

10 Desertification

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☞ Desertification is among the most misunderstood—and the most neglected—of the world’s global environmental challenges. Images of irrepressible waves of sands overwhelming civilization are not entirely fictitious. Indeed, the spectacle can be witnessed every day from the Sahara to China; frequently, natural phenomena can lead to desertification.¹ For the most part, however, desertification refers to the much less dramatic but far more pernicious steady decrease in land productivity that takes place in drylands. It is important to emphasize another misconception. Although they may contain productive oases or river valleys, true deserts (arid and hyper-arid lands) are typically *not* the areas in which desertification on a large scale takes place. Rather, it is in the semiarid and subhumid drylands that receive low, often seasonable rainfall and support soils with modest organic content, where the relatively low-land productivity may decline even further.

When the nations of the world finally negotiated a treaty to “combat” desertification in 1994, they defined the phenomenon as “land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities.”² A higher resolution definition put forward by the United Nations Environmental Program (UNEP) characterizes desertification by five processes that damage land productivity: (1) vegetation degradation, (2) water erosion of soils, (3) wind erosion soils, (4) soil salinization, and (5) soil compaction—in the drylands. Natural shifts in climate or meteorological proc-

esses can surely contribute to these processes. For example, geologists believe that the change in wind directions after the Holocene period replaced the plentiful deposition of Sahara loess in Israel's Negev Desert, with smaller quantities that arrived from Saudi Arabia. With replenishment diminished, loss of soil due to natural erosive processes was inevitable.³ But generally desertification refers to the loss of soil productivity that is driven by such anthropogenic activities as deforestation, overgrazing, or poorly considered water management.

There is nothing new about these activities. Farmers have been aware of the vulnerability of their lands to human abuse and of phenomena like irrigation waterlogging, soil salinization, or rill and gully erosion from time immemorial. And the ancients were not without effective responses. The Old Testament is full of stories that refer to the importance of imposing stock limits in rangelands (as in the pasture distribution between Abraham and Lot) or normative prescriptions, such as the requirement of crop rotation and sabbatical years for soil rejuvenation.⁴ Their terraces still define the gnarled landscape of Israel. Although it is not clear that the farmers of old were fully cognizant of desertification processes when adopting such practices, and their implementation alone cannot guarantee the prevention of desertification, they can meaningfully contribute to sustainable land management. Jared Diamond, a Pulitzer Prize-winning ecologist, described the process that undermined many a civilization in the ancient Near East: "Because of low rainfall and hence low primary productivity, (proportional to rainfall), regrowth of vegetation could not keep pace with its destruction, especially in the presence of overgrazing by abundant goats. With the tree and grass cover removed, erosion proceeded and valleys silted up, while irrigation agriculture in the low-rainfall environment led to salt accumulation. . . Thus, Fertile Crescent and eastern Mediterranean societies had the misfortune to arise in an ecologically fragile environment. They committed ecological suicide by destroying their own resource base."⁵

But "desertification" only emerged as a salient term of reference and a modern international problem during the second half of the twentieth century. As early as 1927, a French biologist working in Tunisia documented the low productivity of rangelands there.⁶ Twenty-two years later, the French colonial forester A. Aubreville coined the term "desertification" itself (in French) when he described the grim situation in West Africa: "The closed forests are shrinking and disappearing, like evaporating spots. The trees of the open forests and savannas become more and more spaced out. On all sides, the bare skin of Africa appears as its thin green veil of savanna burns releasing a grey fog of dust into the atmos-

phere. Arable land is carried away by the yellow waters of flood. Slabs of sterile truncated soil, bearing tufts of grass around, uprooted bushes, recall a kind of leprosy that is spreading over the face of Africa.”⁷

It would take another twenty years, and considerable human misery, before the world woke up to the extent of the challenge, and it was enormous. The 2005 Millennium Ecosystem Assessment reported that the “number of people affected by desertification is likely larger than any other contemporary environmental problem.”⁸ Desertification is therefore a relatively modern environmental phenomenon even though its symptoms have been well documented in the past—from ancient Greece to Ottoman Palestine. Part of the reason for the present acceleration of desertification processes is the link between environmental damage and the exceedance of human carrying capacity on the relatively fragile drylands. Only recently have the sheer numbers of human beings on the planet created extreme population pressures on a global scale. Several salient events and activities over the past century have addressed this global challenge. These can be divided into two categories: (1) natural disasters that have raised public awareness about the severity of the problem; and (2) more recently, international or local efforts that have demonstrated that this trend need not be destiny; just as humans have created the desertification crisis, humans can solve it.

Unfortunately, there are far more examples from the natural disaster category than the latter. The international community that has mobilized to address several insidious and vexing global environmental problems (such as the depletion of the ozone layer, whale extinctions, or trade in endangered species) has found neither the resources nor the political will to make a serious commitment to changing the planet’s desertification profile. Unlike most environmental challenges that require proscriptions on development and cooperative restraint in human interaction with the global commons. The remedies required to stop and reverse desertification are quite the opposite in nature. They require thoughtful investment in sustainable development in the drylands of developing nations. This by its very nature is a gradual process, not given to dramatic turns. At the same time, unless the resources and stamina for such a sustained process are garnered, desertification will continue to be an environmental orphan that spirals out of control, leaving agricultural failure, famine, and refugees in its wake.

Land Degradation and the Dust Bowl of the 1930s

Although desertification is a phenomenon largely associated with Africa, perhaps the first signs during the twentieth century of the potential scope of dev-

astation produced by poor soil stewardship occurred in the United States. The Dust Bowl was actually a series of dust storms that ran through the Great Plains of the United States and Canada beginning in 1933. The background to this disaster was twofold, with the first cause being anthropogenic: the overproduction associated with World War I and the accessibility of mechanized farm equipment. The second was meteorological. Farmers in the American Midwest were encouraged to develop marginal lands to meet the demand for food and fiber that the Great War and its aftermath had created. At the same time many Midwest farms became “overcapitalized” relative to the actual carrying capacity of their lands. To cover the expenses of tractors, listers, and a new generation of plows, farmers tried to press as much land as possible into production. When the United States fell into the Great Depression at the end of the 1920s, prices for food dropped and farmers had to cultivate even more marginal lands to pay their debts. Once these lands were stripped of the natural vegetation, they either fell out of production or the continuous plowing exposed the soil, making it vulnerable to the ferocious winds of the American Midwest. Damage might not have been as acute had these events not coincided with a period of prolonged drought.

The storms began in November 1933 in South Dakota, with the most famous tempest occurring on May 11, 1934. A Nebraska physician recorded: “Wind forty miles an hour and hot as hell. Two Kansas farms go by every minute.” The soil blew clear across the United States. In Chicago four pounds of soil fell from the sky like brown snow in summer. When the storm reached Washington, D.C., members of Congress left the U.S. Capitol building to witness the opaque clouds of dust that darkened the noon-hour skies. The snow that fell that winter in New England was red. Dust storms continued, culminating in Black Sunday on April 14, 1935—also known as the “black blizzard” of the period. The agronomic results of three years of drought and the relentless dust storms were catastrophic. Homes were destroyed as the deluge of dust covered entire towns. Crops failed in successive years and farmers could not pay back loans, leading to eventual foreclosure. Hundreds of thousands of environmental refugees left the region in despair. They became known as “Okies,” after the 15 percent of Oklahoma residents who were forced to leave their lands in destitution. Eventually millions more would migrate west, having lost all prospects of prosperity on their eroded farms. (John Steinbeck’s classic novel *The Grapes of Wrath* movingly describes one family’s ordeal.)

Although the Dust Bowl preceded by many years international recognition of a desertification crisis, its historical significance as a turning point in the field is twofold. First, the sheer magnitude of the disaster raised public awareness

about the vulnerability of soil and the potential ramifications of imprudent land management. Second, the upshot of the disaster was positive: the erosion crisis spawned institutional and legislative change in the United States. The Soil Erosion Act passed in April 1935, and President Franklin Roosevelt established the U.S. Soil Conservation Service (SCS) with a mandate to aggressively deal with land degradation.¹⁰ This SCS remains a massive agency to this day, whose efforts have reduced desertification throughout the prairies and the drylands of America, even as dust-bowl symptoms reappeared in the United States during the 1950s and 1970s. Other nations soon followed the American lead, with soil conservation emerging as a major academic discipline. Laws and institutions have been established regarding drylands from Australia to Spain to assist local farmers to sustainably cultivate their lands.¹¹ When the international community began to seriously consider the issue of desertification, the know-how for addressing it largely existed.

A Population Bomb Explodes in the Drylands, 1950–1970

As civilization has advanced, the sheer number of human beings on the planet has grown exponentially. For example, 90 percent of the increase in human presence since the beginning of time has taken place during the past 350 years. But this understates the astonishing rise in population that has taken place on Earth beginning in 1950—in particular, among the dryland, developing nations. To demonstrate the significance of the phenomenon, it is instructive to divide human history into fifty-year segments. Between 1850 and 1900 the planet's population is estimated to have increased by four hundred million people (from 1.2 billion to 1.6 billion people), with an annual growth rate of 0.6 percent per year.¹² During the next fifty years, which included two world wars, the population rate rose by a mere 0.2 percent (to 0.8 percent), reaching just over two billion people. But no sooner had the explosions from the world wars died down than the "population bomb" began to detonate. During the next twenty-five years, the rate of population growth more than doubled, averaging 1.9 percent, leaving the world with 4.1 billion people in 1975.

Developing nations, especially in Africa, were among those who saw the greatest surge in population size. Afghanistan, Burkina Faso, Burundi, Chad, China, Congo, Egypt, Ethiopia, India, Jordan, Kenya, Mali, Niger, and Nigeria—all countries dominated by their drylands—also showed population growth rates of 2 percent and higher. As villages swelled, traditional land resources became inadequate and new marginal land was put into production. It was only a matter

of time before an ecological price would have to be paid. As desertification became a major scourge through African and Asian drylands, the proximate cause of any given disaster was typically drought. There is anecdotal evidence that in some cases local population growth can create a critical demographic mass for the generating of “alternative livelihoods,” which may ease land pressures.¹³ But on the whole the steady increase in population growth from 1950 until 1970 left little latitude for traditional adaptive responses and made the consequences far more painful.

The 1968 Famine in the Sahel

Although very much a dryland region, the Sahel also constitutes a natural greenbelt located south of the Sahara that protects pastoralists and farmers from the great desert. Although it has low natural rainfall, the Sahel has always been able to support a variety of flora and fauna along with a diverse range of human lifestyles. Deserts also have a rich variety of flora and fauna, but conditions in the Sahel have traditionally supported pastoral as well as farming communities. Elders living in the region today can remember a time when the Sahel was home to rich ecosystems that provided abundant game, including antelope, monkeys, wolves, foxes, and even elephants!¹⁴ Although rainfall was never plentiful, shepherds could find forage for their flocks and millet grew well. All this changed, however, when extensive slash-and-burn agriculture began to decimate the natural woods and bushlands.¹⁵ It was as if population density had crossed a critical threshold and the land could no longer support the traditional farming practices. These often included an inclination to clear fields after harvest, exposing the top soil to powerful winds. When drought set in around 1968, farmers from Mauritania in the west to Ethiopia in the east, as well as the local pastoralists, initially assumed it was just another cyclical dry year from which they would soon recover. But the usual rains did not return until 1972, and 250,000 people died because of the famine and associated disease.

When the rains did come at last, much of the soil that should have supported the recovery was gone, literally blown away. The desiccated lands, lacking the original organic matter, could not sustain the grasses and bushes that normally fed livestock. What had once been a “nondesert dryland” had become desertified. Heartbreaking images of starving children, barren and abandoned villages, and an unforgiving desert smothering once fecund lands filled television screens around the world, for the first time giving desertification an African connotation that has not changed to this day. Environmental disasters can be considered

turning points if they engender a meaningful public policy response. In the case of the Sahel drought, world public opinion was mobilized and the UN General Assembly called for a global response to the crisis. The best it could do was to convene a conference that eventually was held in Kenya. The United Nations Conference on Desertification (UNCOD) brought ninety-five nations together and produced an agreement that called for nonbinding action programs. In retrospect, however, the effort engendered little action indeed.¹⁶ But it did turn the issue of desertification into an international environmental issue, and ten years later a more effective international instrument would go into effect.

Drip Irrigation in the 1970s and 1980s

Although desertification is largely a result of human activities, human innovation also holds the potential for a solution. No invention has been more significant in revolutionizing dryland agriculture than drip irrigation. During the 1930s water engineer Simcha Blass helped to build water systems for new Jewish settlements in "Palestine." A friend showed him a giant tree near his house that had flourished as a result of a leaky pipe, thriving on a steady stream of tiny droplets. Blass had an epiphany that he later compared to "a mosquito in the mind of Titus the evil." But it would take more than twenty years, during which time he ran the Water Department for the young state of Israel, before he could find time to develop an effective application.¹⁷ By then, plastics were available and he could design the world's first drip irrigation system. Rather than flooding a plant's root zone, water is spoon fed to trees and plants, drop by drop, through narrow black pipes whose drippers regulate the amount of water released. Over time the systems could be linked to computer systems that optimize the rate and timing of applications.¹⁸ In 1965, Blass sold his invention to an Israeli kibbutz that created the Netafim company and production began.¹⁹ Forty years later irrigation was an eight-hundred-million-dollar business in Israel, and modern dryland agriculture was never the same.

The agronomic benefits are many. Fertilizers and wastewater can be delivered efficiently. Evaporation, a key factor in the creation of drylands, is greatly reduced relative to sprinkler or flood systems. Even steep terrain and shallow soils, always a problem for irrigation in the drylands, responded favorably. It was now possible to grow a range of crops in coarse sands and clays.²⁰ From the perspective of desertification, the chronic salinization that accompanied the evaporation of flood irrigation waters was largely avoided. And most of all, farm-

ers were producing more “crop for the drop”—a good deal more! It was this invention, more than any other innovation, that led to Israel’s impressive growth in agricultural production. While its population grew sevenfold during the first fifty years of statehood, agricultural production in a nation whose territory is 95 percent drylands increased seventeenfold. Use of fresh water in the agricultural sector, however, dropped as the new technology could effectively utilize recycled wastewater. Lands that were otherwise unprofitable, that would have fallen out of production, could now be sustainably cultivated, even in hyperarid regions. Centuries of degradation in Israel’s semiarid and arid lands could now be reversed.²¹ Although establishing drip irrigation systems requires substantial capital costs, its exportation to dry developing countries from Tanzania to Afghanistan has begun to change the local agricultural profiles

Not all drivers of desertification are given to a “technological fix,” however. Land tenure systems, demographics, and even grazing may require policy responses of an entirely different nature. Yet there is little doubt that when science and technology are creatively used in the battle to combat desertification, substantial benefits and progress can be anticipated. Drip irrigation’s steady dissemination around the world during the past thirty years demonstrated this and offered an empirical basis for optimism.

The Disappearance of the Aral Sea and Lake Chad, 1970s–1980s

In 1960 the Aral Sea was the fourth largest lake in the world, larger than the area of Belgium and the Netherlands combined. The surrounding watershed is largely defined as a drylands region. But that year it began to shrink. The sea links Kazakhstan in the north and Uzbekistan in the south, and for many years its fish provided a livelihood for the surrounding community. During the 1950s Soviet ships could boast an annual catch of forty-eight thousand tons of sturgeon, carp, and bream.²² It was hard to imagine that the Aral Sea was facing one of the twentieth century’s greatest ecological disasters.

As early as 1918, the newly formed Soviet Union decided that it would be well to tap the two rivers that fed the Aral Sea (the Amu Darya and Syr Darya) to irrigate a variety of crops. A series of diversions were completed by 1960, by which time some fifty cubic kilometers that used to reach the Aral Sea was watering fields throughout the surrounding areas.²³ The agricultural strategy was at first ostensibly successful. Cotton production doubled between 1960 and 1980, when 85 percent of the area’s farms were growing the ever thirsty plants. But the

environmental ramifications soon proved disastrous. The sea level fell by twenty centimeters a year. Then the drop began to grow geometrically, so that presently the waterline retreats almost a meter a year.

The disappearance of the sea was hardly a surprise to the Soviet government planners. Indeed, in 1968 a local engineer saw the process as inevitable. But it is a sorry sight today: what remains of the once grand water resource is ten hypersaline pools that hold a mere tenth of the original water volume. The cities built on the banks are often as much as 150 kilometers (about ninety-three miles) away from any water, surrounded by the dusty remnant of what was once a lovely lake. The phenomenon continues, with an area twenty times the size of Manhattan added each year to this new desert.²⁴ The ecological law of unintended consequences quickly began to set in. The lands surrounding the Aral Sea are now heavily polluted with a variety of metals and chemicals. Hence the resulting dust storms that translated into chronic lung morbidity in the surrounding populations, producing alarmingly high cancer rates.²⁵

On the African continent Lake Chad was facing a similar fate. During the first half of the twentieth century, Africa's fourth largest lake, historically shallow, was still able to provide water for twenty million people in Cameroon, Chad, Niger, and Nigeria. Never deeper than seven meters, it was always reliant on the Chari River, which provided some 90 percent of the lake's water. The river meanders for 950 kilometers (almost six hundred miles) and drains a watershed of 548,747 square kilometers throughout Central Africa, before reaching Lake Chad. But while rainfall levels were dropping, more water was diverted from the river, its tributaries, and from the lake itself to support agriculture. Even faster than its Asian companion, Lake Chad began to disappear.²⁶ To be sure, given the flux in its watersheds, the lake had almost dried up before, in 1908 and again in 1983, before bouncing back. But the recent drop looks more ominous and irreversible. During the 1960s, Lake Chad covered more than 26,000 square kilometers, but by the 1990s it had lost 95 percent of its surface area. In a small corner of the southern basin, 550 square kilometers are still wet, but not for long. And where there had once been water and aquatic habitats, there is now desiccated and unproductive land.

Part of the problem with desertification has always been the difficulty in documentation. The steady disappearance of these two extraordinary resources—the Aral Sea and Lake Chad—was quite literally captured in aerial photographs and the attendant land degradation offered a sober wake-up call for the world. Terms like “sustainability” suddenly took on a far greater immediacy, and the deserti-

fication process that ensued had a disturbing poster child in the two continents most affected by desertification.

The UN Convention to Combat Desertification, 1994

The most recent and meaningful chapter in international efforts to address the problem of desertification began in Rio de Janeiro in 1992. Starting with the UN Conference on the Human Environment held in Stockholm in 1972, each decade it has become a tradition for heads of state and senior ministers of the world to convene and discuss the state of the planet. The 1982 gathering in Nairobi was not nearly as dramatic in its results as the Stockholm conference. So when it came time to plan the 1992 event to be held in Rio de Janeiro, the United Nations was looking for global environmental issues that would galvanize the international community. Planning for the conference took place soon after publication of the UN report *Our Common Future* in which the Norwegian prime minister, Geo Brundtland, and her committee made “sustainable development” a modern shibboleth and international environmental paradigm.²⁷ There was a call to make the conceptual slogans more operational. A broad strategic document containing principles and objectives for global “sustainability” was prepared for approval of the conference, entitled *Agenda 21*. Although *Agenda 21* had a chapter on desertification, it was the issues of climate change and biodiversity loss that were the focus of the developed nations, who had grown alarmed at new data and negative trends.

Not everyone was thrilled with the orientation of the conference planners. In particular, many African countries were less than enthusiastic about the agenda. They argued that if global warming existed, it was caused by the excess emissions of wealthy countries that should solve the problem themselves. As to biodiversity loss, while important, surely it was of far less significance than the pervasive poverty that plagued the African continent. In short, given the desperate situation in Africa, what was really needed was a convention to address poverty and Africa.

The Western donor countries were wary of expanding existing commitments for direct poverty relief, but they saw a middle ground in desertification—an environmental issue that was a key driver of global poverty. When the UN General Assembly passed its formal resolution convening the UN Conference on Environment and Development, it called “to accord the issue of desertification high priority.” In retrospect, however, the reference appears to have been an exercise in lip service. During the Preparatory Committee meetings leading up to

Rio, desertification was largely absent from deliberations. When ministers from African states convened in November 1991 in Cote d'Ivoire, they were determined to lobby the UN to get serious about the subject. The ministers called for Rio's *Agenda 21* to include a recommendation to prepare a convention to combat desertification.

But at Rio itself, efforts to support a convention sputtered. The European Union blocked the idea, arguing that desertification by its nature was a regional issue and therefore fundamentally inappropriate for a global agreement. Ultimately, the United States changed its unsympathetic position and came to support the African demands. A compromise was reached: the conference called on the UN General Assembly to establish an Intergovernmental Negotiation Committee to start preparing a convention. The General Assembly assented and the committee was established, starting its work in Nairobi in May 1993 and finishing the draft in Paris. The agreement was ready for signatures by October 15, 1994. The document—known as United Nations Convention to Combat Desertification (UNCCD) in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa—required ratification by fifty countries to enter into force. By December 26, 1996, the requisite number of nations was on board. Today more than 190 nations are signatories.

The convention hardly offered a paragon of global governance or efficacious regulation of the commons, however. It established the usual institutions for an international agreement (a Convention Secretariat based in Bonn, a Committee to Review Implementation of the Convention, and a Committee on Science and Technology to advise the Conference of the Parties that meets every other year). Substantively, the convention divides the world into “haves” and “have-nots.” Endorsing a “bottom-up” orientation, developing “affected nations” (the have-nots) are expected to prepare “action programs” in consultation with local communities. The associated projects are to be funded by donor countries in bilateral or multilateral partnerships with affected developing countries. The convention recognizes that there are indirect, social drivers of desertification that need to be addressed in National Action Plans. It also stipulates that legislation should be part of national strategies.

Progress in implementation has been painfully slow. Only in 2005 did most African nations complete a National Action Plan, and these are often extremely vague and short on specifics. Oversight by the Convention Secretariat is limited by its annual budget, currently a paltry eight million dollars after being cut by 30 percent at the 2006 Conference of the Parties in Nairobi.²⁸ Most important, the success of the convention is predicated on generous financial assistance from

developed nations, and the first world has not ponied up. Although there is no shortage of local success stories that are the result of UNCCD commitments, no empirical evidence as yet points to a reduction in desertified lands on a global scale.

Yet the UNCCD is a dynamic agreement—still young and reasonably nimble. For example, recently the UNCCD adopted a new ten-year strategy that is based on “results based management” and quantifiable monitoring mechanisms.²⁹ There are sufficient signs to justify modest optimism and classification of the treaty as a major turning point. The Global Environmental Facility—the financial mechanism that awards grants for activities that protect biodiversity and reduce greenhouse gasses—recently decided to expand its mandate and include hundreds of dollars each year to support projects that address land degradation. There are literally hundreds of projects on the ground that are part of UNCCD related efforts. Many of them are run by local NGOs that are flourishing throughout Africa, Asia, and South America. Desertification is deemed a lucrative enough field for international aid to motivate many countries without a centimeter of drylands in them, to seek international support to fight their desertification problem—and even to prepare national action programs.

Mapping the Scope of Desertification

An essential element for a global response to desertification involves monitoring progress. Without clear benchmarks of land and vegetative conditions, it is impossible to evaluate whether international efforts are successful or not. There have been at least four attempts to date to assess the scope and the severity of desertification on the planet. None are perfect, but there seems to be a steady improvement in the resolution. When the Millennium Ecosystem Assessment prepared its synthesis report in 2005, it could speak with some confidence about the scope of the problem. Initially information was collected for the UNCOD gathering in 1977, and the same database provided the basis for the World Map of Desertification that was prepared by the UN's Food and Agriculture Organization, UNESCO, and the World Meteorological Organization soon thereafter. But this map only showed areas that were vulnerable to desertification and provided little information about actual conditions on the ground. It was a start, though.

A few years later the soil scientist Harold Dregne, working with a team from Texas Tech University, looked at the state of soil and vegetation degradation in some one hundred countries. The results were more satisfying methodologically but far from perfect. The authors relied on anecdotal accounts, research

reports, travelers' descriptions, personal opinions, and local experience. From a substantive point of view, however, the results were downright alarming, with an aggregate estimate that 70 percent of the world's drylands suffered from desertification. In 1991 the UN Environmental Program commissioned the Global Assessment of Soil Degradation (GLASOD). Prepared in the Netherlands, the data relied on questionnaires circulated to soil experts around the world, and included information about the type, degree, extent, cause, and rate of soil. The report did not consider the so-called hyperarid regions, but of the remaining drylands, it suggested that a fifth suffered from human-induced soil degradation. This left experts with the impression that Dregne's 1983 study had grossly overstated the severity of the situation.

In 2003 the Partial Coverage Assessment was produced at the behest of the Millennium Assessment project. This initiative produced a "desk study" that built on past efforts. It focused on soil conditions (rather than vegetation degradation) and was based on existing literature, erosion models, regional data sets, and remote sensing. Here, the numbers were even less severe. Only about 10 percent of the world's drylands were categorized as degraded. After reviewing the sundry mapping exercises, the Millennium Assessment (the closest thing to a scientific consensus estimate ever compiled) felt comfortable with a 10 percent to 20 percent range of global dryland degradation—still a staggering amount of damaged territory, given that 47 percent of the earth's continental surface is drylands.³⁰ It is somewhat discouraging to think that a full thirty years after the United Nations had turned its attention to the problem of desertification, only today are clear baseline numbers beginning to coalesce by which progress in the field can be measured. Yet, assuming that efforts to address land degradation escalate, it is truly a case of better late than never. Only when the planet knows where it stands, can it hope to figure out where it should be going.

China Legislates a Great Wall to Combat Desertification, 2001

China is an example of a nation that has decided that it can no longer take a "business as usual" approach to the problem of desertification. The crisis is simply too severe, threatening the country with economic collapse. Environmental icon Lester Brown has described the grimness of the situation: "China's Environmental Protection Agency reports that the Gobi Desert expanded by 52,400 square kilometers (20,240 square miles) from 1994 to 1999, an area half the size of Pennsylvania. With the advancing Gobi now within 150 miles of Beijing, China's leaders are beginning to sense the gravity of the situation. With little vegeta-

tion remaining in parts of northern and western China, the strong winds of late winter and early spring can remove literally millions of tons of topsoil in a single day—soil that can take centuries to replace. On April 12, 2002, South Korea was engulfed by a huge dust storm from China that left people in Seoul literally gasping for breath.”³¹

In 1996, China was among the first nations to draft a national action program and it was an ambitious one. The Chinese program envisions complete rehabilitation of local ecosystems. By the year 2050, the program says, “nearly all desertified land will be brought into control.”³² This initially was to be achieved through the expansion of a range of afforestation and agricultural projects to stem the tide of desertification. For example, the Sanbei Shelterbelt was already well under way. Begun in 1978, the windbreak forest was soon declared the “planet’s largest ecological project.” Billions of work days by Chinese peasants have gone into the initial phase, and the tree line will eventually stretch along a 1.3-million-kilometer (780,000 miles) line.³³

But mega projects alone are not enough. Fundamental changes in land use and agriculture are required. In 2001, China passed legislation that transformed the operational aspects of its national action program into an ambitious antidesertification law.³⁴ The law’s regulatory orientation is unprecedented. The Law of Desertification Prevention and Control of the People’s Republic of China *drastically* limits grazing and cultivation on vulnerable lands. It is unlawful to commit an act of vegetation destruction, and the government has the authority to issue orders to stop erosive activities. Any profits from activities that contribute to desertification are illegal and can be confiscated.³⁵ If a government agency violates this law by failing to report land deterioration, failing to erect sand and windbreaks, approving cultivated land in vegetative areas, and developing and constructing on unapproved areas, the overseeing administrative body will be sanctioned.³⁶ Along with the stick there is a carrot: the law establishes financial incentives for farmers who rehabilitate degraded land.³⁷ Individuals who rehabilitate land or set it aside as a protected area or natural reserve are to be compensated.

It is not yet clear whether China will succeed in turning the tide in its battle with desertification. It is also much clearer that most nations do not have a political culture that will allow them to promulgate such stringent command-and-control policies for land use. Yet the Chinese legislation and its implementation offer a model that may offer inspiration about the intensity that human efforts to successfully stop land degradation can take. Of course it can be argued that what China calls desertification is largely the natural movement of sand dunes.

Or some might maintain that China's efforts are local in nature and do not represent a global turning point. To this it can be said that China remains the most populated country in the world, and the unique magnitude of its crisis, and the comprehensive single-minded national response, warrants "turning point" designation.

The International Year of Deserts and Desertification, 2006

When the UN Environmental Program Governing Council convened in 2005, it called on the UN General Assembly to give the desertification issue the push forward it had long needed. UNEP "invited the General Assembly to consider declaring an International Year of Deserts and Desertification."³⁸ It would take less than a year for the General Assembly to respond and pass a resolution to that end. The "IYDD" began with little funding and only a little more fanfare. Nations were expected to launch events that would raise awareness about the problem of desertification and galvanize decision makers and the general public to become engaged. At the same time the UNCCD secretariat emphasized that the year was also an opportunity to remind the world that deserts contain unique and beautiful ecosystems and were the homes of splendid ancient civilizations: "They stand like open-air museums, bearing witness to bygone eras. The Year will therefore also celebrate the fragile beauty and unique heritage of the world's deserts, which deserve protection."³⁹

Dozens of international conferences, workshops, and film festivals were quickly organized to mark the year, from Beijing to Rome to Israel's Negev desert. On the domestic front many countries embraced the UN's "call to arms." For example, by July 2006, Portugal could report more than ninety IYDD-related events (conferences, exhibitions, and so on), ten television programs dedicated to the topic, parliamentary hearings, and over three hundred articles in the written press, exposing thousands of citizens to the issue.⁴⁰ Looking back, though, it is doubtful whether the International Year of Deserts and Desertification will appear as a "turning point" any more than the events summarized in this chapter were truly pivotal watersheds that revolutionized attitudes and solved an acute environmental problem of global dimensions. Indeed, the events highlighted here can more precisely be seen as milestones in a slow and continuous voyage that suffers from the usual sluggishness of international diplomacy and, more important, the general lack of funds that characterize the international response to Africa and the developing world's distress.

Given the high population densities in many affected countries, solving the

problem of desertification will require the creation of alternative livelihoods, enabling people to ease their dependence on the beleaguered soil to earn a living. Reducing birth rates and family planning will have to be elevated and become paramount policy objectives in most developing dryland countries suffering desertification. The road to such sustainable development is a painfully slow and sometimes mundane crawl, rather than an earth-shattering quantum leap or turning point. It is of some comfort to know that the international community has finally begun to join the thousands of dryland communities that suffer from desertification around the world on this journey. But given the enormity of the problem, it is not enough.