EXPLOSIVE DEFORESTATION IN RONDÔNIA, BRAZIL

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It is obvious to those who work in Amazonia that deforestation is increasing in an explosive way in the region, especially in the State of Rondônia. Quantitative information has been lacking, however, on how much the cleared areas have increased in recent years. Remote sensing is the only practical means for obtaining such information for large areas such as Rondônia, whose 244,000 km² area is approximately that of West Germany.

Rondônia serves as a gateway to the Amazon Region for the increasing flood of migrants leaving Brazil's central-south region. Beginning in 1970, Rondônia has been the site of a series of government-sponsored settlement programs for small farmers assigned to 100 ha lots (Valverde, 1979; Mueller, 1980). Government lands in many parts of the state outside of the colonization areas have been sold to large landholders through the process of licitação (closed tenders). Pasture is the most common replacement for forest, both in the large landholdings and in the colonization areas—thus maximizing the human population's impact on the forest (Fearnside, 1983).

Unauthorized squatters, both large and small, commonly occupy forested land; deforestation is used as the principal means of securing land tenure claims. A rapidly expanding network of roads is facilitating the entry of migrants (and speculators) to previously untouched forest areas, including biological reserves and Amerindian reservations (Fearnside and Ferreira, 1984). The paving of the Marechal Rondon (Cuiabá-Porto Velho, or BR-364) Highway and much of the expansion of the associated network of feeder roads has been financed by the World Bank under the POLONOROESTE regional development program (International Bank for Reconstruction and Development, 1981).

Deforestation information from 1983 LANDSAT satellite images has recently become available for Rondônia (Brazil, Ministério da Agricultura, IBDF, 1985). The 13,995 km² deforested by 1983 (5.74% of the state) implies a slightly greater than linear increase since the previous available estimate, made using 1980 images (Brazil, Ministério da Agricultura, IBDF, 1982; see Fearnside, 1984). The rapid increase is apparent when two previous LANDSAT surveys are considered, using images from the years 1975 and 1978 (Tardin et al. 1980; cf. Fearnside 1982). Fig. 1 presents the available LANDSAT data for Rondônia.

A dotted line is included to the year 1970, which is before the existence of LANDSAT satellites. It is known that deforestation in 1970 was minimal based on side-looking airborne radar (SLAR) images taken by the RADAMBRASIL project (Brazil, Ministério das Minas e Energia, DNPN, 1973-82). The 1970 cleared area can be considered zero, particularly if one uses as an operational definition of "deforested" areas, the criteria inherent in the LANDSAT data making up the remainder of the graph. LANDSAT Multispectral Scanner (MSS) interpretation techniques underestimate deforestation by confusing primary forest with the secondary vegetation covering older deforested areas (Fearnside, 1982; Tucker et al., 1983: 3). The fact that the deforested area in 1970 was really greater than zero would imply an even more explosive exponential trend than that suggested by Fig. 1.

The LANDSAT studies have also underestimated deforestation, by using some images from years previous to the dates reported for state-level data (used in Fig. 1). This is the procedure used
to fill gaps that cloud-cover creates in the data-set. In the "1980" estimate by the Brazilian Institute for Forestry Development (IBDF), for example, 19 of 45 images used (42%) were from 1979 rather than 1980 (Brazil, Ministério da Agricultura, IBDF, 1982).

All of the information in Fig. 1 antedates the surge of immigration and deforestation that followed the September 1984 completion of the paving of the Marechal Rondon (Cuiabá-Porto Velho, or BR-364) Highway. In spite of any underestimation in deforestation estimates, the accelerated deforestation evident in Rondônia would lead to complete disappearance of the forest in that State within a few years should the same trend continue. The accelerating trend is due to positive feedback loops inherent in the system of forces that now drive the process. Only if this system is changed will the deforested areas be prevented from growing until they reach the last scrap of forest!

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FIGURE LEGEND

Fig. 1. Deforestation in Rondônia as measured from LANDSAT imagery. The dotted line to 1970 (prior to LANDSAT's existence) reflects the minimal clearing at that time (see text). The explosive growth in cleared area is apparent.