OXFORD UNIVERSITY NEWS RELEASE: Dieback of Amazon rainforest

Oxford University News Release: Embargoed until 10PM Monday 9 February

Study assesses whether climate change will kill the Amazon rainforest

The dieback of the Amazonian forests caused by climate change is not inevitable but remains a distinct possibility, according to a study led by the Professor of Ecosystem Science at Oxford University. The study, published in *Proceedings of the National Academy of Sciences*, is a detailed examination of the climatic and ecological evidence of the likelihood of an Amazon dieback. The researchers conclude that the fate of Amazonian forests will critically depend on the interaction between global climate change and local deforestation and fire use. The study suggests direct intervention to maintain the forest is needed to minimise the risk of a 'tipping point' or dieback occurring.

The study analysed the simulations of 19 Global Climate Models, comparing them with climate observations from the 20th century, and found that almost all the models under-estimated current Amazonian rainfall. This underestimation occurs because climate models are unable to capture some of the peculiar features of the geography of South America.

The researchers then corrected for this underestimation of rainfall, and found that most models suggested that Eastern Amazonia was likely to shift towards a more seasonally dry ('monsoonal') climate rather than a dry 'savannah' climate. This suggests that Amazonia would remain wet enough over the year to sustain a forest although some models suggested a large reduction in rainfall was still a possibility. The study then examined recent ecological field studies that have explored how Amazonian forests respond to seasonal drying. Critically, these seasonal forests may be fairly resilient to occasional drought, but are likely to be more vulnerable to fires. The study warns that these areas will become tinderboxes if deforestation, logging and heavy fire use is not controlled.

Lead author Professor Yadvinder Malhi, from the Environmental Change Institute at Oxford University, points out: ' Forest protection within Eastern Amazonia could play a major role in minimising the prospects of major dieback, while also contributing to tackling global climate change. Forest cover will help Eastern Amazonia adapt to climate change by helping maintain local rainfall in the dry season, limiting the spread of fires and stopping surface temperatures rising too high. This will help people living in the local towns and cities as well as the forests themselves.

He added: ‘ Even with sufficent funds and willpower, the implementation of ‘Biosphere Management’ on such a scale will be a huge challenge. Brazil has recently announced an ambitious plan for slowing down Amazonian deforestation and deserves full international support. It will be critically important to understand the local and national social, political and economic context if this strategy is to succeed. We urgently need to protect one of our planet’s most important ecosystems and at the same time mitigate against climate change.

‘It must be remembered that the fundamental way to minimise the risk of Amazon dieback is to control greenhouse gas emissions globally, particularly from fossil fuel combustion in the developed world and Asia. However, active forest protection in the Amazon forest region can help the region adapt to climate change and minimise the risk of a dieback. This strategy will also contribute to the global effort to reduce greenhouse gas emissions.’

The research was led by Oxford University in collaboration with the School of Geosciences, University of Edinburgh; Centre for Ecology and Hydrology, Wallingford, Oxfordshire; Department of Animal and Plant Sciences, Sheffield; and the Met Office Hadley Centre, Jointcentre for Hydro-Meteorological Research, Wallingford.

For more information or to arrange an interview, please contact the University of Oxford Press Office on 01865 280534 or email press.office@admin.ox.ac.uk

Notes for Editors:

*The paper ‘Exploring the likelihood and mechanism of a climate-change induced dieback of the Amazon rainforest’ by Yadvinder Malhi et al will be published in the online Early Edition of PNAS at www.pnas.org in the week commencing Monday 9 February 2009.

* This study used the Intergovernmental Panel on Climate Change AR4 Global Climate Models, that run over the 20th and 21st centuries under the medium-high range Special Report on Emissions Scenarios.

* Profile of Professor Yadvinder Malhi

* The Environmental Change Institute is a research centre within the School of Geography and the Environment. For more about the School, go to www.geog.ox.ac.uk

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