

DEFORESTATION IN THE BRAZILIAN

AMAZON

With reference to the article by P. Fearnside entitled "Deforestation in the Brazilian Amazon: How Fast is it Occurring?" (*Interciencia* 7 (2): 82-88, 1982), we would like to make some comments.

First of all, Fearnside states that the data used for the regression violates the requirement of independence of the dependent variable (p. 88) which is correct. The use of cumulative data also vio-

lates this requirement. If the conditions for using regression analysis are violated, why use regressions to try and prove the point that the rate of deforestation is increasing exponentially in the Amazon Basin? If we take Fearnside's data in Table III and convert it to annual rates (there are not enough points to run a regression), in all cases except one (Ouro Preto) the annual deforestation *rate* (not the cumulative

area) shows a significant decrease during the most recent period. This also shows up in his curves of the raw data (his Fig. 2). The regression equations cannot be used to prove anything or even suggest a trend. The fact that the rate of clearing decreased in recent times for all the regions except one suggests that it is irresponsible to suggest, instead, that: 1) the trend appears to be exponential, and 2) then to use

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this to predict that the whole Amazon region will be deforested by 1991 (p. 84).

We realize that Fearnside states that the data are insufficient to make firm conclusions (p. 85); then why does he devote so much of the paper to developing the exponential relationships and filling the paper with tables showing results of statistical analysis? And then, he makes predictions for the whole Amazon based on data for a small area of this region. How can he justify all the analysis, etc., when he is

forced to conclude that you can't conclude anything about deforestation rates.

The topic of tropical deforestation is a very controversial one and one in which, we believe, has been greatly overexaggerated c.f., Lugo and Brown, *Interciencia* 7 (2): 89-93. Yes, tropical forests are being cut and having significant impacts on local communities and indigenous peoples, and, in some parts of the world, on the whole country. And, yes, about 7 million ha/yr of forests being cut is a large

chunk of land! But it behooves us as scientists to present the best possible data and to use these data to do the best possible analysis, and not mislead the scientific community and the public into believing something which is not true. We can see this article being used by people not aware of the subtleties of statistical analysis and the weak analysis given in Fearnside's paper as evidence to suggest that all the forest in the Amazon are going to be cleared by the end of the 1990's.

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With reference to the letter of Drs. S. Brown and A. E. Lugo commenting on my paper "Deforestation in the Brazilian Amazon: How Fast is it Occurring? (*Interciencia* 7 (2): 82-88), I readily concur that the paucity of available data on deforestation in the region is evident. However, the speed and irreversibility of deforestation make it important to examine all available data for trends, even though data sets are far smaller than one might wish. The limits of the data and various methods of interpretation are discussed at length in my paper. As reflected in the repeated warning in that discussion, I share the concern that my statements might be misinterpreted or missed. I hope that Drs. Brown and Lugo will not be the first to do so! I did not, as stated in their letter, "predict that the whole Amazon region will be deforested by

1991." Rather, the paper makes a clear distinction between predictions of what will actually occur and projections of trends assuming a given growth form and constant parameters. Such projections can serve only as illustrations of the logical consequences of different trends, and the various governmental policy and other factors affecting the trends. As pointed out in the paper, rates can be expected to change for various reasons, and, more importantly, the complexity of the interrelations affecting clearing rates mean that any simple algebraic model is bound to prove inadequate as a predictor of long-term changes.

I am sure we agree on the need for more data and the need for care in drawing conclusions from what we have. I sense, however, that we do not agree on the pace and impact of deforestation.

Contrary to Drs. Brown and Lugo's suggestion, deforestation is not a problem which is restricted in its impact to "local communities and indigenous peoples," although I hasten to add that it would still be important even if impacts were restricted to these groups. On the scale of potential clearings in Amazonia, the impacts could be far wider. The forces driving deforestation, such as the positive feedback relationship between roadbuilding and land

clearing identified in my paper, must be addressed if the process is to be understood and controlled.

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NOTES.

1. Lugo, A. E., and S. Brown. 1982. Conversion of tropical moist forests: a critique. *Interciencia* 7 (2): 89-93.
2. Three volumes, one each on Tropical Africa, Tropical Asia, and Tropical America, summarized in Lanly, J. P. 1982. Tropical forest resources. FAO Forestry Paper 30. Food and Agriculture Organization of the United Nations, Rome, Italy. 106 pp.

