

The Amazon forest ■ By Thomas E. Lovejoy

## Let it rain

WASHINGTON

**T**wenty-five years ago, the Brazilian scientist Eneas Salati demonstrated that the Amazon forest makes half its own rainfall. The discovery has been partly obscured by the immense biological value of the great forest. Today what once seemed somewhat esoteric is central to the very welfare of much of South America.

The mechanism is relatively simple. As air moves toward the Andes, moisture originally drawn from the ocean falls as rain and is then transpired by the trees and evaporated off the complex surfaces of the forest.

Further to the west it condenses into clouds and falls again as rain. Today we know that this cycle is not only of national interest to the Amazon countries and their forest. We know that 40 percent of the rainfall in the rest of Brazil comes from the Amazon, as do important portions of the rainfall for all countries east of the Andes that lie south of the great forest.

For Brazil this is critical both for agriculture and for hydropower. The great moisture machine also has connections with other parts of the world's climate.

It has been obvious from the beginning that deforestation could at some point cause this hydrological cycle to unravel.

Today, we also know that El Niño is not some local phenomenon off the Peruvian coast, as was once believed, but that it can reach across the continent to create strong droughts, as it did in 1997.

Last year we further learned that changes in the Atlantic circulation — perhaps in a preview of climate change — could create Amazon drought as well. Indeed, 2005 was the driest year in the recorded history of the basin. It looks like 2006 may be a repeat.

The conclusion is obvious: The Amazon must be managed as a system so that it can withstand the possibility of all three independent drying factors occurring simultaneously. The question is how close

the Amazon is to the tipping point of the degradation of the hydrological cycle.

With the deforestation of the Amazon in Brazil (the only country with adequate measurement) at 17 percent to 18 percent and progressing at a rate approaching 20,000 square kilometers a year, plus substantial deforestation in other Amazon nations, it must be very close. It makes no sense to discover the point by tipping it.

The solution lies partly in political will, especially on the part of Brazil, but also other Amazon nations.

Fortunately the Amazon Cooperation Treaty already exists and provides an appropriate and indigenous mechanism. It will require adequate financial resources for on-the-ground implementation. And, again fortunately, a convenient approach already exists in the carbon markets emerging to address greenhouse gases and climate change. These could be extended to include natural forests as well as plantation forests and reforestation.

Globally, greenhouse gases



Sasha Meret

from deforestation and burning amount to roughly one-fifth of annual emissions, and Brazil, a leader in alternate energy sources, is actually in the top five emitting nations when gases from forest burning are included. The numbers are less well known for other Amazon countries.

Many of the details need to be worked out — whether the controls should be voluntary or mandatory, whether the credits should be temporary or permanent, and so forth. But these are details.

By providing income to forest holders that can be used in ways that don't affect the carbon content, carbon markets could go a long way toward generating the necessary political will.

Above all, it would protect the Amazon moisture cycle and all that it does for the well-being and economies of South America to the south of the great forest.

*Thomas E. Lovejoy, president of the Heinz Center for Science, Economics and the Environment, has worked on Amazon science and conservation since 1965.*