

Brazilian Amazon – the race is on

Brazil's Amazon forest was largely intact (98–99%) until the early 1970s, up to which time 'only' an area about the size of Portugal had been converted. Since then the Brazilian government has promoted infrastructure for transport (highways, waterways and railways) and energy (four hydroelectric dams to date). These investments have brought soaring deforestation through logging, cattle ranching, mining, and more recently agriculture, especially soybean, and has resulted in a massive arc of deforestation across the southern Amazon from Rondônia, through Mato Grosso, to southern Pará. Highways are now being paved, and the dramatic but typical effects of this can be seen, for example, along the 1,760 km Cuiabá-Santarém BR-163 highway. Each kilometre of asphalt is stimulus to a cycle of logging, clear-cutting and burning, a brief interlude of cattle ranching, and the rapid appearance of soybean plantations and proliferation of secondary roads and conversion of forest.

Deforestation from August 2003 to August 2004 was 26,130 km², the second highest on record (since 1988 the highest was 29,059 km², in 1995). Figures for August 2004 to July 2005 indicate an encouraging drop to c. 16,000 km² attributed in part to Operation Curupira, which started in June 2005. This was an unprecedented crackdown on illegal logging, focusing on the state of Mato Grosso (responsible for 40% of the total deforestation in 2003–2004 and 60% in 2004–2005). However, these numbers raise the percentage loss for the Brazilian Amazon to c. 17%, or 690,000 km². An area the size of France (545,630 km²) had been lost by 1998, and an entire Greece has been cut down or burnt since then.

The immediate purveyors of destruction are settlers, loggers, miners, dam engineers, farmers and cattle ranchers, propelled by prevailing national and state political and economic climates and, increasingly, global demands for resources. An enormous investment in infrastructure is now making Brazil increasingly competitive in world markets for timber and beef, especially to Europe, and soybean to China. Beef exports are booming because of favourable currency exchange rates and the fact that, since 2003, the states of Mato Grosso, Tocantins and Rondônia in the southern Amazon have been declared free of foot-and-mouth disease. The flourishing economy is reflected in the urban population, which tripled from 4.7 million (45% of the region's

population) in 1980 to 13.7 million in 2000, now accounting for 69% of the region's population.

Paved roads are the most robust predictors of deforestation, providing access to remote lands and the necessary transport for so-called resource-mining – hideously bland jargon for what the Vikings were doing along the British coasts 1,200 years ago. Highways are the key factor in the numerous models now being used to determine what the near future holds for the Amazon basin. The models incorporate the impacts of cumulative factors, knock-on effects, and positive feedbacks. Environmental degradation and forest loss quickly spiral out of control as rainfall is reduced, forest understorey dries out, and dry-season fires become ever more frequent and widespread, resulting in more forest loss, degradation and fragmentation, soil degradation and erosion, and the silting of major rivers.

This assault on the Amazonian wilderness has been accompanied by a simultaneous race to conserve it, through both strictly protected areas and areas for sustainable use. Strictly protected areas, such as national parks, biological reserves and ecological stations, are for biodiversity conservation. Sustainable use areas allow and promote use and resource extraction but have biodiversity conservation as a secondary objective. They include national forests and areas for environmental protection, and extractive and sustainable development reserves that are created to maintain the status quo of traditional lifestyles and economies. Federal, state, and municipal governments have all created protected areas of both categories.

Federal and state protected areas account for 15% of the 4,975,527 km² of the legally defined Brazilian Amazon. Of this 15%, 29.5 million ha (5.5%) is under strict protection, and 47.2 million ha under categories of sustainable use. Since 1979 the federal government has increased the number of its Amazonian protected areas from 4 to 92, covering c. 46.5 million ha. The governments of the nine Amazon states were slower to start, but at the last count there were 133 (all but a handful decreed since 1988), covering c. 30.2 million ha. There are notable differences between the state and federal areas, however (Brandon *et al.*, 2005). State protected areas are generally smaller, with 78% of the area under protection open to use and 22% strictly protected. In contrast, federal protected areas have 49% of their area under strict protection. Besides these protected areas, over one-fifth

of the Brazilian Amazon (c. 100.2 million ha) is in legally defined Indigenous Territories. The fate of Amazonian forests will largely depend on how well these areas are linked to one another and how they are managed.

What we are witnessing, and will continue to witness for a few years to come, is an extraordinary race, like a card game. In this game of Amazonopoly the entire deck is being dealt out amongst the players, a race in which the Amazon is being apportioned out – effectively a land grab over the Earth's greatest single expanse of high biodiversity wilderness. Towns and cities, settlers, loggers, miners, cattle ranchers, dam builders and soy-bean farmers have so far shown their hands in destroying c. 17%, the Indian nations are fighting to keep 20% intact, the Federal and state governments have to date secured 5.5% for strict protection, and 9.5% has been claimed for environmentally friendly use. More than 50% of the Brazilian Amazon has been divided up, most of it in the past 30 years. The terrifying aspect is the utilitarian nature of the game. Although there is a backdrop of major conservation issues – watershed and fisheries protection, carbon emissions, maintenance of regional, national, and even global climates, the conservation of the richest concentration of biodiversity on the planet and the innumerable and immeasurable ecosystem services – these concerns are not governing the strategy of any of the players except those who have so far acquired 5.5% using biodiversity patterns to guide them.

Amazonopoly is picking up speed and most of the cards will be dealt in the next 15–20 years. What will each of the players do then? There will be some swapping to make up sets (one would hope that development and conservation could be complementary rather than conflictive), perhaps acrimonious tussles when players see that some have more cards than others. Bluff and cheating is a part of any card game, and an outcome to watch for will be the fate of the cards acquired under false pretences. Time will tell if those loosely earmarked Environmental Protection Area do as they claim. The Indigenous nations of the Xingu are holding a miraculous 11 million ha, but they are isolated by deforestation. One third of the headwaters of the Rio

Xingu has been deforested, and the spectre of dams along the lower reaches, a card placed at the bottom of the deck under major protest in the 1980s, is again on the table. The Babaquara dam will produce a greenhouse gas generating reservoir of 6,140 km², twice that of the infamous Balbina, near Manaus.

If Brazil and the world were to take global warming seriously the game would be stopped immediately, but perhaps the most optimistic scenario for the Amazon is that a new dealer comes in with a different set of rules and incentives. This has happened in individual Amazonian states, such as Amapá, where 10 million ha, 71% of the state, has been designated a massive biodiversity conservation corridor. The municipal tax redistribution plan that favours conservation, begun in Paraná and copied in other states may help alter the balance. The greatest need, however, is for a sweeping incentive or initiative that is Amazon-wide. Reports on the real impacts of climate change, for example, are now coming in daily, giving credence to scenarios that were, until recently, dismissed. This provides an impetus to design a workable 'avoided deforestation' carbon fund for the Amazon and elsewhere (Santilli *et al.*, 2003). Such a fund would help conservation contribute to development, would entirely shift the rules for Amazonopoly, and would recognize and compensate for management that benefits the global commons. Cards anyone?

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