# Protected areas successfully prevent deforestation in Amazon rainforest

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A forest-dependent household in the Brazilian Amazon. Credit: Pete Newton.

Strictly protected areas such as national parks and biological reserves have been more effective at reducing deforestation in the Amazon rainforest than so-called sustainable-use areas that allow for controlled resource extraction, two University of Michigan researchers and their colleagues have found.

In addition, [protected areas](#) established primarily to safeguard the rights and livelihoods of indigenous people performed especially well in places where deforestation pressures are high. The U-M-led study, which found that all forms of protection successfully limit deforestation, is scheduled for online publication March 11 in the [Proceedings of the National Academy of Sciences](#).

The lead author is Christoph Nolte, a doctoral candidate at the U-M School of Natural Resources and Environment. Co-authors include Arun Agrawal, a professor of natural resources at SNRE.

"Perhaps the biggest surprise is the finding that [indigenous lands](#) perform the best when it comes to lower deforestation in contexts of high deforestation pressure," Agrawal said. "Many observers have suggested that granting substantial autonomy and land rights to indigenous people over vast tracts of land in the Amazon will lead to high levels of deforestation because indigenous groups would want to take advantage of the resources at their disposal.

"This study shows that—based on current evidence—such fears are misplaced," he said.

Preventing deforestation of rainforests is a goal for conserving biodiversity and, more recently, for reducing carbon emissions in the Brazilian Amazon, which covers an area of nearly 2 million square miles.

After making international headlines for historically high Amazon deforestation rates between 2000 and 2005, Brazil achieved radical reductions in [deforestation rates](#) in the second half of the past decade. Although part of those reductions were attributed to price declines of agricultural commodities, recent analyses also show that regulatory government policies—including a drastic increase in enforcement activities and the expansion and strengthening of protected-area

networks—all contributed significantly to the observed reductions.

In their study, the U-M researchers and their colleagues used new remote-sensing-based datasets from 292 protected areas in the Brazilian Amazon, along with a sophisticated statistical analysis, to assess the effectiveness of different types of protected areas. They looked at three categories of protected areas: strictly protected areas, sustainable use areas and indigenous lands.

Strictly protected areas—state and national biological stations, biological reserves, and national and state parks—consistently avoided more deforestation than sustainable-use areas, regardless of the level of deforestation pressure. Sustainable-use areas allow for controlled resource extraction, land use change and, in many instances, human settlements.

"Earlier analyses suggested that strict protection, because it allows no resource use, is so controversial that it is less likely to be implemented where deforestation pressures are high—close to cities or areas of high agricultural value, for example," Nolte said.

"But we observed that recent designations of the Brazilian government placed new strictly protected areas in very high-pressure areas, attenuating this earlier argument," he said.

Hundreds of millions of people in the tropics depend on forests for their subsistence. Forest products that households rely on include firewood, fodder for livestock and timber for housing.

  **More information:** "Governance regime and location influence avoided deforestation success of protected areas in the Brazilian Amazon," by Christoph Nolte, Arun Agrawal, Kirsten Silvius, and Britaldo Soares-Filho, *PNAS*, 2013.