

National Institute of Science and Technology for the Environmental Services of Amazonia – SERVAMB

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Main Research Topics

- 1.) Modeling of deforestation, with data collection on the behavior of actors living on deforestation frontiers through interviews and remote sensing. Simulations use the AGROECO model in the DINAMICA-EGO software. Studies include the effect of protected areas (including leakage), and the effect of migration that is expected to increase due to planned highways.
- 2.) Greenhouse-gas emissions (both current and potential) due to deforestation and other land-use changes.

3.) Forest fires as sources of greenhouse-gas emissions.

Summary of Results Obtained

Despite INCT-SERVAMB having only received its first financial resources from CNPq in June 2010 (and nothing has been released yet from FAPEAM), the group has been producing results on the INCT's research themes of using funds from collaborating projects. Results include the following:

- 1) Interviews with deforestation agents in the region of Apui, an area in the southern part of the state of Amazonas that has only recently been incorporated into the "Arc of deforestation," indicate that the advancement of cattle ranching is explained largely by investment coming from urban or external sources instead of agricultural or ranching production activities. The expectation of speculative profits apparently plays an important role.
- 2) Modeling of deforestation in southern Roraima indicates that the proposed reconstruction of the BR-319 Highway (Manaus-Porto Velho) would lead to a substantial increase in forest loss due to migration of deforestation agents from Rondônia. These impacts in central and northern Amazonia, which are outside of the zone officially considered to be the "area of influence" of the proposed highway, would exacerbate the environmental impact of the road.
- 3.) Protected areas have an important effect on halting deforestation. Although "leakage" occurs (i.e., the shifting to other locations of part of deforestation that would have occurred inside the protected area in the absence of legal protection), reserves have functioned as significant barriers to prevent the advancement of deforestation frontiers in Brazilian Amazonia.
- 4.) Greenhouse-gas emissions from land use and land-use change in the Amazon continue to make a significant contribution to global warming today, and the potential for future emissions is great because of the large stocks of carbon in the region's vegetation and soils.
- 5.) Forest fires pose a risk to carbon stocks in the forest. The probability of fire could increase substantially as a consequence of increased frequency of droughts originating from El Niño (1997/98) and the Atlantic (2005), leading to emissions of much greater quantities of greenhouse gases.

Main Publications

Fearnside, P.M. 2010. Consequências do desmatamento da Amazônia. *Scientific American Brasil Especial Biodiversidade*, pp. 54-59.

Fearnside, P.M. 2010. Tropical Forests of Amazonia. [Impacts of climate change] pp. 104-112. In: S.H. Schneider, A. Rosencranz, M.D. Mastrandrea & K. Kuntz-Duriseti (eds.) *Climate Change Science and Policy*. Island Press, Washington, DC, U.S.A. 522 pp

Fearnside, P.M. 2010. Tropical forests. [Mitigation of climate change] pp. 484-493 In: S.H. Schneider, A. Rosencranz, M.D. Mastrandrea & K. Kuntz-Duriseti (eds.) *Climate Change Science and Policy*. Island Press, Washington, DC, U.S.A. 522 pp.

Fearnside, P.M. nd. Interdisciplinary research as a strategy for environmental science and management in Brazilian Amazonia: Potential and limitations. *Environmental Conservation* (in press).

Pueyo, S., P.M. L.A. Graça, R.I. Barbosa, R. Cots, E. Cardona & P.M. Fearnside. 2010. Testing for criticality in ecosystem dynamics: The case of Amazonian rainforest and savanna fire. *Ecology Letters* 13: 793-802.

Soares-Filho, B., P. Moutinho, D. Nepstad, A. Anderson, H. Rodrigues, R. Garcia, L. Dietzsch, F. Merry, M. Bowman, L. Hiss, R. Silvestrini & C. Maretti. 2010. Role of Brazilian Amazon protected areas in climate change mitigation. *Proceedings of the National Academy of Sciences*. Doi:10.1073/pnas.0913048107.

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Photos



Photo 1 – Advancement of deforestation in settlements in the southern part of the state of Amazonas.



Photo 2 – Large ranches in the southern part of the municipality of Lábrea, Amazonas.



Photo 3 – Cattle pasture advances on forests in the southern state of Roraima, region where deforestation should increase due to migration event that is linked to the Arc of deforestation by the proposed reopening of the BR-319 Highway (Manaus-Porto Velho).



Photo 4 – Dead tree and associated invasion of bamboo as a result of fires in Acre during the drought of 2005. This is climatic phenomenon whose frequency is expected to increase considerably in the coming decades due to global warming if emissions continue without limitations.