

The text that follows is a PREPRINT.

Please cite as:

Fearnside, P.M. 1990. Deforestation in Brazilian Amazonia. Conservation Biology 4(4): 459-460.

ISSN: 0888-8892

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Deforestation in Brazilian Amazonia:

a review of Government Policies and Deforestation in Brazil's Amazon Region, by D.J. Mahar, The World Bank, Washington, DC. 56 pp. (1989).

This short book provides a review of deforestation in Brazilian Amazonia that points out a number of the forces driving the process. The review contains a list of recommendations that the Brazilian government would do well to heed. What has drawn widespread attention to the pamphlet, however, is not the validity of its recommendations on slowing deforestation, but rather the fact that (1) it contains a table projecting deforestation to the year 1988 (indicating a large area of clearing) and (2) it was published by the World Bank. Despite the inevitable caveat that the views expressed represent those of the author rather than the Bank, the Brazilian government's reaction was strong and negative. President José Sarney asked Brazil's Space Research Institute (INPE) to conduct a crash study of satellite imagery from 1988 with the specific mandate of debunking Mahar's deforestation estimate. The INPE study, which claimed that only 5.12% of the Legal Amazon had been deforested by 1988 (versus 12% calculated by Mahar) arrived at such a low percentage by an invalid procedure: dividing the area of recent clearing in the forested portion of the region by the area of the entire Legal Amazon, an administrative zone that includes about 30% of its area in savannas and other non-forest vegetation types. A revised estimate for deforestation in 1988 indicates approximately 9% of the original forest was gone by that year, including old secondary forest areas as deforested.

Mahar's estimate of deforestation was, in fact, erroneous for several reasons. Although the pamphlet states clearly that the data represent "forest clearing" (p. 6), the original sources are studies that included clearing in the central Brazilian scrubland or cerrado together with forest clearing. This factor alone would reduce the estimate by almost a factor of two. The other problem is that the 1988 estimate is an exponential projection from data for 1980 or earlier within each of the region's nine states. The state of Pará is an apparent exception, the number used probably having been derived from a 1986 measurement in that state. Unfortunately, more recent data available at the time from several key states, including Rondônia, were not used. The assumption of an exponential trend over such a long timespan resulted in unrealistically high values for several states, especially the region's largest state (Amazonas) where the projection is high by an order of magnitude. The estimates would have been even higher if old secondary forest had been counted as deforested in the data used by Mahar.

The controversies surrounding the deforestation estimate have overshadowed the discussion of government policies that makes up most of Mahar's text. Mahar accurately portrays the disastrous effect of tax and other fiscal incentives given to cattle ranchers, the opening of highways to facilitate migration of population into Amazonia, and the launching of major regional development programs without environmental safeguards. It is striking, however, how little is mentioned of the World Bank's role in some of these developments.

The POLONOROESTE Program opened the state of Rondônia to migration by reconstructing the BR-364 Highway and building feeder roads and other infrastructure. Mahar notes that "a principal objective of POLONOROESTE was to reduce forest clearance on land with little long-term agricultural potential and to promote, instead, sustainable farming systems based on tree crops" (p. 34). As Mahar's data and discussion show, the effect was exactly the opposite -- explosive destruction of the forest for unsustainable cattle pasture. The only mention of the World Bank's role is that the project was "budgeted at US\$ 1.5 billion, about a third of which was eventually provided by the World Bank" (p. 34). POLONOROESTE is, in fact, one of the major environmental embarrassments of the World Bank, which announced creation of its Environment Department less than 48 hours after an exposé of the project was broadcast on U.S. television. Mahar himself wrote the report of the 1979 World Bank mission to northwest Brazil (published in 1981) that evaluated POLONOROESTE's prospects before the program was launched. Perhaps a more explicit "mea culpa" would have been appropriate.

Another environmental catastrophe where the World Bank's role is barely mentioned is Carajás. Mahar explains the bureaucratic distinction between the "Grande Carajás Program," intended to develop an area of eastern Amazonia twice the size of the U.S. state of California, and the World Bank financed "Carajás Iron Ore Project" (which is responsible only for the mine, railway and port facilities). Of the latter, which is run by CVRD (Brazil's parastatal mining company), Mahar states: "unlike most other projects in Amazonia, the Carajás Iron Ore Project was developed with close attention to its possible effects on the environment" (p. 42). Not mentioned is the fact that the infrastructure built for the iron ore project provided the principal justification for Brazil's launching the entire Grande Carajás Program, with tremendous potential for speeding deforestation and with virtually no environmental controls. The World Bank's funds were only used by the CVRD Carajás Iron Ore Project that built the 890 km railway linking the

mine to the Atlantic Ocean: "Financing was provided by CVRD (40 percent) and national and foreign credit, including the World Bank, which provided US\$300 million" (p. 41). Not mentioned is the fact that most of the foreign financing depended on the World Bank's stamp of approval with reference to the environment. The true environmental impact of the iron mine is not the digging of a hole in the ground and the laying down of railway ties, but rather the generalized deforestation provoked by the Grande Carajás Program.

Mahar describes the Grande Carajás Program's massive scheme for smelting pig iron using charcoal -- with the likely result being clearing of forest to provide the wood from which the charcoal is made. It must be mentioned that this scheme was not a surprise that sprang into being after the railway was completed. Rather, it was announced in July 1982, and denounced by myself and Judy Rankin in an editorial published in *Interciencia* in November of that year. Construction of the railway was not completed until September 1984 -- meaning that almost all of the World Bank's funds were disbursed after it was known that the railway would be used for the pig iron scheme. Several of the smelters are even located right beside the railway -- in the narrow strip of land that the Brazilian government agreed to protect as part of the iron ore project.

While Mahar might have added other things to his review, his conclusion on stopping deforestation is quite correct. His principal message is that "attempts to reduce or stop tropical deforestation by fiat only -- for example, through land-use zoning, legislation establishing national parks, or legal prohibitions of certain types of economic activity -- are not likely to succeed if economic incentives encourage people to do the opposite" (p. 3).

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