

Letters to the Editor

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Deforestation in Amazonia

IN RECENT YEARS, WE AND OTHERS HAVE identified critical threats posed to the forests of Amazonia by the Brazilian government's plans to dramatically expand highways and other major infrastructure projects in the region (1–6). Our conclusions have been disputed by elements of the Brazilian government (7–10), which assert that a key assumption of our spatial models—that new roads and highways will continue to promote large-scale Amazonian deforestation, as they have done in the past—no longer applies. This is so, they argue, because of improvements in frontier governance and environmental-law enforcement, as well as changes in Brazilian public attitudes toward forests (7–10). As a consequence, the Brazilian government is proceeding with the largest expansion of highways, roads, power lines, gas lines, hydroelectric reservoirs, railroads, and river-channelization projects in the history of the Amazon (1–6).

In 2002 and 2003, the rate of deforestation in Brazilian Amazonia climbed to nearly 2.4 million hectares per year (see figure)—equivalent to 11 football fields a minute. This increase mostly resulted from rapid destruction of seasonal forest types in the southern and eastern parts of the basin; relative to preceding years (1990–2001), forest loss shot up by 48% in the states of Pará, Rondônia, Mato Grosso, and Acre (11). The increase was evidently driven by rising deforestation and land speculation along new highways and planned highway routes (12), and the dramatic growth of Amazonian cattle ranching (13) and industrial soybean

farming (6, 14). Soybean farms promote some forest clearing directly, but have a much greater impact on deforestation by consuming cleared land, savanna, and ecotonal forests, thereby pushing ranchers and slash-and-burn farmers ever deeper into the forest frontier. Equally important, soybean farming provides a key economic and political impetus for massive infrastructure projects, which accelerate deforestation by other actors (6, 14).

Anticipating public alarm about the new deforestation figures, the Brazilian government recently announced new measures designed to slow Amazon forest loss. These measures include increased satellite monitoring of deforestation and the involvement of additional ministries—not just the Ministry of Environment—in efforts to reduce illegal deforestation and forest burning (12). These measures, in concert with the establishment of new protected or multiple-use areas in Amapá, Amazonas, and Acre, are a move in the right direction.

The new measures do not go far enough, however. They fail to address one of the most critical drivers of forest destruction: the rapid proliferation of new highways and other infrastructure, which greatly increases physical access to the Amazonian frontier. The Brazilian government plans to create interministerial working groups to

recommend ways to reduce or mitigate project impacts, but is not considering the cancellation or significant delay of any major project. Indeed, just days after announcing the new anti-deforestation package, Brazilian President Lula demanded that his federal ministers find ways to circumvent environmental and other impediments to stalled infrastructure projects throughout the country, including 18 hydroelectric dams and 10,000 km of highways (15).

In the Amazon, new transportation projects frequently lead to a dramatic rise in illegal deforestation, logging, mining, and hunting activities (1–6). If Brazil crisscrosses the basin with thousands of kilometers of such projects, the net result, our models suggest, will be not only further

increases in forest destruction, but fragmentation of surviving forests on an unprecedented spatial scale (1, 5). Many of the government's recently announced measures to slow forest loss are positive steps, but if it does not curtail its aggressive plans for infrastructure expansion, Brazil will fail to address one of the most critical root causes of Amazonian deforestation.

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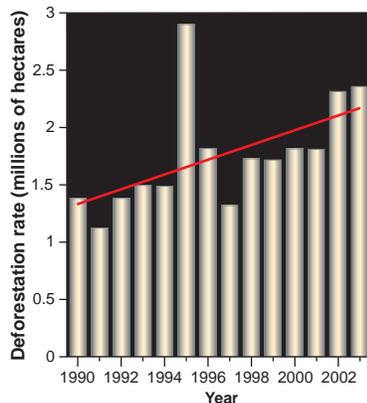
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- The net deforestation rate in these four states increased from 1.43 million ha year⁻¹ from 1990–2001 to 2.12 million ha year⁻¹ in 2002–2003, based on data from the Brazilian National Space Agency (www.inpe.br). Deforestation data for 2003 are a preliminary estimate.
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Painful Deception

IN THEIR RESEARCH ARTICLE "PLACEBO-induced changes in fMRI in the anticipation and experience of pain" (20 Feb., p. 1162), T. D. Wager *et al.* report results from two elegant experiments on placebo analgesia. The research raises ethical concerns that are not addressed in either the article or the Supporting Online Material (SOM). Research participants were deceived about the nature of the studies and the procedures



Deforestation in Brazilian Amazonia since 1990. Data are from Brazil's National Space Agency (the fitted regression line shows the overall trend). The increase in annual deforestation is significant by both parametric ($F_{1,12} = 8.22$, $R^2 = 40.7\%$, $P = 0.014$; linear regression with log-transformed deforestation data) and nonparametric ($R_s = 0.717$, $P = 0.004$; Spearman rank correlation) tests.