

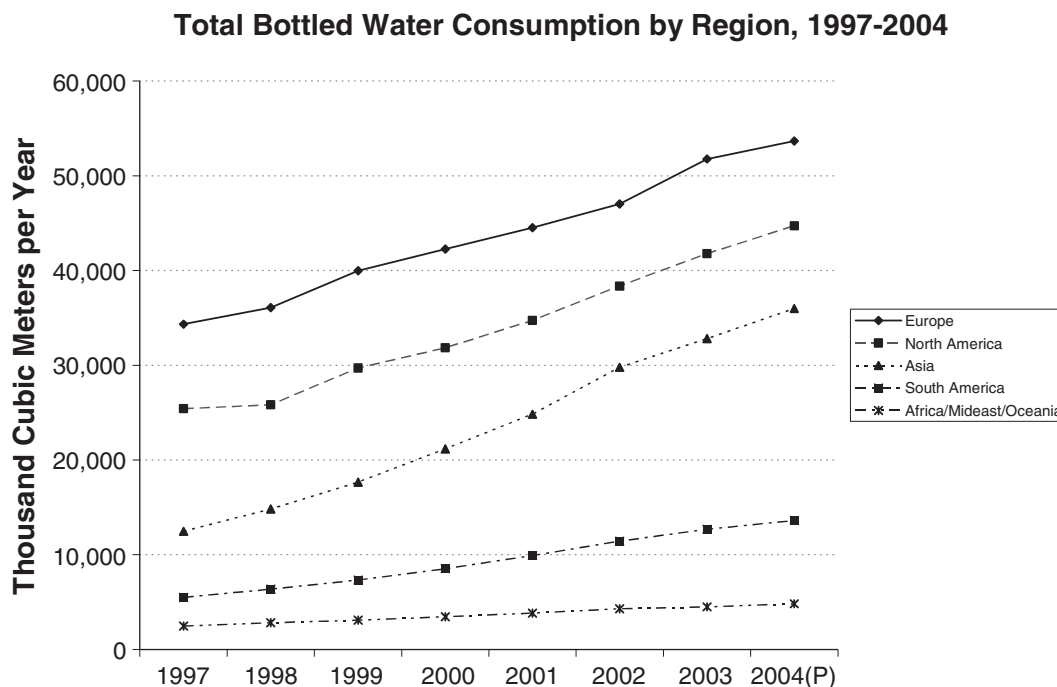
W A T E R B R I E F 1

# Bottled Water: An Update

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The 2004 volume of *The World's Water* discussed the growing phenomenon of bottled use around the world, particularly in regions where high-quality tap water is available, as in most of North America and Western Europe (Gleick 2004). This “In Brief” updates recent events and provides new data on bottled water use.

Bottled-water sales continue to grow rapidly, as does controversy over its use (Water Technology News 2006a; Arnold 2006). Total annual sales are now on the order of \$50 to \$100 billion dollars, for over 150 million cubic meters (m<sup>3</sup>). Growth in sales has been particularly rapid in Asia and South America, where sales have nearly tripled since 1997. Figure WB 1.1 and Table WB 1.1 show the total sales over time for the major continental regions.



**FIGURE WB 1.1** Bottled water consumption by region from 1997 to 2004 (preliminary). While total volume in Europe and North America remains high, consumption is growing very rapidly in Asia.

Source: Data were provided by the Beverage Marketing Corporation to the author in 2005 and are used with permission.

**TABLE WB 1.1** Regional Consumption of Bottled Water, 2003 and 2004  
(Thousand Cubic Meters per Year)

Region	2003	2004 (P)
Europe	51,768	53,661
North America	41,778	44,715
Asia	32,795	35,977
South America	12,677	13,607
Africa/Mideast/Oceania	4,499	4,823
All others	14,074	15,974
<b>Total</b>	<b>157,591</b>	<b>168,758</b>

*Source:* Data were provided by the Beverage Marketing Corporation to the author in 2005 and are used with permission; see also Data Table 11

P, preliminary.

Total use remains especially high in the United States, Mexico, China, and Brazil (Table WB 1.2). Per capita use, however, is still highest in European countries, despite the wide availability of high-quality, reliable tap water, and, in Mexico (Table WB 1.3), where water quality problems are more ubiquitous. Italy reports the highest yearly per capita consumption of bottled water at 184 liters per person, and six of the top ten consumers who drink more than 100 liters per person per year are European.

What drives these sales? No definitive analysis of the reasons has been presented, but three factors play important roles: (1) fear about the quality of tap water, (2) convenience, and (3) preferences and perceptions of taste.

In many parts of the world, tap water is not available or safe to drink. In these regions, the failure of governments to provide basic water services has opened the door to private companies and vendors filling a critical need, albeit at a very high cost to consumers. As Table WB 1.3 shows, total use is very high in Mexico, Brazil, China, and Indonesia, partly due to concern over bad local water quality. As Gleick (2004) noted, the price of bottled water is often literally a thousand times higher than reliable municipal supply. In many developed countries, however, fear of tap water is fueled by public reporting of violations of drinking water quality standards (e.g., Toledo Blade 2006; WISCTV 2006), by advertising that implies that bottled water imparts special health benefits (Water Technology New 2006b; U.S. FDA 2006), and by public ignorance of the actual quality of their municipal supply.

**TABLE WB 1.2** Ten Largest Consumers of Bottled Water, 2003 and 2004  
(Thousand Cubic Meters per Year)

Country	2003	2004 (P)
United States	24,199	25,893
Mexico	16,495	17,683
China*	10,628	11,894
Brazil	10,758	11,598
Italy	10,350	10,661
Germany	9,950	10,313
France	8,907	8,550
Indonesia	6,945	7,362
Spain	5,098	5,506
India	4,202	5,126

\*Includes bottled water use in Taiwan. P, preliminary.

*Source:* Data were provided by the Beverage Marketing Corporation to the author in 2005 and are used with permission; see also Data Table 10.

**TABLE WB 1.3** Fifteen Largest Per Capita Consumers of Bottled Water, 2003 and 2004 (Liters per Person per Year)

Country	2003	2004 (P)
Italy	179	184
Mexico	157	169
United Arab Emirates	145	164
Belgium-Luxembourg	133	148
France	148	142
Spain	127	137
Germany	121	125
Lebanon	96	102
Switzerland	96	100
Cyprus	86	92
United States	85	91
Saudi Arabia	88	88
Czech Republic	84	87
Austria	86	82
Portugal	78	80

P, preliminary.

Source: Data were provided by the Beverage Marketing Corporation to the author in 2005 and are used with permission; see also Data Table 13.

Bottled water is also convenient to use. It is portable, reliable, and widely accessible. Sales at supermarkets, convenience stores, sporting events, and hotels put bottled water in every public location. Companies can even buy generic bottled water with their own labels for sale or distribution to customers.

Finally, some people do not like the taste of their tap water, which is sometimes heavily chlorinated or contains minerals that impart unpleasant tastes. Bottled water, in contrast, is often processed to remove taste. Ironically, many independent blind taste tests have shown that few people can actually identify bottled water by taste or express a preference for bottled water versus tap water when they do not know which they are drinking (Stossel 2005). In 2001 a water company in Yorkshire, England, found that 60 percent of nearly 3,000 people surveyed could not distinguish between local tap water and bottled water. That same year, the *Cincinnati Enquirer* discovered that the city's tap water rated an 8.2, compared with Dannon's 8.3 and Evian's 7.2, on a scale of 1 to 10 (Shermer 2003).

Standards for bottled water remain inconsistent from country to country. In some places, few or no standards are imposed, or monitoring is haphazard, unreliable, or incomplete. Even in the United States, bottled water is regulated and monitored differently from tap water, and, although both are usually safe to drink, both are also periodically found to be contaminated with minerals or other substances in violation of standards. Bottled water violations are not always reported to the public, or are not reported in a timely manner. Table WB 1.4 lists a few examples of bottled water recalls or enforcement reports put out by the U.S. Food and Drug Administration (FDA).<sup>1</sup> As the table indicates, the reports often appear months after the violation is detected and long after the product has been distributed and sold. The violations notices listed in this table appeared at an average of five months after they occurred, but as long as fourteen and fifteen months later, making it impossible for the contaminated product

1. A more complete listing of reported violations will be posted at [www.worldwater.org](http://www.worldwater.org). My personal favorite is the 1994 recall of bottles "contaminated with crickets."

**TABLE WB 1.4** A Few Examples of Bottled Water Recall and “Field Corrections” Notices from the U.S. Food and Drug Administration

<b>FDA Recall Notice Date</b>	<b>Date of Production</b>	<b>Product</b>	<b>Manufacturer</b>	<b>Reason Given</b>	<b>Volume Recalled</b>	<b>Locations</b>
2/28/90	February 1990	Sparkling water	Perrier Group, Paris, France	Contaminated with benzene	0.5 million cases remain on market as of recall date	Nationwide and U.S. territories
7/18/90	April 1990	Spring water	West Lynn Creamery, Lynn, Massachusetts	Fish smell or taste/burning sensation due to sodium hydroxide contamination	125 cases (12 bottles per case)	Vermont
7/10/91	April 1990	Bottled drinking water	Famous Ramona Water Company, Ramona, California	Contaminated with algae and <i>Pseudomonas aeruginosa</i>	Approximately 13,621 cases	Hawaii, California
11/13/91	July–August 1991	Spring water	Idlenot Farm Dairy, Inc., Wilton, New Hampshire	Off-odor and off-taste due to tetrahydrofuran	Approximately 19,500 gallons	New Hampshire, Massachusetts, Vermont
1/29/92	November 1991	Mineral water	Apollinaris Brunnen AG, Federal Republic of Germany	Contaminated with dimethyl disulfide	6,468 cartons (12 bottles per case) were distributed	Nationwide
12/19/94	May 1994	Sparkling water; flavored	Southwest Cannery, Inc., Nacogdoches, Texas	Contaminated with crickets	None given	Alabama, Florida, Georgia
10/5/94	July 1994	Bottled water	Southern Beverage Packers, Inc., Hartlem, Georgia	Product contained brown precipitates	5 million containers	Southeastern United States
4/26/95	September 1994	Drinking water	All Star Bottling Company, Kansas City, Kansas	Contaminated with mold	1 1/2 to 2 million bottles were distributed; firm estimated none remained on the market when the recall was announced	Montana, Texas, Oklahoma, Missouri, Nebraska, Wyoming, Colorado, North Dakota, Minnesota, Louisiana
5/8/96	March–October 1995	Spring water	North Country Natural Spring Water Company, Kent, New York	Contaminated with mold	226,680 cases (4 1-gallon bottles per case)	Connecticut, Delaware, Massachusetts, Maine, Maryland, North Carolina, New Hampshire, New Jersey, New York, Pennsylvania, Virginia, West Virginia, Washington, DC

11/27/96	July, August, September 1996	Drinking water, spring water	Marion Pepsi-Cola Bottling Company, Marion, Illinois	Product is adulterated due to the presence of coliforms	403,608 20-ounce bottles and 42,945 1-liter bottles; 67,789 gallon, 3,505 2-1/2-gallon and 980 5-gallon containers	Missouri, Illinois, Arkansas, Kentucky, Tennessee
8/5/98	May 1998	Mineral water, spring water	Calistoga Mineral Water Company, Calistoga, California	Bottled in defective glass bottles whose rims may chip and allow glass to enter the product	172,533 cases or 4,140,792 bottles were distributed	California and other Western states
No public notice <sup>1</sup>	7/19/00	Bottled water	Cott Beverages, Tampa, Florida	Contaminated with unspecified over-the-counter drug	None given	Unavailable
2/7/01	August 2000	Drinking water, purified water	Safeway Bottled Water Division, Tempe, Arizona	Unfit for food because they contain particulate matter	7,560 cases of purified water and 23,100 cases of drinking water. All products are sold in cases of six gallon bottles each.	Arizona and New Mexico
3/13/02	August 2001	Drinking water	Bareman Dairy, Inc., Holland, MI	May contain equipment sanitizer	19,700 gallons	Illinois, Indiana, Michigan
9/1/04	April 2004	Mineral water	Casa Imports, Inc., Utica, NY	Mineral water makes unapproved claim. Label claims to reduce cholesterol.	1 liter (12 bottles); .5 liter (84 bottles); .25 liter (5 bottles)	Maine, New York, Pennsylvania
10/20/04	September 2004	Purified water, distilled water	Spectrum Laboratory Products, Inc., Gardena, CA	Microbial contamination; <i>Burkholderia cepacia</i>	537 containers	Nationwide and Puerto Rico
8/31/05	June 2005	Drinking water	Publix Supermarkets, Inc., Deerfield Beach, Florida	Bottled water has off-odor and off-taste	48,764 1-gallon containers; 16,064 2.5-gallon containers	Florida

Notes:

This is a small sampling of FDA-listed recall notices. A more complete listing will be posted at <http://www.worldwater.org>.

1. This event and additional violations were discovered by the Pacific Institute through a Freedom of Information Act Request (F06-2744) filed February 22, 2006.

Source: FDA Enforcement Report Index. <http://www.fda.gov/opacom/Enforce.html>.

to be removed from the market. As a result, these “notices” are ineffective at protecting the public from hazardous or mislabeled product.

Bottled water recalls have affected products in every state of the United States. Consumers would benefit from more comprehensive testing, timely detection and reporting, and faster correction of violations, as well as more consistent standards of protection. Serious consideration should be given to making bottled water standards and drinking water standards comparable in all respects.

Some bottled water trade organizations and associations have made an effort to offer standard guidance to their members. The International Bottled Water Association, for example, has created the “IBWA Bottled Water Code of Practice,” which applies to all members of the Association in the United States. The code requires that an annual, unannounced independent audit be conducted by a certified, third-party inspection agency. This inspection includes a look at the plant, including areas used for bottled water production as well as nonproduction areas, along with a review of plant records to confirm compliance with FDA and state standards for monitoring/testing, quality, labeling, and Good Manufacturing Practices (Kay 2006). This inspection, however, requires no testing of actual water quality, which is left up to the bottler themselves under the guidelines established by the U.S. FDA.

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