

Janet Raloff reports from the Conference on Tropical Forest Conservation, at the National Zoological Park in Washington, D.C.

Pressures on Central American forests

In recent decades, Central America's population has been growing as fast as Africa's, according to James D. Nations, research director of the Center for Human Ecology in Austin, Texas. At current rates, the region's population will double within 24 years. And that portends further ecological destruction in this area, Nations says, because "population expansion is most rapid in low-lying tropical forest regions, where soils are generally poor in quality and where most of the region's remaining forest resources are located." While reducing population growth must be a long-term goal, Nations believes that this, in itself, won't be sufficient to save the region's remaining trees. Existing populations are already large enough, he says, to easily wipe out Central America's remaining tropical forests. And over the next 30 to 50 years they will, he says, unless they are given political and economic incentives to reduce further forest exploitation.

One short-term step to conserve the remaining forests, he says, is to create more and larger national parks, wildlife reserves and biosphere reserves. "Creating and protecting these reserves is the only certain way we have of knowing that there will still be something left to conserve in this region 30 years from now," he says. But even the parks and reserves will not survive if the long-term pressures contributing to deforestation are allowed to continue, he maintains.

One of the most important of these pressures "continues to be the expansion of the beef cattle industry in tropical lowlands," says Nations. Since U.S. consumers and their pets eat 25 percent of all beef produced in Central America, Nations believes that they can and should take some of the responsibility for the continuing deforestation there. Knowing the country of origin of the meat they eat and avoiding purchases of meat from areas where cattle raising threatens forests might be a first step, he says. (At present, it's difficult, if not impossible, for individuals to obtain that information.) "An even more important step," he says, "is to maintain pressure on the multilateral development banks [like the World Bank] and commercial banks to stop subsidizing the region's beef cattle industry."

Another important deforestation pressure — perhaps the most serious, Nations says — is the slash-and-burn practice of peasant farm families who migrate into forests (generally illegally, many as economic refugees) on newly bulldozed roads. Since these people rarely get agricultural extension services and the financial support they would need to farm these soils continuously, weeds, pests and soil erosion force them to periodically clear more forest. By mid-1985, an estimated 16 million peasants were attempting to farm tropical forests in Central America and southeast Mexico. And every year, their numbers grow. This pressure can only be alleviated, Nations says, by developing methods for increasing farm yields with techniques that do not further degrade these already poor soils.

Getting into the spirit of ecology

History shows that indigenous Indian cultures generally have had the best record of developing sustainable agriculture while conserving fragile tropical soils. But translating their recipes for success into something others can adopt often takes more than skilled linguists, according to Darrell A. Posey of the Universidade Federal do Maranhão in São Luís, Brazil. His decade-long study of the Kayapó in Brazil's Amazon Basin indicates that "they use language differently than we do," because their "science" is not objectively divorced from spiritualism. To understand their agriculture and ecology, he says, one must first understand the function of their spirits.

Like the *Mryka ak*. This creature, believed to inhabit rivers,

lakes and streams, is known as the guardian of small fish. The Kayapó describe the beast, seen only by village shamans, as resembling a gigantic electric eel. Posey says it's not the beast's size that garners unchallenged respect so much as its reported ability to "zap and kill at a distance of 1 kilometer."

Ecologically, belief in the beast functions as a means of protecting spawning grounds and fish hatcheries, Posey says. Moreover, since *Mryka ak* is also held responsible for eroding riverbanks and changing the course of rivers, Posey says it may "function as a concept of geological change." Conceding he doesn't know what *Mryka ak* is, he says he understands why people respect it.

A second mythical creature, known as *Bepkororoti*, is described as the spirit of a shaman that lives in the sky. Killed long ago in a fight over the division of meat from a tapir, *Bepkororoti* is said to be able to return to earth and send lightning storms or disease to punish those who do not share. Since sharing is essential to the survival of a communal, agrarian society, Posey says *Bepkororoti* serves an important function. And the portions of honey and combs left out in old beehives to placate the sweet-toothed spirit allow many of the local stingless bees to recolonize their hives the following season.

This indigenous people's successful farming of poor forest soils relies on a complex web of interrelated practices — many of which might not, at first glance, appear "agricultural," Posey says. To identify the spiritual practices and social factors that function ecologically, Posey has set up a multidisciplinary Laboratory for Ethnobiology in Gorotire, the largest of the northern Kayapó villages.

To save the monarchs

Every year roughly 100 million monarch butterflies migrate from western Canada and the United States to several 5- or 7-acre patches of Oyamel fir forest in Mexico. Research shows that thinning of the forest where they overwinter modifies air temperature — making it warmer by day, cooler by night. And this is taking its toll on the butterfly colonies, says Cynthia McVay, a Washington, D.C.-based World Wildlife Fund (WWF) project officer overseeing research in this area.

"[T]he butterflies become more active during the day, losing fat and energy necessary for their long return flight north," she notes. "And at night, the butterflies run a higher risk of freezing." Since it appears that the butterfly wintering grounds and surrounding buffer zones are so highly sensitive to human disturbance, McVay believes that even limited logging in this area "must be avoided in order to protect the butterflies."

A five-year-old WWF project under the direction of Rodolfo Ogarrio is tackling the difficult problem of conserving the monarch butterfly and its overwintering habitat. The most important economic resource in the monarch wintering area is the forest. A social revolution won by small farmers early in this century yielded them a communal form of irrevocable land tenure. These *ejidatarios* who work the land are forbidden by law to sell or dispose of their property. And since the forests on it are one of their sole means of support, they have a large financial incentive to exploit it.

To save the butterfly, Ogarrio's Monarca project is seeking to develop alternative sources of income for *ejidatarios* whose land is critical to monarch survival. For example, by creating monarch tourist areas, *ejidatarios* could earn income from hotels, monarch souvenirs and tour-guide services. Other alternatives being explored include development of tree nurseries, resin production and a handicrafts industry. Finally, to compete directly with companies that now buy lumber from the *ejidatarios*, Monarca is considering development of an Adopt-A-Tree Campaign.