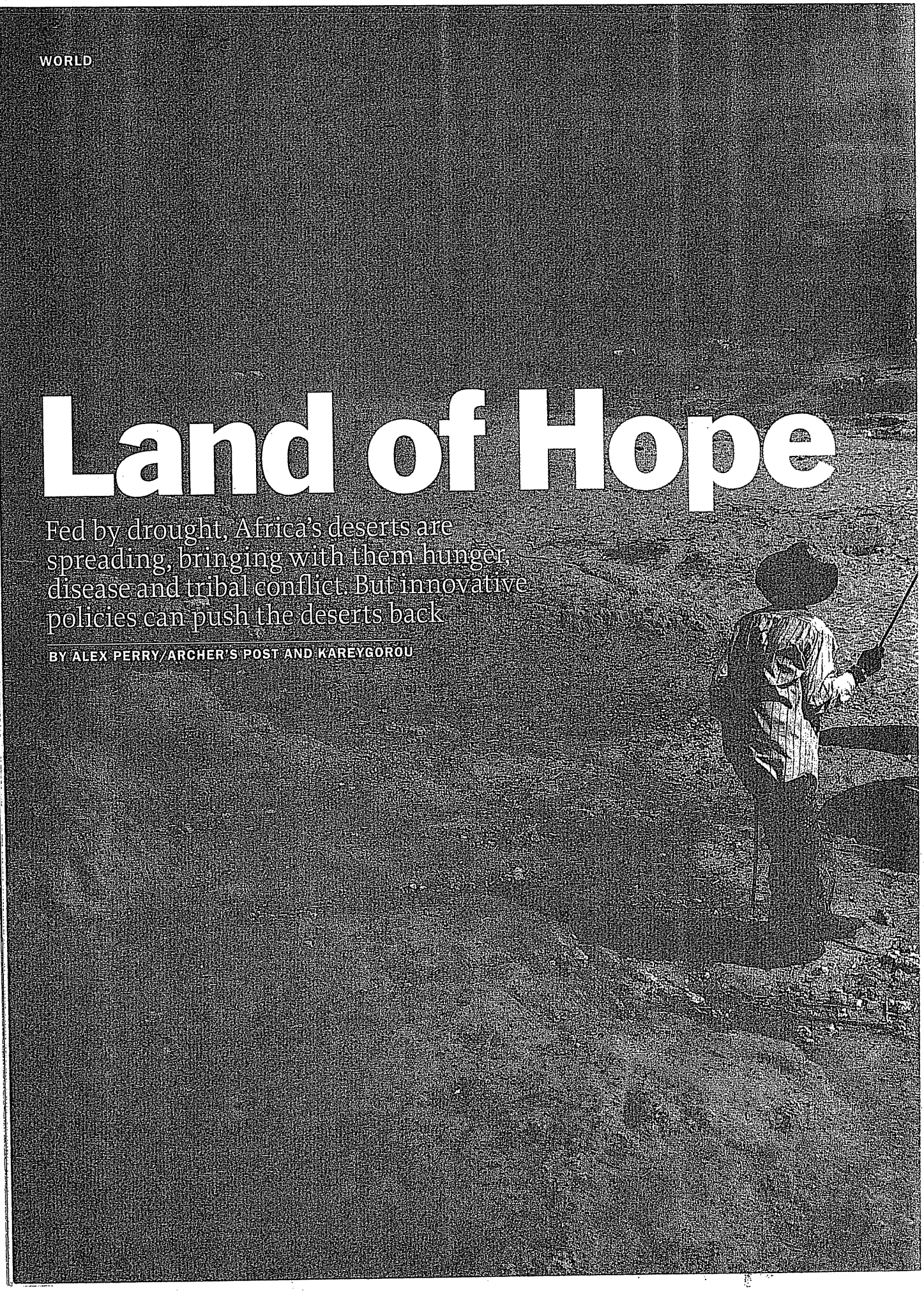
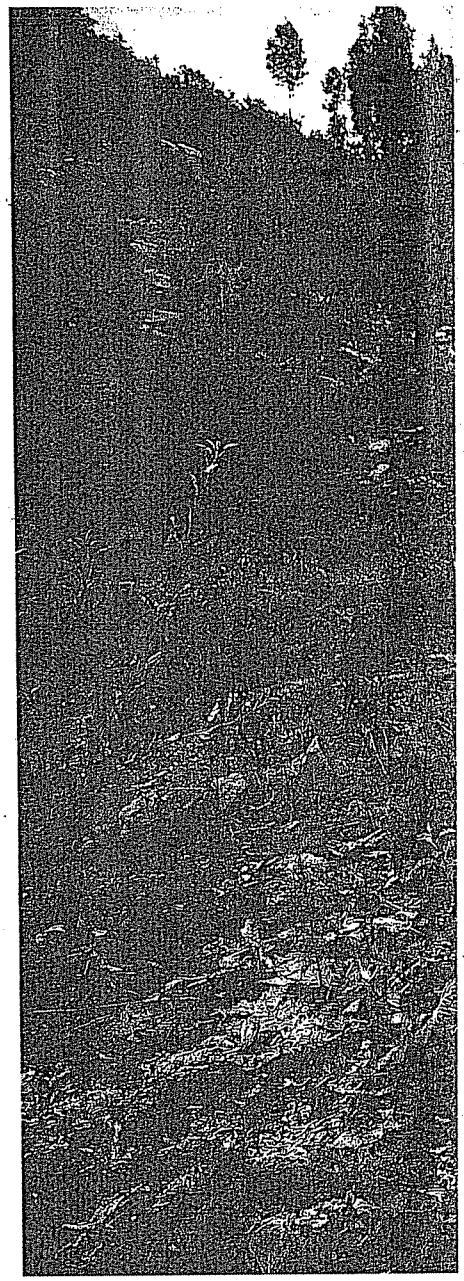
Land of Hope

Fed by drought, Africa's deserts are spreading, bringing with them hunger, disease and tribal conflict. But innovative policies can push the deserts back

BY ALEX PERRY/ARCHER'S POST AND KAREYGOROU





HEAD NORTH FROM NAIROBI TOward Mount Kenya and almost invariably you'll hit weather. Fog, rain, hail, even snow, all unusual for the equator but a blessing for Mount Kenya's farmers, who export coffee, roses, green beans and peas to Europe. Once you pass the mountain and descend onto the dusty Samburu plain, however, the weather evaporates. The first town you reach is Archer's Post, a collection of dusty shacks around a truck stop. From here, says elder Leadisimo Lehgalee, 69, the Samburu are forced to watch the daily deluge over Mount Kenya while enduring a drought on their land that began in 1997. Inevitably, jealousy and desperation turn to enmity. "We rob them," says Lehgalee. "And they rob us back. We raid each other's cattle, and we fight, we kill, and we die. That's the Samburu life."

The urge to appropriate what's on the other side of the fence rules much of the Sahel, the belt of scrub and semidesert that runs across Africa between the Sahara to the north and the plains to the south. The wars in Darfur and Somalia and between northern and southern Sudan all have roots in tribal competition for land and livestock. In northern Kenya, scores die every year in clashes over watering holes and cattle. And if all that weren't enough, lately the Sahara and the Sahel have attracted a new fearsome breed of outsiders, such as al-Qaeda and South America's cocaine cartels, who use the lawless wastes as sanctuaries and smuggling routes.

Africa's deserts, in short, are all kinds of dangerous. And climate change means the badlands are growing. The U.N. Food and Agriculture Organization says that on the southern edge of the Sahara, an area the size of Somalia has become desert in the past 50 years. The U.N. Environment Programme (UNEP) says 14 African countries currently experience water scarcity or stress, a number that will rise to 25 by 2025. In a May 2008 report, the U.N. Convention to Combat Desertification (UNCCD) said 46% of Africa is threatened by land degradation. UNCCD executive secretary Luc Gnacadja concluded that desertification is "the greatest environmental challenge of our times."

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The coming climate crisis will have a massive human cost. The Intergovernmental Panel on Climate Change (IPCC) says that by 2020, "agricultural production, including access to food, in many African countries is projected to be severely compromised." The effects of climate change, including rising sea levels and flooding as well as droughts and desertification, would put at risk of hunger 80 million to 120 million people, of whom 70% to 80% would be Africans, according to the IPCC. Food prices are likely to rise, and with them poverty and disease: mosquitoes and locusts thrive as temperatures go up.

As Samburu's neighbors know, tough places produce desperate, angry people. Unlivable places produce refugees. In a May 2005 study, Oxford and Duke University environmentalist Norman Myers calculated that there were 16 million "environmental refugees" in Africa in 1995 and predicted that number would double by this year. In April 2007, 11 former U.S. admirals and generals described a warming world as a "threat incubator" in a report for the think tank CNA Corp. The same month, the U.N. Security Council held a debate on how climate change can start wars.

That's the gloomy consensus: Africa, beset by conflict, hunger and disease, is being hit by a new disaster that combines them all—though Africa produces just 2% of global emissions. For some, that's a call to action: African governments will make desertification a key issue at the annual global Climate Change Conference, held this year in Cancún, Mexico, Nov. 29 to Dec. 10. For many, it's just more confirmation that Africa is a very sorry place. But for a few, that's plain wrong. They argue, paradoxically, that climate change may be the chance Africa needs.

Threat into Opportunity

ECONOMISTS HAVE A WORD FOR CLIMATE change: *externality*, meaning a by-product of economic activity not included on the balance sheet. It can be positive (a beekeepers' bees pollinating neighboring crops) or negative (pollution from a power station). If the beekeeper doesn't charge for pollination or the energy company doesn't pay a pollution tax, the price of honey or power does not reflect its true benefit or cost. Climate change is the mother of all negative externalities.

The problem is measuring it: How do you calculate the cost of climate change and then apportion it fairly among the world's businesses? Skeptics say rich governments and Big Industry can't or won't. Some, like Nicholas Stern, who produced the British government's *Review of the Economics of Climate Change*, say it can be done. But Stern's figures—which show that climate change could cut global gross domestic product by 20% if quick action is not taken—have been criticized as both over- and underestimates. And others argue that since climate change most affects the poor, programs to lift the developing world are the best way to fight its impact.

But what if the externality could be accounted for, in a way that helped the poor? What if the economic rule book could be

Flourish *In Tigray, Ethiopia, nuns tend to a garden as part of the government's regreening scheme*

DOMINIC NAHR—MAGNUM FOR TIME

rewritten so that fighting climate change *became* development? Pavan Sukhdev, a Deutsche Bank economist working with UNEP, is doing just that—or rather, as Sukhdev prefers to describe it, he's "rediscovering" some long-lost economic principles. In the 20th century, he says, two bad assumptions crept into the dismal science. The first was that public goods—things we consume together, like clean air and sewage-free seas—were subordinated to private goods, like cars and iPods, which are consumed individually. Second, we assumed natural capital like trees, grasslands, wind, sunshine, water and soil had no value because it was mostly free; we also assumed it was not as good as industrial capital at creating wealth. "Guess what," says Sukhdev. "That's some pretty bad economics." To make his case, he cites an effort to remove imported water-intensive plants from a drought-stricken part of South Africa; the project restored the water table, revived farming and gave paid work to hundreds. He also points to environmental activist Wangari Muta Maathai's Nobel Prize–winning tree-planting project on Mount Kenya, which improved farm productivity by boosting soil quality and water retention.

As a result of works by Sukhdev and others, UNEP executive director Achim Steiner can measure the financial benefits of saving the planet. New assessments indicate that "nature may represent between 50% and 90% of incomes in the developing world," he says. "In the past, these services have been invisible or near invisible in national and international accounts. This should and must change."

Two global agreements aim to put that right. The Clean Development Mechanism (CDM) allows developed-world businesses that need to offset their pollution to buy certified emission reductions, or carbon credits, to fund the reduction or sequestering of carbon dioxide in the developing world. The Reducing Emissions from Deforestation and Forest Degradation program (UN-REDD), launched in 2008, allows polluters to pay developing-world farmers to keep their trees, which store carbon dioxide as they grow. UNEP is working with scientists in Kenya, China, Niger and Nigeria to quantify how much carbon each ecosystem swallows—comparing the appetite of a rain forest with, say, that of a mangrove swamp—and when completed in 2012, those formulas will determine how much to pay each landowner. The UNEP's Steiner says "farming carbon" this way is far cheaper than new technology to capture and store carbon dioxide emissions at their source.

Estimates of how much the new market is worth vary wildly. The World Bank says carbon sequestration could be worth $1.5 billion a year to Africa, while Sukhdev reckons UN-REDD will be worth an eventual $30 billion to $110 billion a year globally. Manfred Kern of agritechnology company Bayer CropScience argues that the potential for monetizing natural assets is almost infinite. There is no reason, he says, that what works for trees should not also work for earth. "For the urbanized world, soil is just dirt, mud," Kern told a U.N. conference in Bonn in May 2008. "But soil is the source of our food, the very future of humanity. We must recognize that soil has a value higher than gold." What is clear is the potential. "It is essential that climate change be viewed as a major development opportunity for Africa," World Bank managing director Ngozi Okonjo-Iweala said last year.

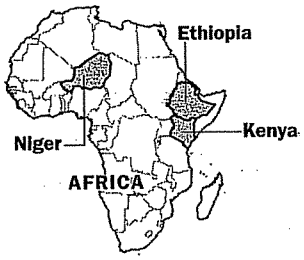
And this is primarily a developing-world opportunity for two reasons. First, the poor world tends to be rich in things like forest and sunshine. Second, the rich world has few incentives to change its ways. "Suddenly there is the possibility of a whole new green trajectory for Africa," says UNEP spokesman Nick Nuttall. "You might ask, Can combatting climate change actually offer a new future for Africa?"

That dream is certainly firing some extraordinary ambitions, like Liberia's plan to become the first nation powered entirely by biomass. Since CDM became operational in 2005, work has begun on 2,510 projects funded by an annual $394 million in carbon credits—a slow start, though the U.N. expects 6,000 projects funded by $2.9 trillion by the end of 2012. And while most CDM projects initially went to Asia, Africa is catching up: the U.N. expects 245 African projects worth $440 million by 2012.

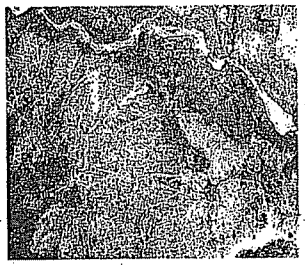
That's still a long way from greening a continent. The question of whether green development becomes an African norm hinges on whether it works for companies and business leaders. That means Africa's farmers: 7 out of 10 Africans live on small farms. Unexpectedly, scientists are finding that it is those farmers who offer some of the best reasons for hope.

The View from the Desert's Edge

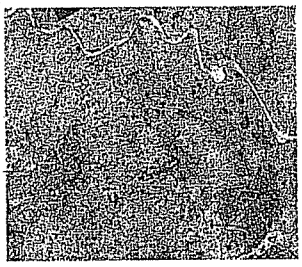
THE FIRST CLUE THAT SOMETHING EXtraordinary is happening to Niger comes on the approach flight to the capital, Niamey. As you drop altitude through the brown haze that fills the air, shapes begin to appear on the desert floor below, stretching in ordered rows to the horizon. At a few hundred feet, it becomes clear that they are the shadows of millions of trees.



Good Growing. Regreening projects around Africa have brought millions of acres of land back to life



1975 An aerial photograph of Galma, a village in central Niger, shows swaths of dry land and very little greenery



2005 Thirty years later, the same area is covered with trees, 15 to 20 times as many as before

For University of Amsterdam environmental researcher Chris Reij, returning to Niger in 2004 after a decade's absence was "quite a surprise." In areas that used to be completely barren, where you could see villages miles away, "suddenly the view was blocked with green." Farmers were digging holes and ditches shaped like crescents and square brackets and erecting low fences out of stones, deadwood and brush to catch drifting soil. These keep the dirt stationary long enough for it to catch water and insects, germinate seeds, allow the farmer to add manure—and gradually become small, narrow fields. Into them farmers plant tough desert trees—like the faidherbia albida, a type of acacia—that fix nitrogen into the soil.

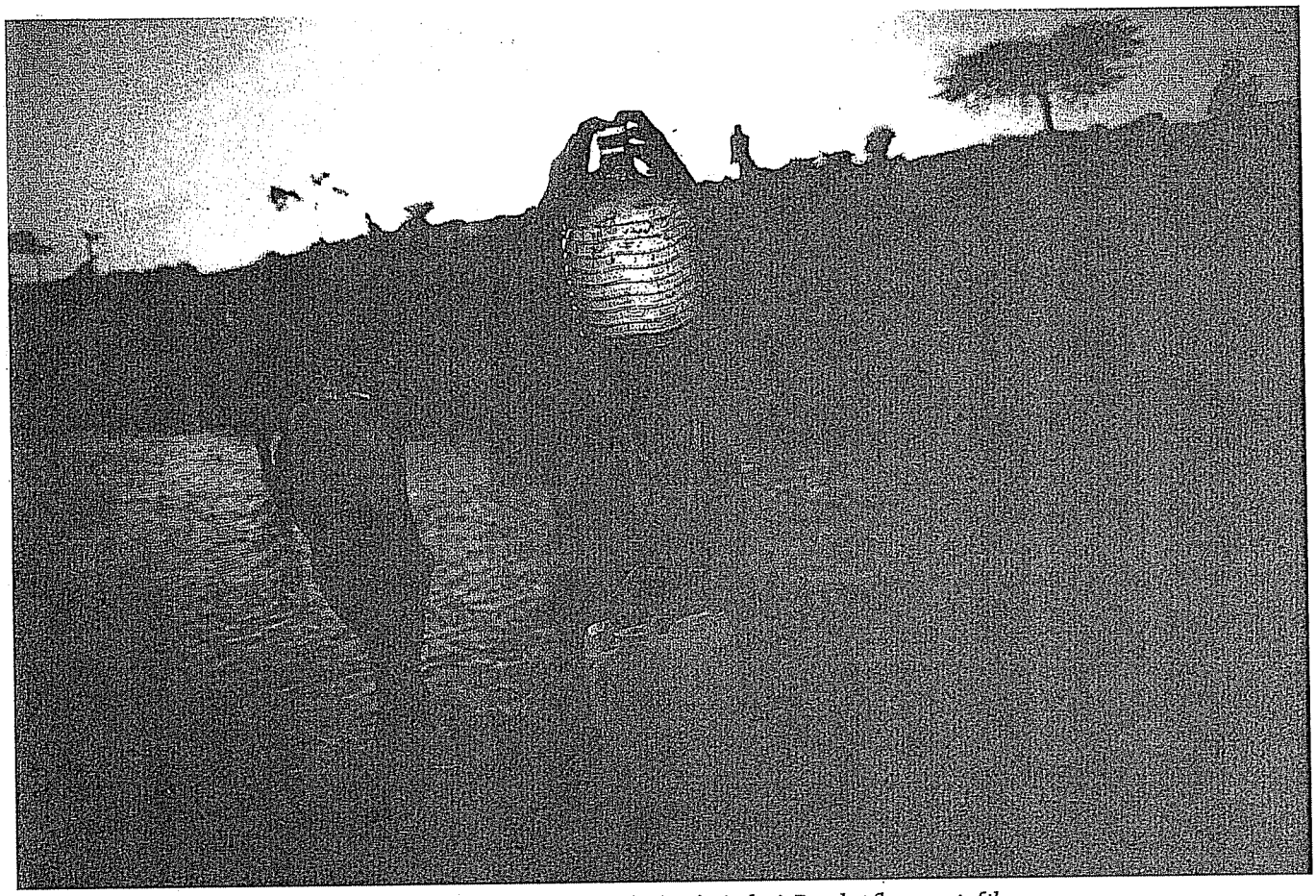
Since work began on them in the 1970s, the fields have grown. Some have become woods. Instead of being sucked downward into the spiral of desertification, they have kick-started a new, virtuous cycle of life. Grassland and trees trap the desert. Fruits and vegetables grown in their shadow provide food for people and animals. Rainfall has increased. Hunger has fallen.

The implications for desertification and global warming are immense. Reij cautioned himself not to get carried away. "I thought maybe they had regreened a few hundred, perhaps 1,000 hectares [2,470 acres]," he says. In August 2005 he asked the U.S. Geological Survey to take some satellite images of Niger, then compared them with ones from 1975. "They'd regreened 5 million hectares [12 million acres]," says Reij. "That's 200 million new trees—20 times the number that had been there before—producing 200 million euros [$270 million] of value that feeds an extra 2.5 million people. It was the biggest environmental transformation in Africa."

What had prompted this renewal? Fighting climate change. Long before that term was commonplace, long-term weather changes were wreaking havoc in Africa. The National Center for Atmospheric Research in Boulder, Colo., has tracked half a century of declining rainfall on the continent. Although unusually good rains shielded an expanding population in the early 1960s, in 1968 came a drought that lasted until 1974. More than 100,000 people died.

The first and most immediate effect was conflict. Military men, accusing their governments of an inadequate response, seized power in Burkina Faso, Ethiopia and Niger and attempted several coups in Mali. Another was mass migration, from the Sahel to greener countries to the south, such as Nigeria and Ivory Coast. A third was an injection of foreign aid, like a $100 million Italian project to build dams and wells and plant 18 million trees in 1.2 million acres of the Keita Valley in Niger.

With nothing like the kinds of resources that international aid organizations have, Niger's new rulers initially tried environmentalism by decree. They renamed Independence Day, Aug. 3, Arbor Day and ordered every citizen to plant a tree on the anniversary. Then they tried green economics. In 1993 the state began allowing farmers to own, buy and sell their land. Farmers could now plan on long-term returns; years of labor on a ditch, known in Niger as a *zai*, became not just socially worthwhile but personally profitable. Reij says each rescued hectare brought in annually an extra $70 for every person working the regreened land, a huge boost in a country where per capita income is $185. Farmers who previously harvested one crop from every four sowings



Thirsty work *Children collect water from the Ewaso Nyiro River, the only river in Archer's Post that flows most of the year*

were now reaping each time they planted and even began buying new patches of desert to rehabilitate and expand their fields.

Today Niger is one of the world's foremost examples of a green economy. Fighting climate change in Niger *is* development. Trees, soil and water have been reinstated as capital. Conflict between farmers and herders is down 80%, says Reij. And all this without dependence on schemes such as CDM or UN-REDD. Which means, as Reij says, "most of it didn't cost anything."

Inspired by Niger's example, Reij turned advocate with a campaign called the Sahel Re-Greening Initiative, spreading the word of how ditches and fences can beat back the desert. There are other regreening projects under way in Mali and Burkina Faso. An 18-year project in Tanzania's Shinyanga region, just south of Lake Victoria, has seen 860,000 acres replanted, making 2.8 million people about $170 a year better off, according to a study by the International Union for the Conservation of Nature. In the northern Ethiopian district of Tigray, the government has directed the regreening of 2.5 million acres, plans to add 618,000 more each year and is exploring the possibility of also introducing private land ownership, as in Niger. Reij's collaborators are also spreading the word as far away as Nepal, Namibia and Australia. What so impresses the delegations he takes to Niger, says Reij, "is the scale of it. It inspires you. You can't help but learn a lesson."

Change will not come easy. Across the Sahel, persuading farmers to give up herding cattle between ever decreasing water holes to work on the land will take a cultural transformation. "We eat meat, blood and milk," says Samburu elder Lehgalee. "The grass is going, and the cows are dying, but it's our way." In Niger, the desert still eats 195,000 to 250,000 acres of land per year. Two consecutive poor harvests in 2009 and 2010 prompted an international emergency operation to feed 4.3 million people, though on a visit in November, Reij found the crisis had spared farmers taking part in the regreening. "Their trees have become like something we keep in the freezer," he says. "A lifeline to prune and sell for money to buy food in the bad years."

'There is the possibility of a whole new green trajectory for Africa ... Can combatting climate change actually offer a new future?'
—NICK NUTTALL, UNEP

The consequences can be startling—and heartening. Moussa Sambo, 57, is chief of Kareygorou village, outside Niger's capital. He admits he used to think life would never be any better. "For years I watched the wind sweep the soil and sand off our land and into the river," he says. Then seeing the success neighboring farmers were having with *zai*, he set his village to work. Crop yields went up. The village diversified from maize and sorghum into jatropha for oil, and pigs, ducks, goats and chickens. The young men who had left to work in Togo or Benin returned home.

Kareygorou's farmers now have enough surplus food and cash crops like wood to see them through poor rains. Sambo, who had resigned himself to watching his village die slowly, now finds that he is presiding over not only its revival but the greatest prosperity it has ever enjoyed. "We stopped the desert," he says, "and everything changed." ■