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Special Report

The Spreading Epidemic

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We're destroying the web of nature. Can we knit it back together?

The earth--and the delicate balance between humans, animals, insects, air, soil and water--is the mother of all networks. But centuries of degradation to our ecosystems are causing dramatic harm to that web of life. In the computer world Metcalfe's Law rules: The value of the network increases with the square of its membership count ([see story](#)). On the planet, scale does not always increase the value of an interconnected web.

If anything, we are the victims of what I'll call Fatcalf's Law. The more of us there are and the more we consume, the more nightmarish the megatrends we produce. Let's focus for a moment on Africa. Each year Africans consume 600 million-plus wild animals-- or 2 billion kilograms of bush meat. As the natural boundaries between humans and animals disappear, people and game share every element of their ecosystems, including the microbes that cause Ebola, Lassa fever, West Nile virus, bird flu, plague, monkeypox and AIDs. In such conditions the probability of deadly bugs hopping from animals to humans approaches 100%.

Don't think the danger is limited to Africa. Global warming is already having a very bad impact on health--everywhere.

Most scientific experts agree that a certain amount of global warming--say, between 2 degrees and 3 degrees Celsius--is now unavoidable, baked in, as it were, from the sins of the past. Even if we stopped all carbon emissions today, we would continue to suffer environmental effects for years to come. Heading down this frightening path, could we see malaria reestablished in Miami (where eight endemic cases were reported in 2003)? Or cholera in New Orleans? Or monkeypox in Manhattan? Not to mention the ever present threat of a bird flu pandemic.

Signs of catastrophe abound. The nonnative tiger mosquito, a vector for diseases including dengue, yellow fever and encephalitis, is expanding its range across North America and is set to displace more benign native species on the back of climate change. Now able to thrive at higher altitudes, malaria-carrying mosquitoes, which cause 1.5 million to 2 millions deaths a year, are about to spread into northern Europe and the highlands of tropical Africa.

Over an unknown number of years rising seas will attack coastal communities, making some regions uninhabitable and creating refugees on nearly every continent. Saltwater will contaminate drinking supplies and diminish harvests. Currently 1 billion-plus people do not have access to safe water; waterborne diseases kill 5 million a year. Roughly 1 billion people are chronically undernourished today. As the world's population approaches 9 billion by midcentury, demands on water and food supplies cannot possibly be met. Get ready for resource wars. Genocide in Darfur started out as conflict over diminishing supplies of water. Last year the Chinese government reported 85,000 conflicts, mostly over resources, in which it called in the military or the People's Armed Police.

Exacerbating the locked-in problems of global warming, humans today are straining every conceivable ecological boundary. We are displacing animal habitats, importing nonnative species when we move or travel on exotic vacations, feeding meat products to herbivores, dining on exotic predators and experimenting with animal hybridization. Increased populations of humans have led to swelling populations of animals as food sources, living in closer proximity to one another. People are living in closer quarters, too: After centuries of migration in search of work or a better living, 51% of all human beings now live in cities or slums. The green barriers that once separated humans and animals, as well as microbes peculiar to each, are

quickly disappearing.

The modern economy's advances in logistics and transportation only accelerate these frightening trends. Thanks to the ease of transcontinental travel, an unheard-of communicable disease from an animal in Africa can show up in North America. Such is the dark side of globalization. Two or three dozen newly emergent communicable diseases are lingering, ready, with a boost from Fatcalf's Law, to jump onto center stage.

What are we to do? We need to reduce population growth through education, choices and widely available contraception. We must invent better desalinization methods and prepare for a new Green Revolution with seeds that will thrive in a brackish world. The attack on climate change must dramatically increase financial flows to clean energy--particularly in the developing world, most vulnerable to the impacts of climate change. Carbon trading systems can spur this clean energy transition, as well as restore forest and agricultural lands. And we must develop an early-disease-detection-and-response system, a sort of AWACs for epidemics. That requires networked technology plus a human network of cooperative efforts by scientists, governments, nonprofit groups, businesses and ordinary people.

There is some hope. In late 2002 and early 2003 epidemiologists in Ottawa, Ont. were able to draw on such an Internet-based system to identify and help stop the spread of an outbreak of SARS (severe acute respiratory syndrome) that began in China. This particular system is a Web crawler (the Global Public Health Intelligence Network) that constantly scans multiple sources of information around the world--general media, newspapers, health alerts--in several languages. A couple of articles in China about otherwise healthy people falling ill from unknown diseases scooped official reports by weeks or months.

Today we have even better electronic trolling services. Google has invested billions of dollars in search capacity. The company is providing these tools to a consortium of disaster-response organizations to provide earlier detection and coordinated response to pandemics and other disasters.

Here's something else that will assist with early warnings. New features of the International Health Regulations, which go into effect in June, for the first time permit the World Health Organization to accept reports of new diseases, and new cases of old diseases, from sources other than government officials. This is big. It will allow scientists like Nathan Wolfe--a professor of epidemiology at UCLA who has spent most of the last five years in Cameroon establishing a network of hunters to supply blood samples from themselves and the animals they eat to check for new viruses--to report quickly any novel animal diseases. Even more critically, the new regs empower ordinary people to notify the right authorities, without getting snarled in politics, commercial interests or bureaucracy.

Help, at last, may be on the way for the mother of all networks.

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