

Development of the Brazilian Amazon

IN THEIR DISCUSSION OF "THE FUTURE OF the Brazilian Amazon" (*Science's Compass*, Policy Forum, 19 Jan., p. 438), W. F. Laurance and his co-authors offer a serious contribution to a very serious subject. Nevertheless, we reject their projections of extensive deforestation in the Brazilian Amazon.

The first difficulty is that they look 20 years ahead but extrapolate practices and events of 15 to 25 years ago. Today, Brazil is a fully functioning democracy. Gone are the days when public debate was shackled and development planning was a centralized, technocratic, closed-door process that produced non-negotiable directives and was dominated by geopolitical concerns. In fact, just the existence of the current debate about development projects, several of them scheduled for many years ahead, shows how much Brazil has changed.

Second, the authors of the Policy Forum seem to deny that the Brazilian government can learn from the past, and they do not recognize the enormous changes of the last quarter-century. Brazil today has world-class environmental licensing procedures. Every major project must be evaluated by independent experts and discussed in public hearings, and recent legislation makes environmental destruction a criminal offense. Brazil uses satellite monitoring and other advanced technologies to observe and control rain forest development. Yes, enforcement is a problem, as in any country, but it

is unreasonable to assume that past errors must necessarily be repeated.

Third, the full scope of the *Avança Brasil* development program goes far beyond the infrastructure projects Laurance and his co-authors mention. They wrongly suggest that Amazon development is a "top-down" process where projects are "approved long before the environmental costs and risks can be evaluated." In fact, *Avança Brasil* was preceded by a 3-year study led by international consultants and involving 100 experts from 18 Brazilian consulting companies and universities, including many nongovernment Amazon specialists. Preliminary results were debated in every state capital, as were numerous additional written submissions. A selection of the projects so identified was then incorporated into the *Avança Brasil* legislation sent to Congress and debated for 11 months. Even so, the government is commissioning supplementary environmental studies.

Finally, it is essential to understand that inclusion in *Avança Brasil* in no way diminishes the legal requirement for each project to undergo full, individual environmental licensing, as described above. If any project is found to present unacceptable environmental costs, it must be modified or shelved.

Nothing threatens the rain forest as much as poverty and ignorance. Some 20 mil-

lion people live in the Brazilian Amazon region, most of them very poor. We must offer these people a lifestyle better than hacking and burning. That is what *Avança Brasil* seeks to do, by steering development toward the appropriate and sustainable use of each individual area through correct zoning.

Vast regions will be left untouched, as nature and Indian reserves. Others are appropriate for sustainable harvesting of forest prod-



Life in the Brazilian Amazon—what changes are in store after implementation of development programs such as *Avança Brasil*?

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ucts. And some areas, but certainly a minority, are appropriate for agriculture. Laurance *et al.* rightly advocate intensive rather than extensive agriculture, favoring "high-value agroforestry and perennial crops," but they do not mention that various programs within Avança Brasil promote exactly that. Others foster biotechnology, ecotourism, and integrated local development, and dozens of programs in education, health, and sanitation seek to break the poverty circle.

Yes, the plan includes paving some existing highways, but no new ones will be added. And wherever possible, we will develop waterways rather than highways, because the environmental impact is much lower. Natural gas will replace oil-fired energy, thus reducing pollution and the demand for new hydropower, and projected dams are designed to minimize reservoir size and impact.

We are satisfied that the general directions proposed in Avança Brasil offer the best way forward. Nevertheless, we will continue to welcome and encourage the critical, informed participation of the Brazilian and international scientific com-

munities in the awesome challenge and responsibility implicit in planning the development of the Amazon.

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Discussion of the Policy Forum "The Future of the Brazilian Amazon" continues online in *Science's* dEbate.