

# The Making of an Eco-Disaster

Despite heroic efforts, Madagascar's splendid animals and wondrous forests may be doomed



By J. MADELEINE NASH TAOLAGNARO

SLIVERY AS DRIFTWOOD AND straight as tombstones, the stumps speak of a forest but recently deceased. "Do you know what's depressing?" says botanist Simon Malcomber as he surveys the devastation. "It's that all this happened within living memory."

It is still happening, as Malcomber discovers when he hears the Missouri Botanical Garden research site on the eastern edge of the Ranomafana National Park. Across a rushing river, a farmer has just hacked down a dense stand of trees. Two years from now, perhaps three, once the soil is depleted of nutrients, he will abandon this raw rhombus of clay and slash out another swatch. Soon he will move on again, hectare by hectare, converting lush cloud forest, with its mosses, tree ferns and towering hardwoods, into sun-scorched wasteland.

This is Madagascar, where scientists are racing the axes of peasants to inventory a dwindling storehouse of biological treasures. The value of what is being lost is incalculable, for this island, adrift in the Indian Ocean off the east coast of Africa, is a geo-

logical Noah's ark. Its species of flora and fauna have been separated from the African mainland for so many tens of millions of years that they have followed unique, even bizarre evolutionary paths. In emerald forests, giraffe weevils, odd-looking insects with elongated necks, prance among the leaves while rhinoceros chameleons with bulbous horns cling motionless to lichen-flecked tree trunks. High in the canopy, primitive primates known as lemurs indulge in harmonic sing-alongs and astonishing aerial leaps. Like 50% of its birds, 85% of its plants and 95% of its reptiles, Madagascar's 32 species of lemurs—including a mouse-size animal identified only this year—can be found nowhere else on earth.

Over the next few decades, the fate of these exotic creatures will be decided by some of the world's poorest people. In dozens of remote villages with long, assonant names, a battle is being fought for the hearts and minds of Malagasy farmers, loggers and fishermen. Borrowing a page from the U.S. Peace Corps, both the World Wildlife Fund and Conservation International are funding agronomy programs, providing literacy training and hiring medics to vaccinate children and dispense information about hygiene and birth control. "What we do sounds like development, and it is," concedes Roderic Mast, who heads the effort Conservation International began five years ago. "We can't talk about saving plants and animals until basic human needs are met."

The magnitude of the problem is daunting, for virtually everything Madagascar's 12 million people do in their daily struggle against hunger can harm the island's delicate ecosystems. Throughout the south, for example, the surreal landscape of the spiny forest is being stripped of new growth by villagers' goats and zebus, the humpbacked cattle that are the measure of local wealth. The signature trees, with their swirls of thorns and succulent leaves, are being turned into planks to build houses and charcoal to fuel cooking fires. Entire groves of ancient baobabs are giving way to scraggly stands of corn.

Uncontrolled pasture fires, set to encourage regrowth, also injure the forest.

**THREATENED NATURE:** Unique chameleons, above, and spiny trees with succulent leaves are among the irreplaceable treasures



**DESPERATE HUMANS:** The forests of Madagascar are being felled by people like this ax-wielding man and sold as charcoal at roadside stands

particularly burns that take place late in the dry season when vegetation explodes like gunpowder. Even plants that are used for medicinal purposes are often gathered with hasty carelessness, pulled up by the roots or stripped of so much bark they fall prey to insects and disease.

World Wildlife Fund workers, based in the southern port city of Taolagnaro, are tackling these problems one by one. Ethnobotanist Nathaniel Quansah, a native of Ghana, for example, is working with pharmacologists at the University of Antananarivo to determine which parts of medicinally valuable plants contain the active compounds. "If we find these compounds in the leaves," he explains, "then we will try to persuade the community to spare the plant by using the leaves, not the roots."

Mark Fenn, a former Peace Corps volunteer who is the organization's technical adviser in the south, is using satellite images to map the fire damage in and around Andohahela. Armed with the evidence, he hopes to enlist the help of village leaders in bringing pasture fires under better control. The forest, he explains over and over again, is vital to human habitation. After years of drought, he observes, "everyone relates to water, and Andohahela is the water tower for the rivers of the region."

Hundreds of kilometers to the north, near a remote redoubt teeming with reptiles and amphibians, Conservation International is encouraging villagers to develop alternatives to slash-and-burn agriculture. Over the past year, several experimental projects have sprung up around the Zahamena Re-

serve, including one that aims to restore fertility to rice fields by replanting them with nitrogen-fixing legumes. The viability of tree farming is also being explored. To boost local incomes, Conservation International fieldworkers have helped establish a cooperative to which farmers can sell their rice when they need cash, then buy it back at below-market prices.

But while the idea of linking development to conservation sounds straightforward, making it work frequently proves tricky. An irrigation project built for the inhabitants of Tsimelaha, a village near Andohahela, illustrates how well-intentioned efforts can backfire. As expected, the additional water provided by the project enabled farmers to grow more rice. The problem was they sold the rice to buy more

zebus, thereby increasing grazing pressure on the forest. A plan to bring environmental education to classrooms in the region ran into an equally unexpected hitch: fewer than 40% of children attend school.

Gaining the trust of the isolated communities that ring the embattled reserves is perhaps the most difficult challenge of all, and reservoirs of goodwill that have taken months to build can easily be poisoned by promises not kept. Around the Beza-Mahafaly Reserve in the southwest, for example, projects intended to win over the village of Analafaly either were never completed, as in the case of an irrigation canal, or were carried out so poorly, as in the case of several wells, that they never functioned properly. Recently a medical team appeared at one of Analafaly's eight hamlets with the intention of vaccinating the children there. The medics arrived without notice, to the irritation of the villagers, who sent them away until Katarzyna Kubzdela, a University of Chicago graduate student they knew and trusted, explained, in halting Malagasy, the health benefits.

What lies ahead for Madagascar? Among the few encouraging developments has been the election in 1993 of a government that put an end to nearly two decades of Marxist misrule. A few conservation-minded officials, apparently realizing that their destitute country's spectacular plants and animals are among its most notable assets, have expressed interest in promoting ecotourism to generate the income needed to protect the flora and fauna. Royalties from Western biotechnology and pharmaceutical firms interested in exploring Madagascar's forests for crops and drugs could also help. The island has already given the world the rosy periwinkle, a source of compounds used to fight childhood leukemia. Still to be exploited are thousands of other plants, including 50 species of coffee, some naturally decaffeinated, and termite-resistant trees. "In an era of gene splicing," notes Russell Mittermeier, the president of Conservation International, "such resources are invaluable."

Unfortunately, there is not much time left. Madagascar has one of the highest birthrates in the world, and its population is expected to double over the next three decades, putting excruciating pressure on the shrinking supply of arable land. So many of the slopes have been denuded of trees that by 2015, scientists predict, half of what remains will be lost, leaving a vulnerable patchwork with villages in between. Efforts to save individual reserves, commendable as they are, cannot change the dismal picture. Unless a massive one to help Madagascar is mounted, and soon, some of the world's most magical forests and magnificent animals seem destined to disappear forever.