INPUT
Iniciativa para o Uso da Terra

CLIMATE POLICY INITIATIVE

## POLICY BRIEF

# STRENGTHENING BRAZIL'S FOREST PROTECTION IN A CHANGING LANDSCAPE

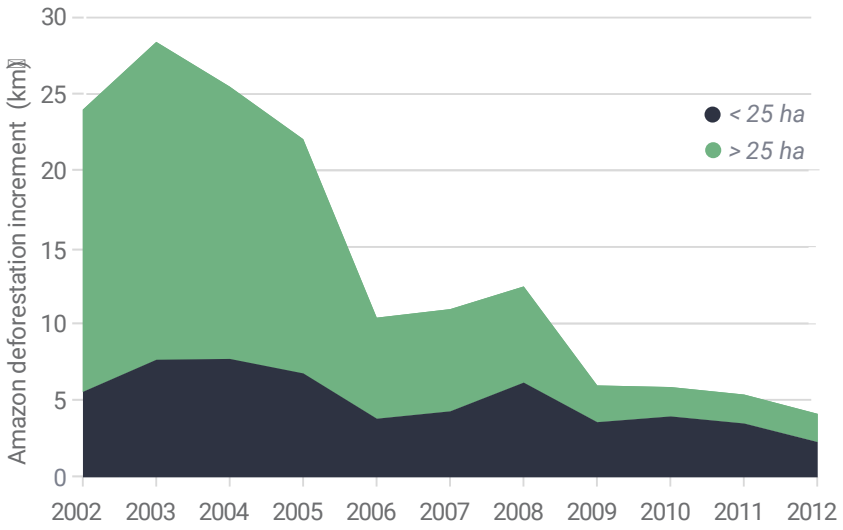
AS AMAZON DEFORESTATION SHIFTS TO SMALL-SCALE CLEARINGS, POLICYMAKERS SHOULD ADAPT

Annual deforestation rates in Brazil's Amazon fell by almost 80% between the mid 2000s and early 2010s due in large part to conservation policies Brazil introduced in 2004. While this is welcome news to policymakers intent on combating forest clearings, a new challenge has emerged: **deforestation now occurs on smaller tracts of land, which is more difficult to detect and remains unaddressed.**

A shift away from large-scale clearings (see Figure 1) raises new questions about what drives deforestation toward smaller-scale tracts. According to insights gained from research conducted by Climate Policy Initiative / PUC-Rio,* regional differences and individual behaviors within those regions hold important implications about how policymakers might adapt.

Researchers looked particularly at deforestation trends and practices in the states of Mato Grosso and Pará and reveal insights that could be applicable throughout the Amazon.

**FIGURE 1:** Amazon deforestation increment




***Note:*** *The annual deforestation increment measures the total area of land cleared in a one-year period, as seen on satellite imagery. The annual deforestation rate is a related measure that accounts for deforestation activity that is not visible in satellite imagery. Deforestation increments and rates are usually similar, but need not coincide in any given year.*

*Photo: Kate Evans/CIFOR*

## KEY RECOMMENDATIONS

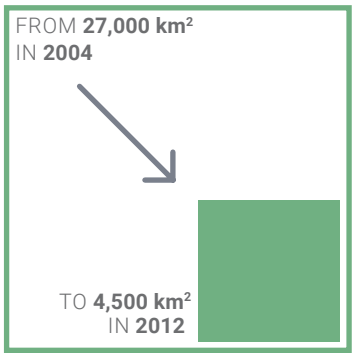
- Create **new strategies** that target small-scale deforestation and complement the tactics that have proven effective in slowing medium- and large-scale clearings.
- Tailor **new policies** to locales in order to accommodate regional differences and characteristics.
- Enhance remote sensing-based **monitoring technology** to detect small-scale clearings.

## KEY FINDINGS

- Due in part to policies that have helped reduce large-scale deforestation, Amazon deforestation now occurs mostly in small increments. Small-scale deforestation is difficult for the current monitoring system to detect and has grown from a quarter to more than a half of overall annual clearings.
- Small-size property holders (smallholders) in Par emerged as the leading agents of forest clearings.
- Medium- and large-size property holders in both Mato Grosso and Par appear to have adapted to the new enforcement by shifting their land clearing practices to smaller areas.
- Differences between states can be in part explained by historical differences in deforestation behavior: in the early 2000s, smallholders in Mato Grosso cleared forest in larger increments, while in Par they were more likely to be engaged in small-scale deforestation. Smallholders in Par were therefore more likely to elude the monitoring system.

# ANALYSIS FOR POLICYMAKERS

## Learning from regional differences in Mato Grosso and Par




**25 ≈ 30**
*HECTARES SOCCER FIELDS*

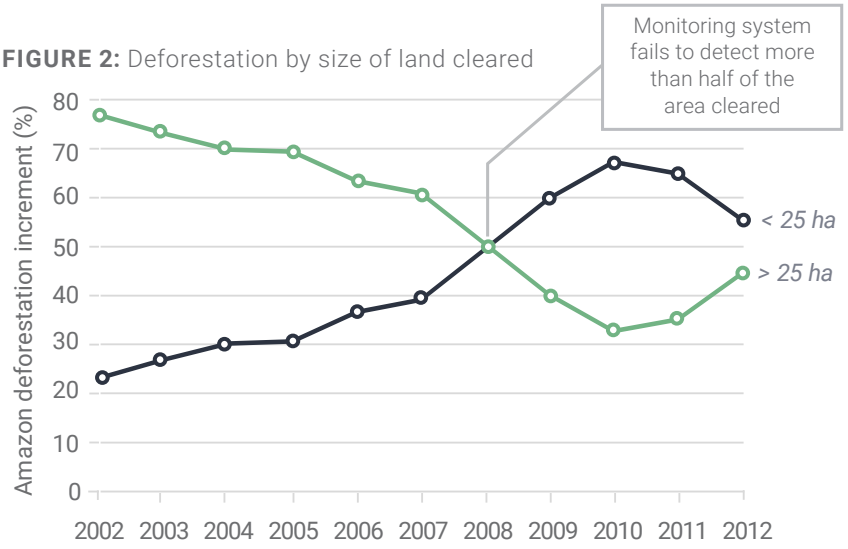
**Brazilian deforestation rates fell from a high of 27,000 km in the mid 2000s to 4,500 km² in the early 2010s.** The large reduction in deforestation rates can be attributed, in part, to conservation policies Brazil introduced in 2004. These policy efforts included the introduction of a remote sensing-based monitoring and enforcement program,which played a key role in reducing deforestation of large- and medium-scale areas; however, due to a technical limitation, it cannot detect deforestation on a smaller scale. **This means that clearings of areas measuring 25 hectares or less  or approximately the size of 30 soccer fields — go mostly undetected.**

Indeed, as Figure 1 illustrates, CPI/PUC-Rio researchers found that from the early 2000s through the early 2010s, total deforestation of small-scale areas remained constant, but grew as a percentage of overall clearing from a quarter to more than a half.

Deforestation now occurs mainly in small increments (see Figure 2). In addition, when researchers looked at the size of the deforestation efforts on different sizes of property, they found that holders who owned smaller-sized properties, those measuring up to approximately 250-350 hectares, behaved differently than holders of larger properties in some circumstances.

Researchers examined deforestation in the states of Mato Grosso and Par to gain a deeper understanding of the regional factors affecting deforestation rates.

**FIGURE 2:** Deforestation by size of land cleared

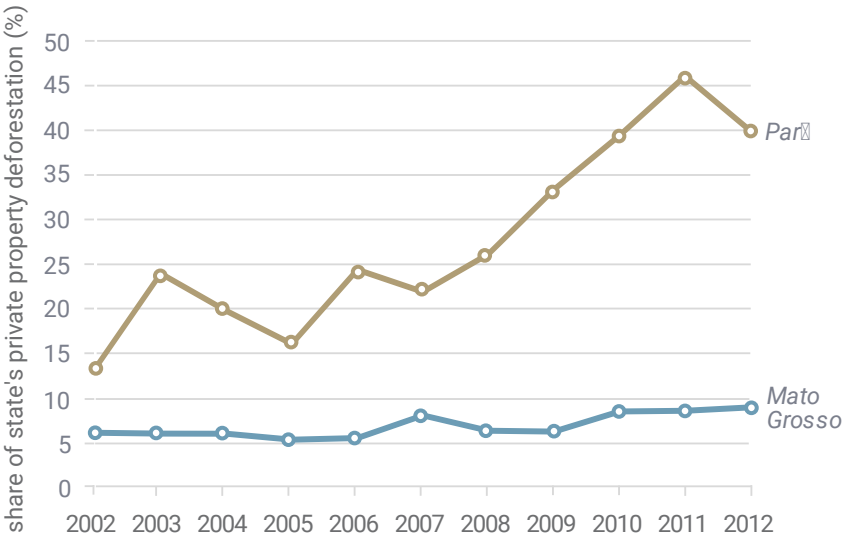


## Deforestation trends in Mato Grosso

At the beginning of the 2000s, smallholders in Mato Grosso tended to clear their property in medium- and large-scale tracts of land. While smallholder's share of deforestation remained constant over the 2000s (see Figure 3), the share of small-scale clearings increased in the state (see Figure 4). This is because clearings of medium- and large-scale tracts fell inside medium and large properties.

Researchers suspect the change in clearing size from medium and large-scale tracts to smaller tracts may be mainly due to the effectiveness of the remote sensing-based enforcement program that thwarted clearings larger than 25 hectares. When this type of illegal activity was more easily detected by the monitoring system, and, thus, more effectively contained, property holders in Mato Grosso shifted their deforestation activities to smaller tracts of land to escape detection.

**FIGURE 3:** Small-property deforestation in Mato Grosso and Par



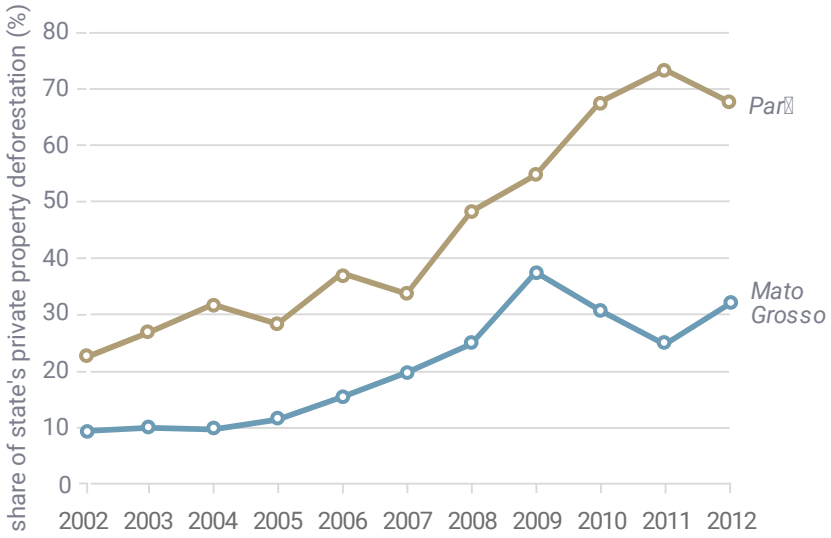

## Deforestation trends in Par

Although deforestation in Par shared some similar characteristics with Mato Grosso during this time period, their differences suggest the importance of tailoring policies to locales.

At the beginning of the 2000s, smallholders in Par were much more engaged in small-scale clearings than in Mato Grosso. Deforestation on small properties remained relatively more persistent in Par throughout the early 2010s. In addition, the share of small-scale clearing in overall state deforestation increased sharply into the late 2000s, especially when compared to Mato Grosso.

In practice then, Par landholders were more likely to elude the remote monitoring system because they were much less visible to law enforcers. This suggests that conservation policies may have been more effective in curbing deforestation in Mato Grosso than Par. Medium- and large-scale landholders in Par may have also responded to the conservation policies, but small-size property holders clearly emerged as the leading agents of forest clearing in that state.

**FIGURE 4:** Small clearings in Mato Grosso and Par




## Differences in property size and conservation policy

In both states, even smallholders who only deforested in small increments may have reduced deforestation in response to stricter law enforcement in neighboring large areas. This effect was likely stronger in Mato Grosso, where medium and large properties prevail. Furthermore, because the average property size in Mato Grosso is much larger than in Par, there was probably a greater chance of the monitoring system detecting private property deforestation in Mato Grosso.

# CONCLUSION

Although the researchers emphasize that their data does not identify the underlying reasons for the differences in Mato Grosso and Par□, their work illustrates how landholders behave differently from region to region. Ultimately, **it is clear that deforestation can no longer be viewed as a single, homogenous problem across the Amazon.**

Rather, clearing activities and landholders differ regionally and even locally. Therefore, **policymakers must begin tailoring solutions to address these regional differences and the challenge of small-scale clearings.**

# NOTES ON DATA

### DATA SOURCES

Annual deforestation increment from the Project for Monitoring Amazon Deforestation (PRODES) by the National Institute for Space Research (INPE).
Private property perimeters from the Environmental Rural Registry (CAR) and the Unique Environmental License (LAU).

**Deforestation Scale and Farm Size: the Need for Tailoring Policy in Brazil.*

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### METHODOLOGY

The study combines property boundary data and georeferenced deforestation data to determine whether deforestation polygons were located inside small, medium, or large properties.

### LIMITATIONS

Due to data availability, the study focuses on registered private rural properties in Mato Grosso and Par□ states. These states accounted for approximately two-thirds of the forest area cleared during the studied time period. Even if the data is not exhaustive, the sample is relevant.

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*The **Land Use Initiative (INPUT □ Iniciativa para o Uso da Terra)** is a dedicated team of specialists who work at the forefront of how to increase environmental protection and food production. INPUT engages stakeholders in Brazil□s public and private sectors and maps the challenges for a better management of its natural resources. Research conducted under INPUT is generously supported by the Children□s Investment Fund Foundation (CIFF) through a grant to the Climate Policy Initiative. **www.inputbrasil.org***