




Dried Up



Animal agriculture, humans' wasteful habits, and energy production are opening the floodgates for the world's water shortage. Is it too late, or can we turn back the tide on the impending crisis?

By Mark Hawthorne



THE SUN IS JUST EMERGING OVER THE Himalayas as Yangchen Dolma, dressed in a traditional Ladakhi *kuntop*, begins the lengthy process of preparing a bath. She fills a large pan with icy water and places it on a small propane stove. The water, cleverly diverted from a nearby glacier into a 55-gallon drum on the roof of the adobe house, takes a long time to heat at high altitude, but Dolma is in no hurry. When she has finally filled her tub, the water is barely tepid, but in a region of India that receives only about two inches of rain a year, a bath is a luxury.

Dolma chuckles at her inscrutable Western houseguest, who, not wanting to use his host's propane, shivers through a freezing ablution each evening. "You bathe every day?" she asks.

"Yes," replies her guest. "Don't you?"

"No," Dolma says. "One time every month."

Outside Ladakh and other water-poor environments, the developed world has a much different relationship with H₂O. Automatic sprinklers keep lawns green. Indoor plumbing makes hygiene convenient. And slaking thirst is as simple as turning on the tap. Or at least it used to be—now staying hydrated has become a \$50-billion global industry that has all but convinced denizens of even the cleanest cities that their municipal water is undrinkable. Instead, everyone—from Little Leaguers to CEOs—totes a bottle of filtered or purified water.

Such consumption feeds a myth of abundance and ignores a global water crisis experts predict is approaching. Indeed,

some argue it's already here: the World Bank estimates that more than 1 billion people have no access to clean water and 3 million people die from waterborne diseases every year. Putting the world's water into the control of private companies will help combat these statistics, says the Bank. But with Earth's population predicted to reach 8.2 billion by 2030, would commodifying water answer the planet's need—and how would it impact the environment?

While bottled water and its attendant environmental consequences are major concerns, agriculture, energy, and global warming are even bigger (and more

“Non-vegetarians consume five cubic meters [176 cubic feet] of water per day. It is the water for food that is the big problem. Be rational and eat less meat.”

overlooked) kinks in the world's water supply. Food production not only uses colossal amounts of water, but animal agribusiness pollutes rivers, streams, and other freshwater ecosystems. The energy sector, meanwhile, accounts for nearly 40 percent of freshwater withdrawals in the US, making thermoelectric power plants the second-largest users of freshwater in the country (after agriculture). Then there's human-induced climate change, which is reducing snow packs, drying up lakes, and causing glaciers—massive bodies of ice that provide most of the world's river water—to shrink.

Tapped Out

From space, Earth looks like a cool, thirst-quenching ball of liquid. But less than three percent of the world's water is fresh, and only about one-third of that is drinkable, since much of it is inaccessible in aquifers and icebergs. The one percent of the planet's water that is safe to swallow is unevenly distributed, with some countries awash in freshwater lakes and underground sources and other populations left high and dry. For example, Brazil, the world's wettest nation, has an average annual renewable freshwater supply of 8,233 cubic kilometers per year (roughly twice the amount annually

consumed worldwide), while Rwanda only has about five.

Such disparity has international water experts and leaders debating the fairest and most efficient way to deliver a scarce supply. Is water a natural resource and free to all, like air? Or is it a commodity, like oil, for which people should pay? Among the approaches being floated is privatized water, with corporations operating water production and distribution instead of public funds paying for these services. The World Bank and the International Monetary Fund say privatization provides market discipline and investment

Forty percent of freshwater usage goes to energy production.



Personal-care products and other human detritus pollute waterways.



capital to keep the water flowing in developing countries. But watchdog groups such as Corporate Accountability International (CAI) and Food & Water Watch challenge the model, arguing that when municipal water services are privatized, quality standards decline, rates increase, and customers who can't afford it are cut off.

"The market is amoral, and it's going to lead you to taking advantage of pollution and scarcity, frankly. It's going to lead you to selling it to those who can buy it but not to those who need it," says water advocate Maude Barlow in the 2008 documentary *FLOW: For Love of Water*. Barlow is one of the leading figures in the water-justice movement, which works to halt the commodification of water, a \$400 billion global industry. "This notion that we'll have water forever is wrong," she says. "California is running out. It's got 20-some years of water. New Mexico has got 10, although they're building golf courses as fast as they can, so maybe they can whittle that down to five. Arizona, Florida, even the Great Lakes now, there's huge new demand."

"We are flat-out running out of fresh water," says Harold Brown, a former dairy farmer and the founder of Farm Kind, a non-profit that advocates for animal rights, sustainable agriculture, and environmental and social justice. "The EPA warns us that if current water use continues unchecked, 36 states will suffer water shortages within the next five years."

Down the Drain

Barlow and other experts say a confluence of diversion, toxic waste, and urban sprawl has polluted the finite supply of clean water, created deserts, and hampered Earth's hydrologic cycle—the process in which moisture is drawn up into clouds and released back to land. As more soil is paved over, less precipitation remains in watersheds and river basins. Meanwhile, draining aquifers for flood irrigation elsewhere causes desertification as the water overfills and eventually erodes the topsoil.

Perhaps the most disturbing issue, however, is pollution caused from raising animals for food. Much of the 500 million tons of waste generated by billions of chickens, pigs, cows, and other animals confined in US factory farms every year is stored in huge manure "lagoons." These holding pools can leak or spill and pipelines can rupture, tainting surface and ground water. Just last year, a lagoon pipe at a Maryland dairy burst, spewing 560,000 gallons of liquid manure—nearly enough to fill an Olympic-size swimming pool—into a nearby creek and contaminating the town's water supply with E. coli.

Pharmaceuticals, too, corrupt water. In fact, it's so common that the water industry has an acronym for it: PPCP, for "Pharmaceuticals and Personal Care Products." PPCPs found in water include human and veterinary drugs and hormones, household cleaning products, fragrance, and cosmetics. These chemicals are flushed down toilets, poured into sinks,

The Consequences of Desalination

In response to our ever-growing thirst for fresh water, giant corporations are pushing the idea of desalination, which would involve drawing water from the world's oceans and removing its salt and minerals to make it potable. This may sound like a good idea for easing the world's water-shortage woes, but there are plenty of not-so-great consequences of this process:

❖ It's only a quick-fix solution.

The global water shortage problem is complex—socially, politically, and environmentally—and addressing the underlying causes, then working to reverse them, is the only truly effective answer.

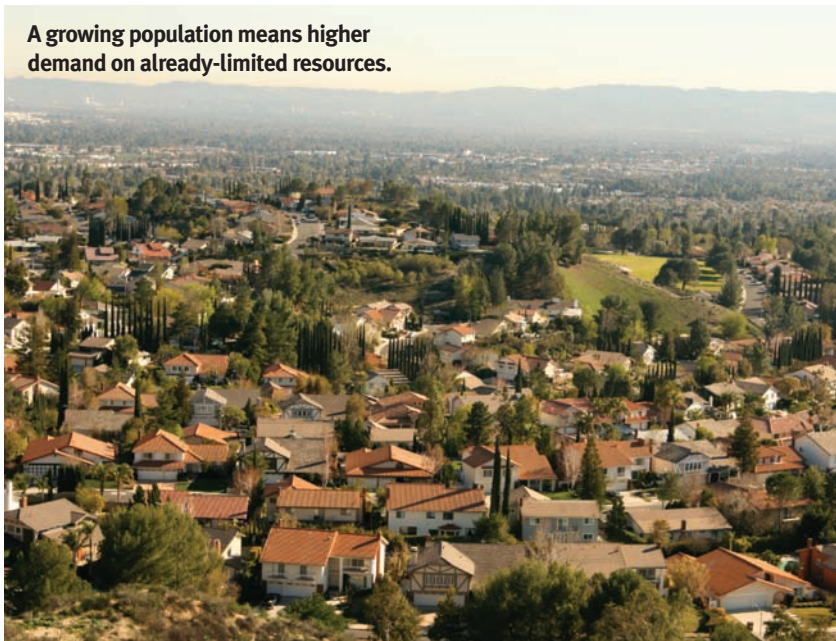
❖ It's a money-waster. It's approximately three times more expensive to produce potable water using desalination than the standard water purification measures already being used.

❖ It harms animals and the environment. Chemicals and super-salted residues resulting from the desalination process threaten local water supplies and harm marine life. Fish larvae, plankton, and adult fish are often trapped and killed in the intake.

Factory farms' manure lagoons routinely pollute local water supplies.



A growing population means higher demand on already-limited resources.



Message in a Bottle

It's a \$50-billion worldwide industry that has become the new SUV, but bottled water is more than just a symbol of waste to many social activists. It represents a host of other problems, including unsustainable and expensive water delivery.

"In this state and across the globe, water corporations are transforming a public resource into a high-priced luxury," says Deborah Lapidus, national organizer with the Think Outside the Bottle campaign in Boston, Mass. "And to add salt to the wound, **corporations like Coke are disparaging public tap water, bottling it, and then selling it back to us for more than the price of gasoline.**" (An average 20-ounce bottle of water costs about \$1.39—that's nearly \$9 per gallon.)

The Think Outside the Bottle campaign works to reduce the negative effects of bottled water and stimulate support for public water systems. The campaign is led by Corporate Accountability International, which in 2007 successfully pressured Pepsi-Cola into revealing the source of its Aquafina water. **Turns out the second-best-selling bottled-water brand in the US is purified tap water. Same for Coca-Cola's Dasani, the number-one brand.**

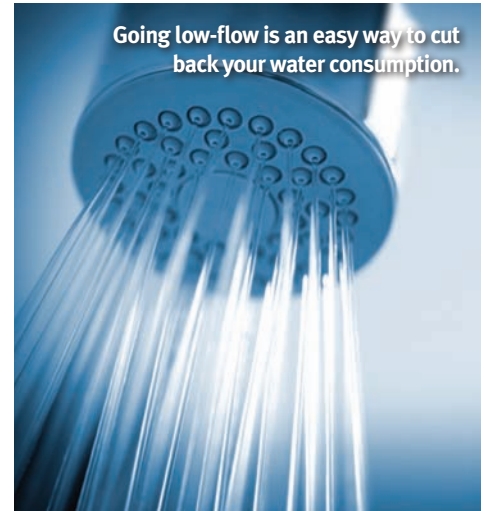
Whether it's purified, mineral, or spring water inside, the bottle itself usually ends up as litter or in a landfill. US consumers discard an estimated 60 million water bottles a day, most of which are not recycled.

Fortunately, there is some indication the reduce-reuse-recycle message may be getting through. **For the first time in a decade, sales of bottled water slowed in 2008**, growing just 6.7 percent, versus 6.9 in 2007, according to the Beverage Marketing Corporation, a US trade group. Not much, but it's a start.

Privatized water could limit access to clean water for many.



Going low-flow is an easy way to cut back your water consumption.



absorbed in swimming pools, and seeped into waterways from factory farms.

According to the Centers for Disease Control and Prevention (CDC), PPCPs in drinking water pose no health threats. "One of the great things about the scientists at CDC and the scientists at EPA and elsewhere is that they've been able to develop instruments that can detect *exquisite* quantities of chemicals in water and other materials," says Dr. Julie Gerberding, director of CDC. "So we can find the chemicals, but they're at *extremely* low levels and we have not been able to identify any direct health effects of those very low-level exposures so far. But of course there is a reason to continue to look, to measure, and to do more science to try to get to the bottom of the issue."

Ripple Effect

With increasing demands for energy focusing more on biofuels, it makes sense that a fluid approach to reducing water consumption must include the energy sector. Wind and solar power, for example, are often rejected as too expensive, yet they use less water than thermoelectric power. Though much hope is placed on biofuels, which are produced from plants, they require vast water supplies, so the need for water will increase as the popularity of biofuels grows. The Stockholm International Water Institute estimates that in 40 years the water needed to produce biofuels will be equal to the amount used by the agricultural sector to feed the world.

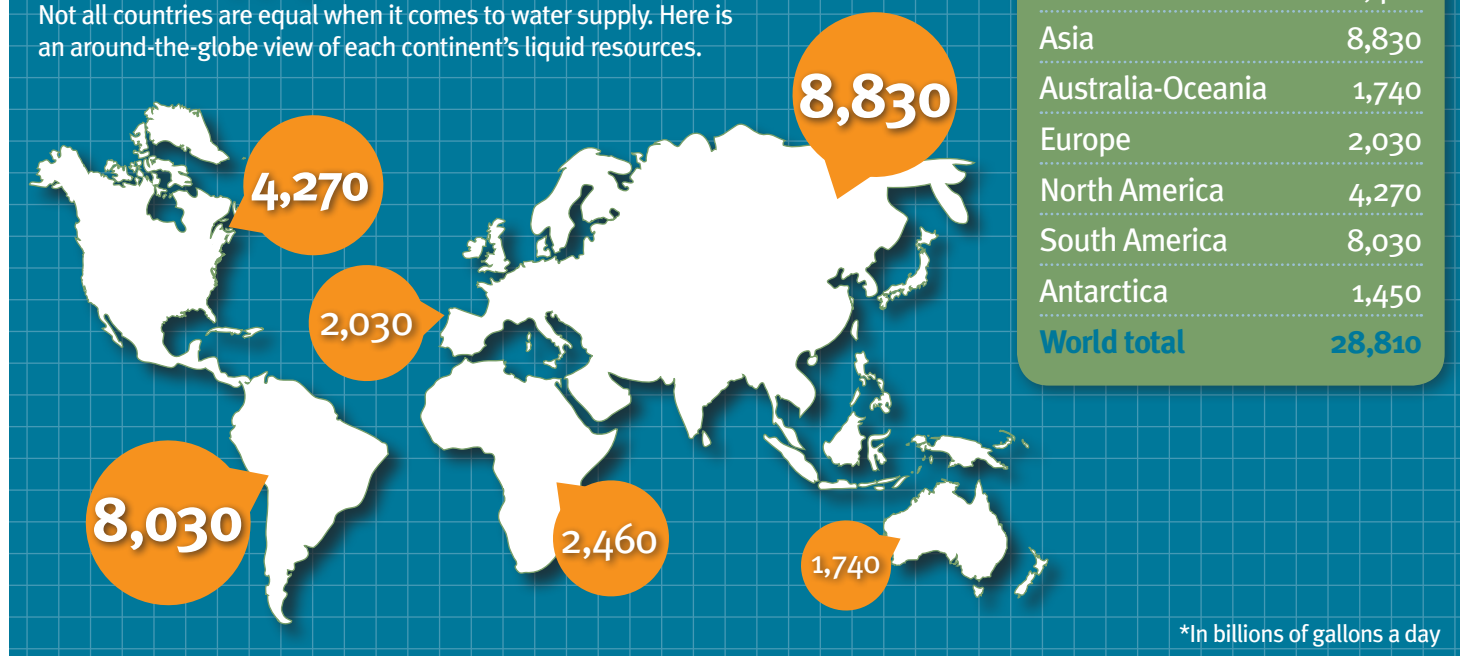
Of course, feeding the world could be achieved more efficiently too. Animal agriculture requires enormous amounts of water for animals to drink, for growing feed

crops, and even for the slaughtering process. According to Sandra Postel, director of the Global Water Policy Project in South Hadley, Mass., "It can take five times more water to supply 10 grams of protein from beef than from rice, and nearly 20 times more water to supply 500 calories from beef than from rice. These disparities create opportunities to meet food needs in more ecologically sustainable ways by adjusting diets." Postel observes that the average North American diet takes nearly twice as much water to produce than an equally—or even more—nutritious plant-based diet does. "An average US resident who decides to reduce the intake of animal products by half would lower the water intensity of his or her diet by 37 percent," she says. "If all US residents made such a shift by 2025, when the US population is projected to reach 350 million, the nation's total dietary water requirement would drop by 256 billion cubic meters per year, a savings equal to the annual flow of 14 Colorado Rivers and enough water to meet the dietary needs of more than 200 million people."

Professor John Anthony Allan of King's College, London, agrees that meat consumption plays a major role in the world's water woes. The winner of the 2008 Stockholm Water Prize, Allan created the concept of "virtual water," which measures how water is embedded in the production of food and services. "Non-vegetarians consume five cubic meters [176 cubic feet] of water per day; your bath is a tiny puddle compared to that," he told a group at World Water Week, an international conference in Stockholm, last year. "It is the water for food that is the big problem. Be rational and eat less meat."

Water Supply Around the World*

Not all countries are equal when it comes to water supply. Here is an around-the-globe view of each continent's liquid resources.



*In billions of gallons a day

Sink or Swim

The prospect of running out of water is as scary as it is preventable. Regrettably, humanity's deeply entrenched habits have brought us to the brink of a doomsday scenario, and it will take innovative thinking, new policies, and a change in lifestyles to reverse the damage. In addition to reducing or, better yet, eliminating the use of animals for food and the unsustainable practice of displacing water, the issue of global warming will need to be addressed. Scientists are reaching a consensus that climate change is indeed occurring, accelerating evaporation, melting ice, and causing droughts.

"Nearly three-quarters of the world's available freshwater is being diverted to irrigation-intensive industrial agriculture," says Anna Lappé, co-founder of the Small Planet Institute. "Because industrialized agriculture relies on so much water, these farms will be much more vulnerable as climate change increases extreme droughts."

Droughts could be just the tip of the iceberg, says Mark Hertsgaard, journalist and author of *Earth Odyssey: Around the World in Search of Our Environmental Future*. "Virtually all of the experts I have interviewed believe that water, both too much of it and not enough, will be the greatest and most challenging impact of climate change as it continues to unfold in the

years to come," he says. "We will see—indeed, we are already seeing in various places around the world—more and stronger floods, deeper droughts, and melting snow packs and glaciers. The snow pack atop the Himalayan Mountains supplies water for approximately a billion people. Hundreds of millions more rely on the snow packs of the Rocky Mountains and the Andes Mountains. These snow packs are melting as we speak, and the process is bound to continue for at least the next 30 years

The good news is being water-wise doesn't have to mean resorting to a monthly bath like Yangchen Dolma.

because of the inertia of the climate system. This is a human catastrophe in the making that can only be addressed if we focus on it with urgency and creativity, starting *now*."

The one-two punch of higher temperatures and less water may also exacerbate a crisis that Brown notes could turn violent. "Many experts say that this is only the beginning and that the next major wars will not be over oil but fresh water," he says.

Cleaning and reusing wastewater (reclamation), fixing leaky pipes (which squander billions of gallons of water a day), and installing frugal irrigation systems that provide more crop per drop could all play major roles in solving the water-shortage

disaster. One solution gaining popularity is desalination—extracting salt from seawater to make it drinkable. There are more than 13,000 desalination plants throughout the world, with more being built; California alone has plans to install 30 along its coastline. Yet these projects kill marine life and are often energy intensive. Critics say it's better to focus on recycling water and conservation, such as using seawater in electric power plants, rather than fresh water.

The good news is being water-wise doesn't

have to mean resorting to a monthly bath like Yangchen Dolma in Ladakh. Lifestyle changes such as eating a plant-based diet, installing low-flow shower heads, opting for public tap water over bottled water, and simply being mindful about water use all help make the most of the planet's limited supply. "Old approaches and ingrained mindsets die hard," says Postel. "But the benefits of working constructively with nature's water cycle, rather than further disrupting it, are now too compelling to ignore." **VN**

Mark Hawthorne drinks his tap water from a reusable bottle, upgraded to stainless steel since he left India.