



Supporting Online Material for

Climate Change, Deforestation, and the Fate of the Amazon

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This PDF file includes:

SOM Text
References and Notes

Supplementary Online material

Logging in Amazonia

The overall direct footprint of human activity in Amazonia is much greater than deforestation alone, and includes logging(*S1*, *S2*), hunting(*S3*) and fire leakage(*S4*). Selective logging is a major activity, and has significant effects on the biological functioning of forests. Intensively logged areas in Brazilian Amazonia are expanding by 12,000–20,000 km² year⁻¹, at similar rates to deforestation (*S0*). Logged forests are often prone to deforestation (*S1*), but in some areas forests persist and repeated logging is the prevailing land use. Whilst maintaining some of their ecosystem functioning and retaining significant biodiversity value, logged forests suffer loss of 25-50% of their canopy area – up to 30 trees are damaged for each tree harvested (*S5*).

How feasible is good governance of the Amazon frontier?

Brazil has the longest experience of rapid expansion of its forest frontier, and lessons for the wider region can be drawn from its history of development. In 2004 32 % of Brazilian Amazon forest (total 4.1 million km²) occurred within protected areas (PAs), mainly indigenous lands (940,000 km²; 23%). Brazil is implementing a significant expansion of PAs, with 240,000 km² of strict PAs declared between 2004 and 2006 (Amazon Region Protected Areas programme), and 500,000 km² of sustainable production forest planned (National Forest Programme). Private lands could also be important in maintaining the forest matrix connectivity: under current Brazilian law private land in Amazonia can only be 20% deforested, although this has been weakly enforced to date (*S6*).

A number of local actors can play a constructive role if empowered with rights and resources. National parks play an important role but are often located far from land-use pressure, for reasons of political expediency and risk-aversion (*S7*). Indigenous lands have been shown to be effective conservers of forests, and are often actively defended by their inhabitants (*S8*). Migrant smallholders have played a major role in grassroots movements that have successfully pressed for the recent ecological zoning in the hotly contested frontier landscape of central Pará state, including 68,000 km² of protected area (*S9*). This effort was specifically driven by the desire to maintain local rainfall, but also to provide buffer zones against the social disturbances and violence that have accompanied the expansion of the cattle-ranching frontier.

Agroindustry and governments have important roles to play. As an increasing fraction of Amazonian beef and soy is exported to the southern Brazilian and international markets, those industries are becoming more responsive to demands by consumers for environmental and social standards and labelling (*S10*). The Brazilian government has begun to attempt to improve enforcement of land-use legislation and has imprisoned some corrupt officials. There is increasing political will in Amazonia to implement conservation strategies based on the economic value of environmental services

provided by the forest. For example, the Brazilian state of Amazonas has recently an environmental law related to payment for environmental services (SII). The Brazilian National Institute for Space Research (INPE) has pioneered the free and rapid availability of satellite-derived deforestation data on the web, enabling independent and timely assessment of deforestation hotspots and outside auditing of enforcement in protected areas and private lands. Recent advances in satellite detection of logging (SI) potentially enable this approach to be extended to forest degradation.

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