannas or shrublands) by cultivated pastures or crops”, and not only outright deforestation. For this article, however, we accepted the assumption made by Nolte and co-authors that all land transformations can be equated to deforestation.

2.2. A Province With a Substantial Increase in Deforestation Was Omitted

Formosa, a province with extensive Dry Chaco forests in which a substantial increase in deforestation was observed during the time

¹ Newspaper Página12, Buenos Aires, 26 July 2017 (available at: <https://www.pagina12.com.ar/52451-donde-pasa-no-crece-mas-el-verde>). Last accessed 26 July 2017.

² Newspaper La Nación, Buenos Aires, 26 July 2017 (available at: <http://www.lanacion.com.ar/2047160-greenpeace-denuncia-desmontes-ilegales-en-el-norte-argentino>). Last accessed 26 July 2017.

³ Original datasets used can be downloaded at: <http://monitoreodesmonte.com.ar/descargas> (Last accessed 26 July 2017).

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