

Yet Another 'Footprint' to Worry About: Water

Taking a Cue From Carbon Tracking, Companies and Conservationists Tally Hidden Sources of Consumption

By **ALEXANDRA ALTER**

It takes roughly 20 gallons of water to make a pint of beer, as much as 132 gallons of water to make a 2-liter bottle of soda, and about 500 gallons, including water used to grow, dye and process the cotton, to make a pair of Levi's stonewashed jeans.

Though much of that water is replenished through natural cycles, a handful of companies have started tracking such "water footprints" as a growing threat of fresh-water shortages looms. Some are measuring not just the water used to make beverages and cool factories, but also the gallons used to grow ingredients such as cotton, sugar, wheat, tea and tomatoes. The drive, modeled partly on carbon footprinting, a widely used measurement of carbon-dioxide emissions, comes as groundwater reserves are being depleted and polluted at unsustainable rates in many regions. Climate change has caused glaciers to shrink, eroding vital sources of fresh water. And growing global demand for food and energy is placing even more pressure on diminishing supplies.

Two-thirds of the world's population is projected to face water scarcity by 2025, according to the United Nations. In the U.S., water managers in 36 states anticipate shortages by 2013, a General Accounting Office report shows. Last year, Georgia lawmakers tried, unsuccessfully, to move the state's border north so that Georgia could claim part of the Tennessee River.

Lately, water footprinting has gained currency among corporations seeking to protect their agricultural supply chains and factory operations from future water scarcity. Next week, representatives from about 100 companies, including Nike Inc., PepsiCo Inc., Levi Strauss & Co. and Starbucks Corp., will gather in Miami for a summit on calculating and shrinking corporate water footprints. In December, a coalition of scientists, companies and development agencies launched the Water Footprint Network, an international nonprofit that helps corporations and governments measure and manage their water footprints.

The water-footprint concept was coined in 2002 by Arjen Hoekstra, a professor of water management at University of Twente in the Netherlands. Using data from the U.N.'s Food and Agricultural Organization, Mr. Hoekstra and other researchers gauged the water content that went into the making of various products and applied those statistics to people's consumption patterns to get a rough water footprint for average individuals and nations as a whole.

A new wave of research on "virtual," or embedded, water has given companies and governments new tools to track not just the water that they consume directly, but also the gallons that are embedded in everything from dishwashing detergent and Argentine beef to Spanish oranges and cotton grown in Pakistan. A cup of coffee takes roughly 35 gallons. A cotton T-shirt typically takes some 700 gallons of water to produce. A typical hamburger takes 630 gallons of water to produce -- more than three times the amount the average American uses every day for drinking, bathing, washing dishes and flushing toilets. The bulk is used to grow grain for cattle feed.

A large water footprint isn't necessarily bad if the product is made in an area where water is plentiful and well managed. Almost all of the water that goes into crops and food production is returned to the water cycle, either as evaporated water or in the form of polluted runoff. But it is temporarily unavailable for other uses, and may not be restored to the same aquifer, lake or river if it comes back as rainfall in another region. That poses problems for water-scarce areas.

Water shortages have plagued Georgia, including a 2007 drought that lowered the Lake Allatoona reservoir. The state tried unsuccessfully to move its border north to claim part of the Tennessee River.

Some experts doubt the accuracy and usefulness of water footprints, which vary depending on where and how products are made. Oranges grown in Brazil might have a higher water footprint than oranges from Spain, but the Brazilian orange might be a better choice because of the country's rainy climate. "It's a hard thing to calculate," says Peter Gleick, president of the Pacific Institute, an Oakland, Calif., environmental group. "Beef grown in the Eastern U.S. has different water use than beef grown in Illinois."

Tallying the water footprints of manufactured goods can be tenuous since there are no clear standards for what a water footprint should measure. Some companies measure just water used in factory operations; others count the gallons used to grow ingredients in their supply chains, and still others take stock of water that consumers use to wash clothes or dishes with their products. Coca-Cola Co.'s bottling factories use a little over a gallon of water to make a 2-liter bottle of soda. But that figure surges to as high as 132 gallons of water per 2-liter bottle of soda if you add the water used to grow ingredients such as sugar cane, according to an estimate provided to the company by the World Wildlife Fund. A Coca-Cola spokeswoman said the water-footprint figure is preliminary and may change as the methodology improves.

"When you try to reduce a complex subject into a single number, the methodology is so inconsistent and unreliable that it's fraught with the possibility of manipulation and misinformation," says Wayne Balta, vice president of corporate environmental affairs and product safety for International Business Machines Corp.

For many food and beverage companies, calculating water use isn't just an attempt at an eco-friendly makeover. It's a matter of self-interest. A Coca-Cola bottling plant was shuttered in south India in 2004 after residents claimed the company was depleting and polluting local water supplies. SABMiller PLC -- whose brands include Miller Lite, Peroni and Pilsner Urquell -- invested in water-purification technology for its factory in Dar es Salaam, Tanzania, where the overuse of groundwater by various industries has caused fresh aquifers to grow increasingly salty. The city's drinking water supply is sufficient for only a third of its three million residents, water aid groups say.

SABMiller's executives started to worry about the company's water footprint in August 2007. The World Business Council for Sustainable Development had just released its online "global water tool," which allows companies to enter the GPS coordinates of their factory sites in order to identify hot spots where water scarcity overlaps with factory operations or agricultural supply chains. The results were alarming: About 30 of the company's sites, including factories in South Africa, India and Peru, were shown to be vulnerable to future water shortages, says Andy Wales, SABMiller's director of sustainable development.

The company decided to tackle its water footprint in South Africa -- a water-scarce country where more than five million people lack access to safe drinking water -- with hopes of replicating the project elsewhere. South Africa breweries produce 17% of SABMiller's beer. The company hired the environmental consultancy URS Corp. to trace how much water was used in everything from growing hops to rinsing bottles before recycling them, and brought on the World Wildlife Fund as an independent adviser.

The study, completed in October, showed that 95% of the company's water footprint goes toward growing agricultural ingredients. The water used to grow barley, maize and hops, as well as what is used in factories, added up to about 155 liters of water, or 41 gallons, per liter of beer.

The findings led SABMiller to focus on water-scarce regions, including Gouritz -- a coastal area where SABMiller's suppliers grow hops, barley and other ingredients and where water supplies are diminishing. SABMiller is examining more-efficient irrigation technology for its sugar and barley farms there.

Conservationists are divided over whether water footprinting will translate into meaningful conservation efforts. "Footprinting has its place, but it's not a panacea," says Nick Hepworth, director of Water Witness International, a nonprofit advocacy organization. Companies may feel better by calculating their water footprints, says Mr. Hepworth, "but at the end of the day there's still a need for an objective audit."

Despite the challenges involved, water footprinting is poised to grow. Unilever PLC, which owns 400 food and household brands, estimates that it saved about \$26 million by reducing water waste in its factories from 2001 to 2007. Recently, the company has started reducing water used to grow ingredients for its Lipton Tea and Ragu tomato sauce by using drip irrigation to grow black tea in Tanzania and tomatoes in California. Such efforts stand to have a significant impact: Unilever buys 7% of the world's tomatoes, and 12% of the world's commercial black tea.

Water-management experts have started to build models for "water offset" projects so that beverage companies and other heavy water users can soften their impact by funding water sanitation and conservation projects. PepsiCo recently piloted a program to help rice farmers cultivating 4,000 acres in India switch from flood irrigation to direct seeding, a planting method that requires less water and makes crops more resilient to drought.

"Three billion more people are going to be on this planet [by 2050]," says Stuart Orr, manager of the Freshwater Footprint Project for the World Wildlife Fund. "Somehow, we're going to have to use the same amount of water we use today."

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