

MUDGY WATERS: THE PUBLIC HEALTH RISKS AND SUSTAINABILITY OF BOTTLED WATER IN CHINA

Abigail Barnes* & Wei Cao**†

INTRODUCTION

The men took their positions in front of their lanes, elastic caps tightly gripping their heads and silver diaphanous bulbs shielding their eyes. As the Olympic swimmers geared up for the 400-meter freestyle in London in 2012, China's Sun Yang cracked open a bottle of water and doused himself.¹ His Hungarian competition took the more traditional approach, splashing himself with handfuls of pool water. At the 2012 London Olympics, a striking number of Chinese swimmers emptied bottles of water over their bodies before the start of each race.² This public spectacle not only reflects China's vibrant consumer culture, but also carries a note of irony given that water shortages affect over half of China's cities.³ One cannot help but wonder whether these acts were inconsequential, or whether they reflect broader Chinese perceptions about water and the nexus between resource conservation and consumerism.

Urbanization and rising energy demand have strained China's fresh water resources.⁴ Approximately 70% of China's fresh water supplies are polluted to some degree, and the water pipes in many urban areas are outdated, often leeching impurities into the public drinking water.⁵ The

* Abigail Barnes is a J.D. Candidate at Vermont Law School and M.E.M. Candidate at the Yale School of Forestry and Environmental Studies.

** Wei Cao is a PhD Candidate at Renmin University.

† The authors would like to thank Professor John D. Echeverria and David Zoppo for their insightful feedback and careful edits to earlier versions of this Article. The authors are also grateful to the U.S.-China Partnership for Environmental Law at Vermont Law School for the opportunity to write this Article and the U.S. Agency for International Development.

1. *Men's 400-Meter Freestyle: London Olympics*, YOUTUBE (July 28, 2012), <http://www.youtube.com/watch?v=nIIHQWPdBec&feature=relmfu>.

2. *E.g., id.*

3. PETER H. GLEICK, *China and Water*, in THE WORLD'S WATER 2008–2009, at 79, 85 (2009), available at <http://www.worldwater.org/data20082009/ch05.pdf>; see China Daily, *Safe Drinking Water*, CHINA-WIRE (Apr. 27, 2012), <http://china-wire.org/?p=19946> (noting that 242 million rural villagers and 33 million rural students do not have access to safe drinking water).

4. See Elizabeth Economy, *China's Growing Water Crisis*, THE GLOBAL PUB. SQUARE BLOG, CNN WORLD (Aug. 10, 2011), <http://globalpublicsquare.blogs.cnn.com/2011/08/10/chinas-growing-water-crisis/> (explaining that a majority of China's industrial water use involves energy production, and that China's plan of urbanizing 400 million people by 2030 will only exacerbate the problem).

5. *China's Rivers: Frontlines for Chemical Wastes*, WORLDWATCH INST., <http://www.worldwatch.org/chinas-rivers-frontlines-chemical-wastes> (last visited Apr. 21, 2014); see Gong Jing & Liu Hongqiao, *Half of China's Urban Drinking Water Fails to Meet Standards*, CHINADIALOGUE (June 6, 2013), <https://www.chinadialogue.net/article/show/single/en/6074-Half-of->

country's economic growth is outpacing fresh water supplies.⁶ National water demand is projected to rise 63% by 2030, which is, "gallon for gallon, more than anywhere else on earth."⁷ In response, Chinese authorities are pursuing a series of ambitious projects that include greater investment in desalination technologies and a \$62 billion overhaul of the nation's waterways to divert water to more arid regions.⁸

This brings us to bottled water: the ostensibly pure, healthy water source that offers safety and abundance in the face of contamination and scarcity.⁹ A once ridiculed novelty from the 1960s is now a multi-billion dollar industry with distribution stretching to the farthest reaches of the world. Producing bottled water requires significant quantities of water and energy and leaves a growing trail of waste in its wake.¹⁰ As a result, the product's environmental drawbacks are coming to the fore, particularly in China where water and waste issues are especially grim.¹¹ Public health risks also accompany bottled water consumption.¹² Yet few question the fundamental underpinnings of the industry's success—however, one contaminated bottle and the bottled water myth could crumble. Bottled water in China is particularly susceptible to contamination given the industry's antiquated and lax regulations as well as the financial hardships that accompany proper water filtration.¹³ This combination of factors

China-s-urban-drinking-water-fails-to-meet-standards (mentioning a 2002–2003 housing ministry survey that found water pipes in hundreds of cities "universally sub-standard").

6. KWR WATERCYCLE RESEARCH INST., CHINA TOP SECTOR WATER: WATER TECHNOLOGY OPPORTUNITIES FOR DUTCH COMPANIES 5 (2013), available at http://china.nlambassade.org/binaries/content/assets/postenweb/c/china/zaken-doen-in-china/import/kansen_en_sectoren/water/20130730-kansenrapport-watertechnology.pdf.

7. Michael Wines, *China Takes a Loss to Get Ahead in the Business of Fresh Water*, N.Y. TIMES (Oct. 25, 2011), <http://www.nytimes.com/2011/10/26/world/asia/china-takes-loss-to-get-ahead-in-desalination-industry.html?pagewanted=all>.

8. *Id.*; *South-North Water Transfer Project*, INT'L RIVERS, <http://www.internationalrivers.org/campaigns/south-north-water-transfer-project> (last visited Apr. 21, 2014).

9. Yong Jiang, *China's Water Scarcity*, 90 J. OF ENVTL. MGMT. 3185, 3187 (2009), available at <https://www.uni-hohenheim.de/fileadmin/einrichtungen/hebrew-university/Literature/Jiang-JEM2009.pdf> (noting that "China's total water deficit could reach 400 billion m³" by 2050, which is "roughly 80% of the current annual capacity of approximately 500 billion m³").

10. Emily Arnold & Janet Larsen, *Bottled Water: Pouring Resources Down the Drain*, EARTH POL'Y INST. (Feb. 2, 2006), http://www.earth-policy.org/plan_b_updates/2006/update51.

11. See KWR WATERCYCLE RESEARCH INST., *supra* note 6, at 7 (noting that the Chinese government is seeking to promote environmental protection to deal with increasing water issues).

12. See Carol Potera, *The Price of Bottled Water*, 110 ENVTL. HEALTH PERSPS. 76, 76 (2002), available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240751/pdf/ehp0110-a0074c.pdf> (mentioning two reports that suggest bottled water is neither safer nor healthier than tap water).

13. See Katie Burkhardt, *Tips for Drinking Safe, Clean Water in China*, ECHINACITIES.COM (May 10, 2013), <http://www.echinacities.com/expat-corner/Tips-for-Drinking-Safe-Clean-Water-in-China> (explaining that China has 80% fewer national standards for bottled water than it does for tap water and that water filtration systems vary in price, with some costing several thousand dollars).

invites a high-profile public health scare on par with China's melamine scandal. In fact, a high-profile bottled water scandal involving Nongfu Spring occurred in April 2013.¹⁴

In a country like China—where water pollution is pervasive and tap water notoriously risky¹⁵—bottled water is presumably safer than tap water because the bottler's reputation is at stake.¹⁶ But the industry's lack of transparency challenges this presumption. Additionally, China's notoriously poor tap water quality makes purchasing bottled water in China easier to justify than in many developed countries¹⁷—where fewer tap water quality concerns exist.¹⁸ Even if bottled water is relatively safer than tap water, it does not mean that it is a safe drinking source for consumers. Skepticism surrounding the quality of bottled water is mounting in the wake of recent contamination scandals that have compromised perceptions of China's bottled water safety and undermined its perceived superiority.¹⁹

For decades, bottled water has fueled an international industry shrouded in secrecy. This is particularly true in China, where data and information concerning business operations can be difficult for "ordinary citizens" to obtain.²⁰ Although commercial market research on Chinese bottled water exists, these industry reports are generally expensive and thus difficult for the public to access.²¹ Moreover, although this research reveals

14. Chris Marquis & Zoe Yang, *Nongfu Spring Water: How Food Safety Scandals Affect a Company's Image*, DANWEI (Sept. 5, 2013), <http://www.danwei.com/nongfu-spring-water-how-food-safety-scandals-affect-a-companys-image/>.

15. See NETSCRIBES, BOTTLED WATER MARKET IN CHINA 2 (2011) (describing China's rampant water pollution and poor tap water quality).

16. See Potera, *supra* note 12, at 76 (explaining that bottlers face penalties and recalls if their water fails to meet certain standards).

17. See Dermot Doherty, *Nestle Taps China Water Thirst as West Spurns Plastic*, BLOOMBERG (Jan. 10, 2013), <http://www.bloomberg.com/news/2013-01-10/nestle-taps-china-water-thirst-as-west-spurns-plastic.html> (stating that bottled water businesses in China are growing due to pollution concerns, while environmental concerns are causing the businesses to decline in Europe and the United States).

18. See NETSCRIBES, *supra* note 15, at 8 (recognizing that Western water supplies typically do not contain the dangerous levels of heavy metals present in Beijing tap water).

19. *Beijing Halts Sales of Tainted Bottled Water*, AGENCIE-FRANCE PRESS (Jul. 7, 2011), http://www.terrada.com/reports/Beijing_halts_sales_of_tainted_bottled_water_999.html; Cf. Wu Wencong, *Questions Remain Over Safety of Bottled Water*, CHINA DAILY, http://www.chinadaily.com.cn/business/2011-08/16/content_13120656.htm (last updated Aug. 16, 2011, 9:24 AM) (noting that despite widespread home use of bottle services, thirty one water brands failed regular safety checks).

20. David Barboza, *Obtaining Financial Records in China*, N.Y. TIMES, Oct. 26, 2012, http://www.nytimes.com/2012/10/27/business/global/obtaining-financial-records-in-china.html?_r=0; Marquis & Yang, *supra* note 14.

21. *Purchase Options*, IBISWORLD, <http://www.ibisworld.com/cartv2/purchaseoptions.aspx> (last visited Apr. 21, 2014) (making available the market report for IBISWorld's *Bottled Water Production in China* report for \$1,595); *Bottled Water in China*, EUROMONITOR INT'L (Apr. 2013),

consumption rates, sales, and key market shareholders, it does not discuss the quality of bottled water. Additionally, a fair amount of literature on water in China glosses over the topic of bottled water altogether. For example, a 143-page report on water in China published in 2009 includes only a single reference to bottled water.²² Likewise, a book titled *Water and Development in China* dedicates an entire chapter to water privatization in China, but makes no reference to bottled water.²³ The media only recently started seriously investigating bottled water quality. In May of 2013, the *Beijing News* published a report criticizing the nation's bottled water laws and questioning bottled water quality in China.²⁴

Perhaps the enigmatic nature of the bottled water industry in developed countries like the United States—where industry information is presumably easier to access—discourages inquiry into China's industry. The bottled water business in the United States has long faced criticism for its lack of transparency. As water expert Peter Gleick points out, the United States bottled water industry is rife with “complicated and contradictory [rules], full of loopholes and ambiguity.”²⁵ However, in the United States (and many other developed countries), freedom of the press and investigatory journalism often keep industry in check by exposing corrupt businesses’ dealings.²⁶ Conversely, in China, there is no *60 Minutes* equivalent, and investigative journalists are closely monitored.²⁷ The state heavily patrols

<http://www.euromonitor.com/bottled-water-in-china/report> (pricing its market report on bottled water in China at \$900).

22. See, e.g., JIAN XIE ET AL., THE WORLD BANK, ADDRESSING CHINA'S WATER SCARCITY: RECOMMENDATIONS FOR SELECTED WATER RESOURCE MANAGEMENT ISSUES 89 (2009), available at http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2009/01/14/000333037_20090114011126/Rendered/PDF/471110PUB0CHA0101OFFICIAL0USE0ONLY1.pdf (mentioning bottled water once, on page 89).

23. See generally SEUNGHO LEE, WATER AND DEVELOPMENT IN CHINA: THE POLITICAL ECONOMY OF SHANGHAI 181–225 (2006) (making no reference to bottled water).

24. See Wang Xiaodong, *Unified Standards for Bottled Water in the Pipeline*, CHINA DAILY (May 4, 2013, 1:23 AM), http://www.chinadaily.com.cn/china/2013-05/04/content_16474580.htm (mentioning a *Beijing News* report stating that about one-third of bottled water sold in Beijing is in accordance with the company’s own standards).

25. PETER GLEICK, BOTTLED AND SOLD: THE STORY BEHIND OUR OBSESSION WITH BOTTLED WATER 33 (2010) [hereinafter GLEICK, BOTTLED AND SOLD].

26. See Leonard Downie, *Forty Years After Watergate, Investigative Journalism is at Risk*, WASH. POST (June 7, 2012), http://www.washingtonpost.com/opinions/forty-years-after-watergate-investigative-journalism-is-at-risk/2012/06/07/gJQArTzILV_story.html (noting the many areas in which investigative journalism has exposed corruption and other problems).

27. See Xiao Shu, Op-Ed., *Dim Hopes for a Free Press in China*, N.Y. TIMES, Jan. 15, 2013, <http://www.nytimes.com/2013/01/15/opinion/dim-hopes-for-a-free-press-in-china.html> (“[I]n the last few years, amid rising social unrest, the government has intensified its efforts at ‘preserving stability’ . . . [resulting in] a dramatic increase in control of the media.”); e.g., Sharon LaFraniere, *China Moves to Tighten Data Controls*, N.Y. TIMES, Apr. 27, 2010, <http://www.nytimes.com/2010/04/>

news sources, and information that portrays China in a negative light is often classified as a “state secret,” lending legitimacy to government decisions to bar disclosure.²⁸ Because of these Orwellian censorship policies, businesses and commercial activities often escape media scrutiny.²⁹ The lack of free press limits the amount of information available on China’s bottled water industry, and specifically the quality and safety of the water inside the bottle. This Article relies on the information available surrounding China’s bottled water industry to piece together a glimpse of a well-guarded water world. Part I provides a sketch of the global and Chinese bottled water markets and their origins, and explores the sustainability of Chinese bottled water through the lens of energy, water, and waste. Part II looks at bottled water contamination scares and examines public health and quality control concerns. Part III examines the different laws, regulations, agencies, standards, and rules regulating bottled water in China. Part IV offers law and policy recommendations for improving China’s bottled water regulation and for protecting public health and the environment.

I. THE BOTTLED WATER INDUSTRY

A. *The Global Bottled Water Market*

When the pilgrims landed at Plymouth Rock in 1620, the idea of drinking water to quench their thirst was as foreign as the land underfoot.³⁰ The barreled water stored below the ship decks held little appeal for the thirsty pilgrims disembarking from the Mayflower. Beer was the beverage of choice at that time, as drinking water was generally associated with poverty, destitution, and disease.³¹

Bottled water—or mineral water, historically—was treated differently. Traditionally, mineral water came from natural spas and underground aquifers. Revered as a gift from the gods, people believed mineral water

28/world/asia/28china.html (describing an instance when a journalist was arrested for violating the state secrecy law).

28. E.g., LaFraniere, *supra* note 27 (describing an incident when a journalist was arrested for violating the state secrecy law).

29. Christopher Buckley, *NY Times Reporter Forced to Leave China Over Visa*, ASSOCIATED PRESS (Dec. 31, 2012, 6:23 PM), <http://bigstory.ap.org/article/ny-times-reporter-forced-leave-china>; Raymond Li, *Chinese Media Censorship: All-Pervading, Increasingly Challenged*, BBC (Jan. 21, 2013, 3:51 PM), <http://www.bbc.co.uk/blogs/blogcollegeofjournalism/posts/Chinese-media-censorship-all-pervading-increasingly-challenged>.

30. FRANCIS H. CHAPELLE, *WELLSPRINGS: A NATURAL HISTORY OF BOTTLED SPRING WATERS* 103 (2005).

31. *Id.* at 103, 106–07.

provided health benefits and cured disease.³² These perceived health and medicinal benefits fueled bottled water's early appeal.³³ Bottling mineral water dates back to the Roman times, when mineral waters were transported in amphoras—Roman-style jugs—to treat medical ailments throughout the Empire.³⁴ Although Europeans long recognized the health properties of mineral water, it did not gain global appeal until the early eighteenth century, when drinking mineral water became fashionable in the Americas.³⁵ In the mid-1800s, as diseases like cholera and typhoid spread throughout Europe and the United States, bottled water was not only considered a healthier and safer alternative to municipal water, but was also perceived as a sign of refinement.³⁶ Although the bottled water market has its origins in Western Europe,³⁷ the bottled water industry that we know today emerged in the United States during the mid-1800s.³⁸ The industry took root when a preacher from New York bottled the spring waters of Saratoga Springs.³⁹ Around the same time, a Maine innkeeper, extolling the therapeutic properties of water from a local spring, began selling his water under the name Poland Spring.⁴⁰

The popularity of bottled water ebbed in the early twentieth century with the introduction of chlorine to tap water.⁴¹ This disinfectant boosted tap water's popular appeal by making faucet water seemingly purer and safer to drink. As a result, consumption of bottled water declined and triggered the bottled water industry's near demise in the 1930s and 1940s.⁴² It was not until the 1970s—when concerns about the quality of municipal water surfaced—that the bottled water industry rebounded.⁴³ Tap water

32. *Bottled Waters Facts: History of Bottled Water*, EUR. FED'N OF BOTTLED WATER, <http://www.efbw.eu/bwf.php?classement=01> (last visited Apr. 21, 2014).

33. *Id.*

34. *Id.*; cf. CHAPELLE, *supra* note 30, at 72–73 (discussing how the wealthy would be the ones to bottle and transport mineral spring water home).

35. CHAPELLE, *supra* note 30, at 105, 107.

36. *Id.* at 107, 110–11.

37. Europe's oldest mineral water brand, San Pellegrino, is approximately six-hundred years old. Mark Miller, Bottled Water: Why Is It So Big? Cases for the Rapid Growth of Bottled Water Industries 3 n.1 (May 2006) (unpublished honors thesis, Texas State University—San Marcos) (on file with author).

38. CHAPELLE, *supra* note 30, at 4.

39. *Id.* at 4. The first documented cases of bottled water sales in the United States date back to the 1760s. *Id.* at 73.

40. *Id.* at 172; JAVIER GIMENO & KAREL COOL, INSEAD, THE EVOLUTION OF THE BOTTLED WATER INDUSTRY: READY FOR THE “WATER WARS”? 1 (2012), available at <http://www.slideshare.net/arulalmbhatia/growth-of-market-whole-world>.

41. CHAPELLE, *supra* note 30, at 3, 5, 111.

42. *Id.* at 4–5.

43. *Id.* at 5–6.

quality concerns, coupled with Europe's popularization of single-serving size bottles, led to market growth in the mid-to-late twentieth century.⁴⁴

Developments in water sourcing also fueled growth in the bottled water industry. Following legislative revisions in bottled water regulation, bottled water no longer needed to come from a single original source; rather, it could be drawn from public municipal water supplies.⁴⁵ This changed the bottled water industry and facilitated the expansion of bottler operations and distribution.⁴⁶ Permitting bottled purified tap water drew large beverage corporations like PepsiCo and Coca-Cola into the bottled water business.⁴⁷

As the industry expanded and globalized, larger multinational corporations pushed out smaller bottlers or acquired them.⁴⁸ Before 1980, the bottled water landscape was heavily localized and comprised primarily of small bottlers specialized in bulk delivery.⁴⁹ These small bottlers disappeared over the next few decades as large corporations with established distribution networks and markets entered the business.⁵⁰ When this happened, the market went global and the smaller, localized business model vanished.⁵¹

In addition to legislation allowing bottlers to source from tap water, two developments propelled the industry's impressive global growth. First was the growing public concern about tap water quality—triggered by the release of an Environmental Protection Agency (EPA) report in the 1970s revealing potentially harmful elements in United States tap water.⁵² Second was the advent of oil-derived polyethylene terephthalate (PET). Before PET became popular, bottlers primarily used glass in their bottling operations.⁵³ The beverage industry's widespread use of PET plastic bottles in the late 1960s did not include bottled water until Nestlé introduced its PET bottled water line in the 1990s.⁵⁴ Identified by a number "1" triangle at the base of the bottles, PET revolutionized the bottled water industry by allowing

44. *Id.* at 6–7, 111.

45. Cf. GIMENO & COOL, *supra* note 40 (referring to the use of municipal tap water as “a major change in the industry”).

46. *Id.*

47. *Id.*

48. *Id.* at 1.

49. CHAPELLE, *supra* note 30, at 119, 122.

50. GIMENO & COOL, *supra* note 40, at 1 (observing that “large multinational” corporations entered into the industry).

51. *Id.* (noting that four companies control more than 30% of the global market).

52. See EPA, THE HISTORY OF DRINKING WATER TREATMENT (2000), available at <http://www.epa.gov/safewater/consumer/pdf/hist.pdf> (following studies finding chemicals in treated water, politicians introduced proposals for a federal safe drinking water law).

53. CHAPELLE, *supra* note 30, at 73, 76.

54. GLEICK, BOTTLED AND SOLD, *supra* note 25, at 91; GIMENO & COOL, *supra* note 40, at 5.

companies to transport bottled water long distances—even overseas.⁵⁵ PET was also an attractive material for bottlers because of its lightweight and transparent properties as well as its neutral effect on the water's taste.⁵⁶ In addition to the rise of PET and the public's increasing skepticism towards tap water, the convenience, taste, and status appeal of bottled water also helped drive the international bottled water market.⁵⁷ Although the primary motivations for bottled water consumption vary globally, these factors played a central role in cultivating bottled water's global appeal.

These forces led to impressive growth in the bottled water market. Since 1990, the number of bottled water consumers worldwide increased six-fold from 37 million to 228 million in 2010.⁵⁸ The industry generates roughly \$85 billion in annual sales,⁵⁹ which is divided primarily between the top market leaders: Coca-Cola, Nestlé, and San Pellegrino.⁶⁰ The industry predicts that the Asia-Pacific region, Africa, and the Middle East will lead growth over the next five years.⁶¹ This prediction matches analyst projections that the Asia-Pacific market will expand from \$24 billion in 2011 to \$34 billion in 2016.⁶² Presently, the United States, China, Mexico, Indonesia, and Germany (in that order) make up the top five countries in bottled water consumption.⁶³ If China's per capita consumption rises, China could easily surpass the United States in global consumption rankings.

There are three general categories of bottled water: natural mineral water, spring water, and purified water.⁶⁴ These categories are held to different criteria depending on the country.⁶⁵ In addition to these categories, the International Bottled Water Association (IBWA) also identifies three other bottled water categories: artesian water or artesian well water,

55. GIMENO & COOL, *supra* note 40, at 5 (explaining that PET bottles possess improved strength, lighter weight, and more design options); GLEICK, BOTTLED AND SOLD, *supra* note 25, at 89–92.

56. CHAPELLE, *supra* note 30, at 76.

57. Frank I. Salazar, *Bottled Water Industry*, SBDCNET, <http://www.sbdnet.org/small-business-research-reports/bottled-water-industry> (last visited Apr. 21, 2013).

58. UNICEF & WORLD HEALTH ORG., PROGRESS ON DRINKING WATER AND SANITATION 10 (2012), available at <http://www.unicef.org/media/files/JMPreport2012.pdf>.

59. CREDIT SUISSE, WATER 31 (2007), available at <http://www.ewatertek.ca/PDF/Credit%20Suisse-Investment%20Water%20Research%20Report-June%202007.pdf>.

60. Richard Hall, Chairman Zenith Int'l, 2011 Global Bottled Water Congress: Webinar 7 (Jul. 13, 2011), available at http://www.zenithinternational.com/pdf/events/00010_webinar.pdf.

61. *Id.* at 21.

62. Bloomberg News, *Nestle Suffers from Water Woes*, HOUSTON CHRON. (Apr. 21, 2012, 1:27 AM), <http://www.chron.com/news/houston-texas/article/Nestle-suffers-from-water-woes-3499142.php>.

63. Hall, *supra* note 60, at 12.

64. CATHERINE FERRIER, WORLD WILDLIFE FUND, BOTTLED WATER: UNDERSTANDING A SOCIAL PHENOMENON 3 (Apr. 2001), available at assets.panda.org/downloads/bottled_water.pdf.

65. *Id.*

sparkling water, and well water.⁶⁶ This Article recognizes three categories of bottled water: mineral water, non-mineral water, and purified tap water. While similar to the generally recognized categories mentioned above, this Article's categories are more broadly defined and better suited to categorizing China's bottled water market. Part III of this Article will define these categories.⁶⁷

The remarkable rise in demand for bottled water may be attributable to the consumer belief that bottled water is healthier, cleaner, and safer than tap water.⁶⁸ However, this belief is difficult to verify without more information. In countries like China, where there is a dearth of bottled water information, the premise that bottled water is safer than tap water is even shakier. Despite uncertainties about bottled water quality in China, recent contamination scares suggest that the nation's bottled water may present significant public health risks. To understand and contextualize these risks, it is necessary to examine the composition and historical trajectory of China's bottled water industry.

B. China's Bottled Water Market

1. Origins of the Industry

Bottled water in China can be traced back to the Zhou Dynasty (B.C. 781–771), when mineral water was reportedly used for medicinal purposes.⁶⁹ Emperors bathed in hot springs to recover from medical ailments like rheumatism.⁷⁰ Famous Chinese pharmacologist Li Shizhen (A.D. 1518–1593) of the Ming Dynasty published a scientific report on the medicinal benefits of China's mineral waters.⁷¹ Several centuries after Shizhen's study, mineral water became a commercial industry in China.

Prior to the 1980s, bottled water in China was exclusively mineral water, as other water sources had not yet been commercialized. In 1930, Germans established the Laoshan Mineral Water in Shandong Province,

66. *Types of Water—Bottled*, INT'L BOTTLED WATER ASS'N, <http://www.bottledwater.org/types/bottled-water> (last visited Apr. 21, 2014).

67. See *infra* Part III.

68. See NETSCRIBES, *supra* note 15, at 10 (stating that fear over water quality has led to demand for bottled water).

69. SPRINGS AND BOTTLED WATERS OF THE WORLD: ANCIENT HISTORY, SOURCE, OCCURRENCE, QUALITY AND USE 269 (Phillip E. LaMoreaux & Judy T. Tanner eds., 2001) [hereinafter SPRINGS AND BOTTLED WATERS].

70. *Id.*

71. *Id.*

making it the first commercial bottler in China.⁷² Several other mineral water companies emerged in the 1960s, including Weina Mineral Water of Inner Mongolia Autonomous Region and Longchuan Mineral Water of Guangdong province.⁷³ Since the 1960s, bottled water's popularity in China has grown considerably.

Although these Chinese mineral water companies predated most foreign bottled water competitors, foreign imports built China's modern bottled water industry. Foreign brands entered China in the late 1980s, and the industry developed rapidly thereafter.⁷⁴ Evian launched its first bottling operation in China around 1986,⁷⁵ and many Chinese business entrepreneurs who gambled on this new industry made millions.⁷⁶ The wealthiest man in China, Zong Qinghou, is the founder and CEO of Hangzhou Wahaha—one of China's leading bottled water companies.⁷⁷ By 1994, approximately 100 bottled water companies operated in China with an output of 3 million tons.⁷⁸ The following section examines the industry's rise and market design.

2. The Market Landscape and Projected Growth

A basic overview of China's bottled water market reveals a fragmented and localized landscape. Over 1,500 domestic bottled water brands are

72. RESEARCHINCHINA, CHINA DRINKING WATER INDUSTRY REPORT, 2009–2010, at 5 (Apr. 2010), available at <http://www.researchinchina.com/FreeReport/PdfFile/634130776590468750.pdf>.

73. SPRINGS AND BOTTLED WATERS, *supra* note 69, at 3.

74. See RESEARCHINCHINA, *supra* note 72, at 2, 5 (noting that the bottled water industry has seen steady growth since it entered the Chinese market in the early 1980s). Now a \$31.1 billion industry, bottled water accounts for the largest division of China's soft drink market. *Bottled Water Production in China Industry Research Report—Now Available from IBISWorld*, PRWEB.COM (Oct. 21, 2012), <http://www.prweb.com/releases/china/bottled-water/prweb10017907.htm>. Market analyst group Zenith International estimated that China's bottled water consumption grew from eight billion liters in 2000 to nearly twenty-one billion liters in 2009—approximately a 300% increase in consumption. Shaun Weston, *The Chinese Bottled Water Market*, FOODBEV.COM (Aug. 12, 2009), <http://www.foodbev.com/news/the-chinese-bottled-water-market#.UvKNBvtPOOc>.

75. Zhang Chunyan, *Flowing Well from Roof of the World*, CHINA DAILY (Oct. 19, 2012, 10:40 AM), http://europe.chinadaily.com.cn/epaper/2012-10/19/content_15830666.htm.

76. See Weston, *supra* note 74 (discussing the growth and future growth of the bottled water industry in China).

77. Russell Flannery, *China's 100 Richest*, FORBES (Oct. 11, 2012, 10:00 PM), <http://www.forbes.com/sites/russellflannery/2012/10/11/chinas100richest/>; *How China's Richest Man Made It*, WASH. POST (Nov. 3, 2012), http://www.washingtonpost.com/national/health-science/how-chinas-richest-man-made-it/2012/11/03/39a02a88-23ad-11e2-ba29-238a6ac36a08_story.html.

78. *Bottled Water from China*, FINEWATERS.COM, http://www.finewaters.com/Bottled_Water/China/index.asp (last visited Apr. 21, 2014).

scattered throughout the country,⁷⁹ yet only three of those brands are sold nationally.⁸⁰ The remaining brands are smaller and serve local communities.⁸¹ In 2012, approximately 740 bottle-manufacturing firms operated in China.⁸² Major bottlers include Hangzhou Wahaha Group Co., Ltd (14.5%), Ting Hsin International Group (14.2%), Nongfu Springs (4.2%), and C'estbon Food & Beverage (2.3%).⁸³ Combined, these top sellers generate over one-third of the industry's total domestic revenue.⁸⁴ The remaining two-thirds of the domestic market are comprised of smaller national brands such as 5100 Tibet Glacial Spring Water and Kunlun Mountains Water.⁸⁵

Foreign brands make up a smaller sliver of the China market. The major foreign players are Nestlé, PepsiCo, Heckman Corporation, Coca-Cola, and Groupe Danone.⁸⁶ The current leader among foreign brands is Nestlé, with an estimated 2% of the domestic market.⁸⁷ In 2012, Nestlé was the ninth largest seller of bottled water in China,⁸⁸ peddling popular brands such as Vittel, Perrier, San Pellegrino, Nestlé Pure Life, and Nestlé Aquarel.⁸⁹ The company's Pure Life brand is one of the nation's most

79. RESPONSIBLE RESEARCH, WATER IN CHINA: ISSUES FOR RESPONSIBLE INVESTORS 56 (Lucy Carmody ed., Feb. 2010), http://www.sustainalytics.com/sites/default/files/water_in_china_issues_for_responsible_investors_feb2010.pdf.

80. *Id.* at 54.

81. *Id.* at 56.

82. IBISWORLD, INDUSTRY REPORT 1532: BOTTLED WATER PRODUCTION IN CHINA 17 (2012).

83. These percentages are based off of 2012 figures. *Id.* at 22. A recent *Forbes* article contradicts this list. According to the article, "The top three water brands leading the charge in China now are Kangshifu (Tingyi Holding Corp.), Nongfushanquan (Zhejiang Nongfushanquan Water Co Ltd), Ice Dew (Coca-Cola) and Yibao (China Resources Enterprises)." Kenneth Rapoza, *Bottled Water Market Quickly Turning Chinese*, FORBES (Aug. 13, 2013, 1:51 PM), <http://www.forbes.com/sites/kenrapoza/2013/08/13/bottled-water-market-quickly-turning-chinese/>. This list is not likely accurate as it does not include Wahaha, which was by and far the largest bottled water company in 2012. *Bottled Water in China*, *supra* note 21.

84. IBISWORLD, *supra* note 82, at 17.

85. Weston, *supra* note 74; see, e.g., Zheng Yangpeng, *Opportunity Looms for Premium Chinese Water Brands*, CHINA DAILY (Aug. 13, 2012, 12:00 AM), http://www.chinadailyasia.com/opinion/2012-08/13/content_115936.html.

86. NETSCRIBES, *supra* note 15, at 2. Until recently, Danone dominated the foreign market, holding nearly 30% of the Asian market through a joint venture partnership with Hangzhou Wahaha. GIMENO & COOL, *supra* note 40. Although Danone exited this partnership in 2009 following a legal dispute, the company continues to maintain a strong presence in China's domestic market. Cf. David Barboza, *Danone Exits China Venture After Years of Legal Dispute*, N.Y. TIMES, Sept. 30, 2009, <http://www.nytimes.com/2009/10/01/business/global/01danone.html> (noting that the partnership helped Danone become a leader in the Chinese beverage industry).

87. See Doherty, *supra* note 17 (noting that Nestle had 1.7% of the Chinese market by value).

88. *Id.*

89. Weston, *supra* note 74.

popular, and one of the few foreign brands that sells at a domestically competitive price: \$0.30 (CN¥2) per bottle.⁹⁰

Although foreign brands can be found at nearly every street corner shop, Chinese brands overwhelmingly satisfy domestic demand.⁹¹ This is because foreign brands are relatively costly—selling often at two to three times the price of domestic competitors.⁹² Most foreign brands, like Evian, cost between \$1–3 (CN¥10–15), putting the brand in China’s “premium” market category.⁹³ By contrast, domestic brands are available for as little as \$0.15 (CN¥1).⁹⁴ This disparity in price may soon change, however, as the price of domestic bottled water is currently in flux.⁹⁵ Domestic bottled water prices recently rose 5–10% and this trend is projected to continue as quality standards improve and water becomes scarcer.⁹⁶

China’s bottled water market is expected to continue growing. In 2009, Asia was considered the leading driver of global bottled water growth—with China spearheading consumption.⁹⁷ Between 2004 and 2009, bottled water consumption in China roughly doubled.⁹⁸ Over the past decade, sales grew from \$1 billion in 2000 to \$9 billion in 2012.⁹⁹ Analysts anticipate an annual growth rate of 16.3% between 2010 and 2015—valuing the industry at \$21.4 billion.¹⁰⁰ However, more conservative estimates project 6%

90. See Dermot Doherty, *China’s Unsafe Water Is Nestlé’s Opportunity*, BUSINESSWEEK (Jan. 24, 2013), <http://www.businessweek.com/articles/2013-01-24/chinas-unsafe-water-is-nestls-opportunity> (noting that Pure Life is the world’s best-selling brand and that Nestlé has been successful in part because of its “middle-of-the-pack” pricing).

91. See *China Info Sheet: Bottled Water*, NEW ZEALAND TRADE & ENTER. 1, available at <http://www.prclive.com/pdf/uploads/Bottled%20water%20in%20China%20-%20info%20sheet%20-%202011.pdf> [hereinafter NEW ZEALAND TRADE & ENTER.] (observing that most of the market is made up of domestic brands).

92. See *id.* (“[D]ue to the higher price point of these [foreign] brands, most of the market is made up of domestic brands.”); see also Meng Jing, *China Gushes Over High-End Bottled Water*, CHINA DAILY (Oct. 7, 2011, 10:15 AM), http://usa.chinadaily.com.cn/weekly/2011-10/07/content_13843116.htm (purchasing a bottle of Evian is CN¥9 whereas a bottle of Nongfu is CN¥1).

93. Meng Jing, *supra* note 92.

94. *Id.*

95. See NEW ZEALAND TRADE & ENTER., *supra* note 91, at 1 (noticing a trend toward premium water due to growing Chinese affluence and water quality scandals).

96. Weston, *supra* note 74; see NETSCRIBES, *supra* note 15, at 9 (arguing that water shortages will only increase the demand for bottled water).

97. *Global Report: Bottled Water Some Ups and Downs*, BEVERAGE WORLD, Mar. 15, 2010, at 46, available at <http://www.nxtbook.com/nxtbooks/idealmedia/bw0310/index.php?startid=46>.

98. John G. Rodwan, Jr., *Challenging Circumstances Persist: Future Growth Anticipated: U.S. and International Developments and Statistics*, BOTTLED WATER REP., Apr./May 2010, at 16 (2010), available at <http://www.bottledwater.org/files/2009BWstats.pdf>.

99. Lily Kuo, *China Still Uses Soviet-Era Regulations to Test its Bottled Water*, YAHOO! FINANCE (May 3, 2013, 6:26 AM), <http://finance.yahoo.com/news/china-still-uses-soviet-era-102616231.html>.

100. NEW ZEALAND TRADE & ENTER., *supra* note 91, at 1.

growth.¹⁰¹ Under either scenario, demand for bottled water in China will continue to rise and shows little sign of waning. Considering the industry's incredible growth, it is not surprising that the richest man and woman in China lie at opposite ends of the bottled water production cycle: Hangzhou Wahaha's Zong Qinghou on the production end and billionaire recycling and waste guru Zhang Yin on the other.¹⁰²

While the industry is growing at an impressive rate, per capita consumption in China lags behind other countries like Mexico, Italy, and the United States. After adjusting for inflation, the average American spent \$121 per capita on bottled water in 2010, while Chinese consumers only spent \$6 (CN¥37) the same year.¹⁰³ Similarly, per capita consumption in Italy and Mexico stood at 187 liters and 243 liters, respectively, while China's rate hovered around 95 liters.¹⁰⁴

Because of its large population, China is primed to become a bottled water leviathan. If every person in China drank just one-fourth of the bottled water consumed by the average American in 2004, China would replace the United States as the world's leading bottled water consumer.¹⁰⁵ It is figures like this that highlight the importance of understanding China's bottled water market landscape and the market forces driving its growth and threatening its collapse.

3. The Chinese Market's Characteristics

The rise of bottled water in China has given way to an idiosyncratic market structure that is worth examining to understand broader market trends and vulnerabilities in quality control and sustainability. Although foreign imports built China's bottled water market, it is uniquely Chinese in structure and design. Chinese eccentricities include high demand for barreled bottled water, a unique distribution system that relies on bicycles

101. *Id.*

102. Yin is famous for her rags-to-riches tale of building her billion-dollar fortune off of China's waste and recycling industry. Xinhua, *China's Richest Woman: From Waste to Wealth*, CHINA DAILY (Oct. 20, 2006, 3:42 PM), http://www.chinadaily.com.cn/china/2006-10/20/content_713250.htm.

103. *Tibet Spring Bottled Water: Status Symbol or Slippery Slope?*, INVENTORSPOT, http://inventorspot.com/articles/tibet_spring_bottled_water_status_symbol_or_slippery_slope (last visited Apr. 21, 2014).

104. Peter H. Gleick et al., *Per-Capita Bottled Water Consumption by Top Countries 1999-2010 (Liters per Person per Year)*, in 7 THE WORLD'S WATER 339, 340 (2012), available at http://worldwater.org/wp-content/uploads/2013/07/data_table_19_per_capita_bottled_water_by_country.pdf.

105. Arnold & Larsen, *supra* note 10.

and water stores, and a unique market landscape.¹⁰⁶ These market features distinguish China's industry from many of its foreign counterparts.

China consumes large quantities of bottled water in barreled (or bulk) form, which comes in large containers holding roughly nineteen liters (five gallons) of water.¹⁰⁷ The prevalence of barreled bottled water is less common in other regions of the world, like the United States and Europe.¹⁰⁸ These barrels can be found in many Chinese households and businesses.¹⁰⁸ An estimated 10 million Chinese citizens "subscribe to water dispenser services," spending upwards of \$4.7 billion (CN¥30 billion) every year.¹⁰⁹ Approximately 44% of industry revenue in China comes from barreled water sales.¹¹⁰ Beijing, for example, consumes over 100 million barrels of water each year,¹¹¹ and half of Nestlé's sales in China are in five-gallon jug form.¹¹² One explanation for the popularity of barreled water in China is the nation's tap water concerns and the convenience of having a large supply of ostensibly safe and clean water for household and business use.¹¹³

Another uniquely Chinese feature is China's bottled water distribution system. In major cities like Shanghai, customers can place phone-orders for delivery of bottled water at local water stores.¹¹⁴ Fleets of bicycles often deliver water to homes in urban areas; bikes wheeling by with crates of barreled water strapped to a pulley in the rear is a common sight along China's city streets.¹¹⁵ This distribution network, however, is in the throes of change as major supermarkets—like Walmart, which sells water in bulk—become more commonplace and influence consumer behavior.¹¹⁶

The industry today is primarily private-owned, with about 1% of industry revenue coming from state-owned companies.¹¹⁷ Twenty years ago, the industry was almost entirely government-owned—this has changed.¹¹⁸ Fewer state-owned companies have led to greater foreign

106. Doherty, *supra* note 17.

107. Wu Wencong, *supra* note 19.

108. *Id.*

109. *Id.*

110. IBISWORLD, *supra* note 82, at 10.

111. Li Yanhui, *Fake Brands, Bacteria Proliferate in Water Market*, GLOBAL TIMES (July 8, 2011), <http://china-wire.org/?p=14578>.

112. Doherty, *supra* note 90.

113. IBISWORLD, *supra* note 82, at 10.

114. Doherty, *supra* note 90.

115. See, e.g., *id.* ("On the busy street outside, workers stack about two dozen bottles onto electric tricycles for delivery to homes and offices.").

116. Cf. IBISWORLD, *supra* note 82, at 10, 4 (commenting on how supermarkets and grocery stores are the main distributors of bottled water as barreled and bulk water rise in popularity among consumers).

117. *Id.* at 21.

118. *Id.* at 4.

investment and intensified market competition as currently eight out of the ten top bottled water industry participants are companies that are either foreign-funded joint ventures or foreign-owned.¹¹⁹ Greater foreign market penetration has advanced bottling technologies and equipment in the industry.¹²⁰ Under a state-controlled company, the CEO and manager are generally appointed by the State-Owned Assets Supervision and Administration Commission (SASAC) and are considered state workers.¹²¹ State-owned companies are generally found in key industries, like finance and energy.¹²² The bottled water industry, however, is primarily private.¹²³ One of the few companies that has strong state involvement is Wahaha, but even this company is not formally recognized as a state-owned enterprise (SOE).¹²⁴ In years ahead, understanding China's unique market structure will necessarily help address regulatory deficiencies and manage public health risks.

4. Forces and Trends Driving Growth

The rise of bottled water consumption in China can be attributed to several factors, including poor tap water quality, increasing health awareness, higher income levels, and international tourism.¹²⁵ Combined, these factors propelled bottled water's consumption.¹²⁶ Premier bottled water brands are also trending—primarily a result of China's burgeoning middle class.¹²⁷

119. *Id.* at 21.

120. *Id.*

121. Cf. Choon-Yin Sam, *Partial Privatization and the Role of State Owned Holding Companies in China*, 17 J. MGMT. & GOVERNANCE 767, 768 (2013) ("SASAC serves as a shareholders representative of the government to appoint top executives of public enterprises, monitor their performance and improve the incentives system for corporate management.").

122. See generally Central SOEs, STATE-OWNED ASSETS SUPERVISION AND ADMINISTRATION COMMISSION OF THE STATE COUNCIL (SASAC), THE PEOPLE'S REPUBLIC OF CHINA, <http://www.sasac.gov.cn/n2963340/n2971121/n4956567/4956583.html> (last visited Apr. 21, 2014) (listing of 117 state-owned companies).

123. IBISWORLD, *supra* note 82, at 21.

124. See *Wahaha Guquan Jiegou Shiyi Tu* (娃哈哈股权结构示意图) [Wahaha Shareholding Structure Diagram], BIZ163.COM (Nov. 30, 2004, 6:16 PM), <http://biz.163.com/41130/8/16F422FA00020S40.html> (China) (illustrating that the state government holds 45% of the company's shares).

125. Gaurav Kumar, *Bottled Water—China (Part I)*, NETSCRIBES (Jul. 12, 2011), <http://www.slideshare.net/ResearchOnIndia/market-research-india-bottled-water-market-in-india-2009>; Weston, *supra* note 74.

126. NEW ZEALAND TRADE & ENTER., *supra* note 91, at 1.

127. See Weston, *supra* note 74 ("The Chinese consumer has started to become more sophisticated when it comes to making decisions about consuming water, with growing awareness of the differences between source and purified waters.").

The growing market for bottled water in China is a result of the nation's unsafe tap water. Approximately half of China's urban drinking water does not meet government standards and consumption is regularly linked to public health problems.¹²⁸ In the event of a chemical spill, residents typically flock to nearby markets to purchase bottled water, leading to an increase in its consumption.¹²⁹ In some instances, however, the bottled water is sourced from the very same water body that was contaminated.¹³⁰ Generally though, it is widely regarded that bottled water remains relatively safer than tap water.¹³¹ Because of this perception, the bottled water sector dominates 75–80% of Chinese drinking water consumption.¹³² For those unable to afford this more expensive commodity, however, issues of social injustice abound. Together, tap water pollution and the cost of bottled water burden the poor by creating a catch-22 where the poor cannot drink tap water but cannot afford bottled water.¹³³

Studies show that China's urban tap water contains higher levels of chemical contamination than its Western counterparts—including dangerous levels of organic pollutants and other contaminants that cannot be boiled out.¹³⁴ Shanghai city authorities have publicly acknowledged the poor quality of their tap water. According to the Shanghai Water Authority, “almost all” of the city’s surface water is polluted and fails to meet drinking standards.¹³⁵ This is unsurprising considering that 80% of its water comes from the Huangpu River and the remaining 20% from the Yangtze—two of the world’s most polluted rivers.¹³⁶

128. See Jing & Hongqiao, *supra* note 5 (detailing visible and invisible—including sudden acute illness, cancer, birth defects, and mutations—health problems associated with dirty drinking water).

129. In 2011, a chemical spill on the Xin'an River in Zhejiang province resulted in a spike in bottled water purchases. *Pollution Leads to Run on Bottled Water*, PEOPLE'S DAILY (Jun. 7, 2011, 9:09 AM), <http://english.people.com.cn/90001/90776/90882/7401874.html>. In 2005, Harbin experienced a similar spike in bottled water demand following a chemical spill. Naomi Cookson, *Water Crisis: When Benzene Entered Harbin's Water Supply, Government Communication—And Public Trust—Broke Down*, 33 CHINA BUS. REV. 61, 61 (2006).

130. *Pollution Leads to Run on Bottled Water*, *supra* note 129.

131. See NETSCRIBES, *supra* note 15, at 8 (explaining that most people in China consume bottled water daily because they do not trust the safety of tap water).

132. KWR WATERCYCLE RESEARCH INST., *supra* note 6, at 14.

133. Tim Johnson, *Chinese Thirsting for Safe Drinking Water Pollution, Chemical Spills, Poor Stewardship Mean Lack of Clean Water for Hundreds of Millions*, PHILLY.COM (Feb. 19, 2006), http://articles.philly.com/2006-02-19/news/25409324_1_bottled-water-drinking-water-water-supply.

134. See Jing & Hongqiao, *supra* note 5 (noting that conventional technology does not remove heavy metal ions or organic compounds).

135. Doherty, *supra* note 90.

136. *Water Quality*, PURELIVING, <http://www.purelivingchina.com/learning-center/water-quality/> (last visited Apr. 21, 2014).

Even if the water source is clean, these waters can become contaminated while traveling to the consumer's tap. About 20% of Shanghai's water pipes were built before 1968, and this outdated piping leaches lead and other hazardous materials into water supplies.¹³⁷ Beijing's piping infrastructure faces similar challenges.¹³⁸ This reality makes consuming bottled water more tenable in countries like China, where polluted water is pervasive—assuming bottled water is a safer drinking source.¹³⁹ Roughly 300 million individuals in rural areas lack access to safe drinking water in China.¹⁴⁰ By contrast, in many developed countries, tap water is often of comparable or superior quality to bottled water, undermining most arguments supporting bottled water consumption.¹⁴¹

The second driving force behind the growth in the Chinese bottled water market is China's rising middle class, which is changing the demographic of Chinese society and boosting demand for luxury goods and high-end commodities.¹⁴² Chinese consumers are growing more health-conscious and, as a result, are gravitating towards superior food and water quality—including bottled water.¹⁴³ This is most apparent in China's burgeoning “premier” bottled water market. Because premier water brands are costlier, they are typically perceived as superior.¹⁴⁴ Currently, premier brands sell for six to seven times the price of other bottled water.¹⁴⁵ Nestlé and Nongfu, for example, cost around \$0.16 (CN¥1) per bottle, whereas

137. See *id.* (explaining that old pipes are at fault for the high levels of hazardous materials in the tap water).

138. See Jing & Hongqiao, *supra* note 5 (“Beijing—which has the best quality tap water—has been heavily investing for 10 or more years to transform its water supply system, and still isn’t finished: the water is still not drinkable.”).

139. “An estimated 700 million Chinese drink contaminated water every day.” Steve Toloken, *Investment Company Heckmann Acquiring Chinese Blow Molder*, 20 PLASTICS NEWS 32, 32 (2008).

140. XIE ET AL., *supra* note 22, at xxi; see also China Daily, *Safe Drinking Water*, CHINA-WIRE (Apr. 27, 2012), <http://china-wire.org/?p=19946> (recognizing that nearly 300 million rural people are without safe drinking water). Notably, the Minister of Water Resources in 2012, Chen Lei, “promised to provide all rural residents with safe drinking water by the year 2015.” *Id.*

141. Nick McDermott, *Bottled Water “Less Safe” Than Tap (Despite Costing up to 1,000 Times More)*, DAILY MAIL (Mar. 12, 2013, 5:32 AM), <http://www.dailymail.co.uk/news/article-2255803/Bottled-water-safe-tap-despite-costing-1-000-times-more.html>; *Bottled Water*, NAT’L RES. DEF. COUNCIL, <http://www.nrdc.org/water/drinking/qbw.asp> (last visited Apr. 21, 2014).

142. Weston, *supra* note 74; see also Christine Haughney & Jonathan Landreth, *The Stylish Side of China*, N.Y. TIMES, July 22, 2012, <http://www.nytimes.com/2012/07/23/business/global/fashion-magazines-in-china-laden-with-ads-are-thriving.html?pagewanted=all> (describing the luxury goods market in China); Meng Jing, *supra* note 92.

143. NETSCRIBES, *supra* note 15, at 2.

144. See Yang Ning, *Local Water Bottlers to Sip from Premium Market*, CHINA DAILY (June 4, 2010, 8:05 AM), http://www.chinadaily.com.cn/bizchina/2010-05/04/content_9811818.htm (noting that foreign premium brands are more expensive and that consumers sometimes choose these brands because they perceive them as high quality).

145. Zheng Yangpeng, *supra* note 85.

Evian costs roughly \$1.48 (CN¥9).¹⁴⁶ Although most bottlers in the industry operate at a loss,¹⁴⁷ analysts project that premium bottled water sales will increase 80% annually over the next five years—with sales climbing to upwards of \$1.56 billion (CN¥10 billion) by 2015.¹⁴⁸ Currently, foreign exports supply the majority of premier brands, with France holding approximately 63% of the import market.¹⁴⁹ Several domestic companies are looking to jump on the premier bottled water bandwagon.¹⁵⁰ As a result, many domestic bottled water brands are now selling their products at a higher price and marketing them with elevated cachet.

One such brand is Tibet 5100. Launched in 2006, Tibet 5100 falls under the “premium” category, selling water from the Qumanong Spring—a Tibetan glacial spring located 5,100 meters above sea level.¹⁵¹ The water sells for approximately \$1.20 (CN¥7.5)—roughly five times the amount of an average non-premium bottle, but less than Evian or Perrier.¹⁵² In 2011, Tibet 5100 reported \$99.2 million (CN¥633) in revenue, an increase of approximately 76% from the previous year.¹⁵³ The brand received increased international attention after the company’s CEO, Fu Lin, spoke at the 2012 Bottled Water Congress.¹⁵⁴ This Chinese-owned company, incorporated in the Cayman Islands,¹⁵⁵ raises questions of social justice for the Tibetan people—whose water is being extracted. Similar issues of social justice exist in the nation-island Fiji. While Fiji bottled water—also incorporated in the Cayman Islands¹⁵⁶—is bottled and shipped across the world, native Fijians have historically lacked access to safe drinking water and fallen

146. Meng Jing, *supra* note 92.

147. Zhang Yangpeng, *supra* note 85 (“Tibet 5100 is one of the few brands making a profit. Of the 100-odd major domestic mineral water producers, most are suffering losses or only making meager profits.”).

148. Meng Jing, *supra* note 92.

149. IBISWORLD, *supra* note 82, at 14.

150. NETSCRIBES, *supra* note 15, at 18.

151. Zhang Chunyan, *supra* note 75.

152. Laurie Burkitt, *Chinese Luxury Water? Tibet 5100 Aims High*, WALL ST. J. CHINAREALTIME (Oct. 7, 2012, 3:27 PM), <http://blogs.wsj.com/chinarealtime/2012/10/05/luxury-water-from-china-tibet-5100-aims-high/>; see also Weston, *supra* note 74 (observing that multinational bottled water companies sell their water at a higher price point than domestic companies); Zhang Chunyan, *supra* note 75.

153. Zheng Yangpeng, *supra* note 85.

154. Zhang Chunyan, *supra* note 75.

155. Announcement, Tibet 5100 Water Resources Holding, Ltd., Announcement of Final Results for the Year Ended 31 December 2012 (Mar. 22, 2013), available at http://hk.5100.net/files/upload/announcements/2012%20Annual%20Results_Eng.pdf.

156. See Anna Lenzer, *Fiji Water: Spin the Bottle*, MOTHER JONES (Aug. 12, 2009), <http://www.motherjones.com/politics/2009/09/fiji-spin-bottle> (stating that the company’s American trademarks are registered to an address in the Cayman Islands).

prey to bouts of typhoid and other water-borne ailments.¹⁵⁷ Despite issues of social justice, China's rising middle class is driving premier bottled water market sales and overall bottled water demand, citing "time constraints," demand for higher quality goods, and the inconvenience of spending time boiling water.¹⁵⁸

The last market force driving bottled water consumption is international tourism. Tourists in China—specifically Westerners—exclusively drink bottled water, and foreigners are assumed to be accustomed to superior water quality, reinforcing the perception that bottled water is superior and safe.¹⁵⁹ To cater to the international community—warned not to drink tap water¹⁶⁰—foreign and domestic bottled water brands are available in almost every convenience store on China's city streets. The prevalence of bottled water in urban areas may also influence the preferences of incoming rural migrants moving from China's countryside to its cities.¹⁶¹ China expects to move over 250 million residents from rural to urban areas over the next twelve years.¹⁶²

These forces and trends will invariably influence the future composition of China's bottled water market. Demographic, environmental, and social trends continue to strain water availability.¹⁶³ Regardless of how the country plans to support its nation's growing water needs, the bottled water industry will feel the effects of whatever policy China pursues. If China's bottled water market continues on this accelerated trajectory, critical deficiencies in its regulatory system must be addressed to safeguard public health. Unless the government enacts strong regulatory controls to manage these emerging forces, it risks compromising the safety, security, and widespread availability of clean drinking water in China.

157. Cynthia Lee, *Students' assignment: Help Fijians get clean drinking water*, UCLA TODAY (Aug. 15, 2003), <http://today.ucla.edu/portal/ut/students-assignment-help-fijians-247897.aspx>.

158. IBISWORLD, *supra* note 82, at 11. For example Press Release, AQUAGOLD Int., Recent Sales Activity Prompts Visit to China by AQUAGOLD's CEO (Sept. 18, 2009), *available at* <http://www.reuters.com/article/2009/09/18/idUS107495+18-Sep-2009+MW20090918> discusses that AQUAGOLD's main focus is on sales and marketing in China and how the upper and growing middle class of China are demanding luxury goods.

159. Cf. *id.* (noting that consumer habits are shifting towards drinking more bottled water).

160. *Health Information for Travelers to China*, CTRS. FOR DISEASE CONTROL AND PREVENTION, <http://wwwnc.cdc.gov/travel/destinations/traveler/none/china#stay-healthy-and-safe> (last visited Apr. 21, 2014).

161. See Doherty, *supra* note 17 (explaining the confluence of people leaving rural areas for cities to find work with the lack of safe tap water in the cities).

162. Ian Johnson, *China's Great Uprooting: Moving 250 Million into Cities*, N.Y. TIMES, June 15, 2013, <http://www.nytimes.com/2013/06/16/world/asia/chinas-great-uprooting-moving-250-million-into-cities.html>.

163. Doherty, *supra* note 17.

5. Environmental and Energy Issues

The cost of bottled water is not always as clear as its contents. The true cost of individual-sized bottles of water is often concealed by non-internalized environmental externalities. The environmental impacts of water extraction, transportation, packaging, and disposal are not reflected in the price of bottled water.¹⁶⁴ This reality leaves society bearing the unaccounted-for environmental and social costs. In a country of 1.3 billion people,¹⁶⁵ where bottled water consumption rates are expected to grow,¹⁶⁶ the environmental burden may prove too great for China to bear. The three primary environmental issues that stem from bottled water production are (1) plastic manufacture and waste; (2) the overexploitation of water resources; and (3) energy use.

Plastic waste is becoming an increasingly critical global issue, and bottled water is contributing to the problem.¹⁶⁷ In China, approximately 16% of urban solid waste is made up of plastic.¹⁶⁸ China's bottled water industry generates millions of tons of plastic waste every year—most of which ends up in landfills—and these bottles can take upwards of 1,000 years to biodegrade.¹⁶⁹ Sophisticated recycling programs and supporting infrastructure in China, like one recently implemented in Guangzhou, are still at a nascent stage.¹⁷⁰ Although China has enjoyed a robust recycling regime for several decades, recycling businesses are mostly small mom-and-pop shops¹⁷¹ that rely on unregulated distribution channels and are difficult to monitor;¹⁷² they can also cause more environmental harm than

164. Yong Jiang, *supra* note 9, at 3192. “Water policies largely fail to account for the economic nature of water resources in relation to their natural characteristics.” *Id.* at 3190.

165. POPULATION REFERENCE BUREAU, 2011 WORLD POPULATION DATA SHEET: THE WORLD AT 7 BILLION 2 (2011), available at http://www.prb.org/pdf1/2011population-data-sheet_eng.pdf.

166. NETSCRIBES, *supra* note 15, at 2.

167. See Potera, *supra* note 12, at 76 (noting that 1.5 million tons of plastic is used in bottled water worldwide each year).

168. ELIZABETH BALKAN, EMERGENCE ADVISORS, WASTE-TO-ENERGY IN CHINA 3 (2012), available at <http://www.wilsoncenter.org/sites/default/files/Elizabeth%20Balkan%20PowerPoint.pdf>.

169. Arnold & Larson, *supra* note 10.

170. See TARA SUN VANACORE, WILSON CNTR., REFUSING TO WASTE AWAY: CHINA'S TALE OF TRASH CITIES AND THE INCINERATOR BOOM para. 8 (2012), available at http://www.wilsoncenter.org/sites/default/files/China_Incineration_SunVanacore_Part1_2.pdf (discussing Guangzhou's new “fee-for-service program”).

171. According to recent statistics, approximately 60,000 “small-scale family-owned” plastic recycling businesses operated in China in 2006. Adam Minter, *How Beijing—and the Rest of China—Recycles Plastic*, SCI. AM. (Nov. 8, 2013), <http://www.scientificamerican.com/article.cfm?id=china-recycles-plastic>.

172. See *id.* (noting that migrant laborers make a living by sorting recycling on the streets).

good because of this poor oversight.¹⁷³ Migrant workers by and large run the recycling business and much of their work is undocumented, making data on China's recycling operations difficult to obtain.¹⁷⁴ Recently, however, the government has been promoting efforts to methodize and regulate current recycling programs.¹⁷⁵ Plastics recycling is also becoming an increasingly lucrative business that generates local tax revenue—although often at significant public health and environmental cost.¹⁷⁶

Generally, the return value of a plastic water bottle is \$0.02 (CN¥0.1).¹⁷⁷ The bottles are broken down into plastic granules and resold as a raw material for industry use.¹⁷⁸ According to recent reports, Beijing is ramping up recycling efforts: Beijing is expected to build 300 waste recycling sites and plans to develop two to four major recycling businesses within the city.¹⁷⁹ With the exception of Germany, where glass is the preferred bottling material because of the country's strict recycling laws, most countries use PET for bottled water packaging.¹⁸⁰ Some companies are seeking to mitigate bottled water waste. Coca-Cola and Nestlé, for example, are reducing the amount of plastic used for their bottles.¹⁸¹ In light of China's environmental problems, all bottlers should follow suit and integrate environmental values into production and manufacture.¹⁸²

The second major environmental issue surrounding bottled water is water resource management. China is currently the world's biggest

173. See Gwynn Guilford, *A Lot of US Plastic Isn't Actually Being Recycled Since China Put Up Its Green Fence*, QUARTZ (Sept. 16, 2013), <http://qz.com/122003/plastic-recycling-china-green-fence/> (observing that many plastics are “heaped onto China's growing massif of trash mountains”); see Minter, *supra* note 171 (calling Wen'an a “dead zone” despite recycling initiatives).

174. Minter, *supra* note 171.

175. See *id.* (“China is spending millions on recycling research.”).

176. In Wen'an County, located two hours south of Beijing, a barren industrial wasteland has emerged from what was once bucolic farmland and the public health conditions have significantly deteriorated. *Id.*

177. See Fu Yu, *Beijing Subway Offers Bottle Recycling Machines*, CRJENGLISH.COM (Dec. 6, 2012, 11:57 AM), <http://english.cri.cn/6909/2012/12/06/2941s736880.htm> (noting that bottling recycling machines give out 0.1 Yuan per bottle).

178. See, e.g., Guilford, *supra* note 173 (explaining that shredded and granulated plastics are raw materials to build items ranging from laptop cases to cosmetics).

179. *Beijing Shi Shangwuwei: Jinnian Xinjian Sanbai ge Feipin Huishou Zhidian* (北京市商务委: 今年新建300个废品回收站点) [Beijing Business Council: Building 300 New Waste Recycling Sites This Year], BEIJING NEWS (Feb. 6, 2012, 3:29 PM), <http://finance.chinanews.com/ny/2012/02-06/3647988.shtml> (China).

180. Rodwan, *supra* note 98, at 14.

181. AMY GALLAND, AS YOU SOW, WASTE & OPPORTUNITY: U.S. BEVERAGE CONTAINER RECYCLING SCORECARD AND REPORT, 2011, at 6 (2011), available at http://www.asyousow.org/publications/2011/Waste&Opportunity2011_20110811.pdf.

182. RESPONSIBLE RESEARCH, WATER IN CHINA: ISSUES FOR RESPONSIBLE INVESTORS, *supra* note 79, at 10.

consumer of freshwater—13% of the world’s freshwater resources.¹⁸³ Water conservation measures and extraction quotas are therefore critical to China’s long-term drinking water security.

A significant amount of freshwater is used in the production of bottled water.¹⁸⁴ Analysts estimate that one liter of bottled water requires around three liters of water to produce.¹⁸⁵ Part of this water use comes from the plastic industry—which is estimated to consume “over 350,000 litres of water per day.”¹⁸⁶ Presently, about “24 km³ of water beyond rechargeable quantities is extracted from the ground,” resulting in lowered water tables and groundwater depletion.¹⁸⁷ This affects water quality, flow rates, and ecosystem vitality.¹⁸⁸ An estimated 70% of China’s population relies on groundwater for its drinking water¹⁸⁹ and some scientists estimate that China could run out of groundwater by 2030.¹⁹⁰ Chinese bottlers draw heavily from both groundwater and surface water supplies, and these water sources are being depleted faster than they are being replenished. What is more, because water resources are considered national property, or “a common-pool resource,” incentives to conserve water or use it efficiently are nonexistent.¹⁹¹ While water is sometimes set aside for the environment, “these volumes are not allocated on a sound scientific basis.”¹⁹²

183. RYLAN SEKIGUCHI, *Water Issues in China* para. 1, in 10,000 SHOVELS: CHINA’S URBANIZATION AND ECONOMIC DEVELOPMENT (2007), available at http://fsi.stanford.edu/docs/water_issues_in_china.

184. *Bottled Water and Energy Fact Sheet*, PAC. INST. (Feb. 2007), <http://pacinst.org/publication/bottled-water-and-energy-a-fact-sheet/>. In the United States, bottled water is, per ounce, more expensive than gasoline and can cost upwards of 250–10,000 times more than tap water, depending on the brand. MAUREEN DUFFY, CHALLENGES IN THE WATER INDUSTRY: THE TAP VERSUS BOTTLED WATER DEBATE, AM. WATER, available at <http://www.amwater.com/files/TapVsBottle012609.pdf> (last visited Apr. 21, 2014).

185. PAC. INST., *supra* note 186.

186. RESPONSIBLE RESEARCH, WATER IN CHINA: ISSUES FOR RESPONSIBLE INVESTORS, *supra* note 79, at 122.

187. XIE ET AL., *supra* note 22, at 17. China’s surface and groundwater levels have dropped significantly in recent years as a result of human use. *See id.* at 18 (noting that ground water tables in the Hai River basin and in Beijing have dropped as a result of overexploitation). The Hai River basin, for example, has seen 40% of its connected water bodies disappear, including 194 lakes and depressions, totaling 6.67 km². Yong Jiang, *supra* note 9, at 3187. Groundwater overexploitation has increased over the past few decades. *Id.* Groundwater levels have also dropped 14 meters in the past 50 years. GLEICK, *supra* note 3, at 86.

188. Yong Jiang, *supra* note 9, at 3187.

189. Burkhardt, *supra* note 13.

190. Jennifer Lee, *Drinking the Water*, N.Y. TIMES, Aug. 13, 2008, <http://beijing2008.blogs.nytimes.com/2008/08/13/drinking-the-water/>.

191. Yong Jiang, *supra* note 9, at 3190.

192. XIE ET AL., *supra* note 22, at xxiv.

If they have not already, Chinese bottlers will soon feel the strain of water scarcity, which is expected to begin in earnest in 2050.¹⁹³ China is ranked eighty-eighth globally in freshwater volume per capita, with approximately 2,200 cubic meters per person.¹⁹⁴ This amount is expected to decline to 1,875 cubic meters per person between 2007 and 2033.¹⁹⁵ Given that bottled water production requires significant amounts of water,¹⁹⁶ industry use will pose a threat to an already water-scarce nation unless properly managed and regulated.¹⁹⁷ In light of these concerns, Coca-Cola vowed to limit its water consumption and become water neutral by 2020.¹⁹⁸ To date, no domestic Chinese bottlers have committed to such targets.

In addition to bottler initiatives, the Chinese government must overhaul its water pricing system to reflect water scarcity and environmental externalities while also increasing conservation and efficient water usage. Water pricing in China is historically determined by a “top-down administration [approach].”¹⁹⁹ Generally, the price of water is “insufficient to cover the full cost of water supply,” thereby distorting price signals and creating market inefficiencies.²⁰⁰ Chinese consumers typically pay approximately 1.2% of their disposable income on water, whereas consumers in developed countries generally pay 6%.²⁰¹ With the comparatively low cost, Chinese consumers lack incentive to conserve water.²⁰²

Recent efforts are underway to reform China’s water pricing model to reflect more accurately the cost of servicing safe drinking water while encouraging water conservation and recycling.²⁰³ According to the National Development and Reform Commission (NDRC), China will impose higher water rates for water-intensive industries and endorse water-recycling

193. See Robert I. McDonald et al., *Urban Growth, Climate Change, and Freshwater Availability*, 108 PROC. NAT'L ACAD. SCI. U.S. AM. 6312, 6313 (2011), available at <http://www.pnas.org/content/early/2011/03/21/1011615108.full.pdf> (predicting China “will have a large number of cities with seasonal water shortage by 2050”).

194. U.S. DEP’T. OF COMMERCE, WATER SUPPLY AND WASTEWATER TREATMENT MARKET IN CHINA 1 (2005), available at <http://www.icwt.net/china%20water.pdf>.

195. XIE ET AL., *supra* note 22, at 1.

196. PAC. INST., *supra* note 184.

197. See Yong Jiang, *supra* note 9, at 3186–87 (observing that China’s water shortage for industry and domestic use has increased in magnitude and frequency since the 1980s).

198. CHARLES FISHMAN, THE BIG THIRST: THE SECRET LIFE AND TURBULENT FUTURE OF WATER 120 (2011).

199. Yong Jiang, *supra* note 9, at 3192.

200. *Id.*

201. *Id.*

202. *Id.*

203. *China to Adopt Progressive Water Pricing*, ENGLISH.NEWS.CN (Jun. 22, 2012, 1:55 PM), http://news.xinhuanet.com/english/china/2012-06/22/c_131669919.htm.

practices.²⁰⁴ This progressive pricing system is expected to start by 2015.²⁰⁵ The pricing scheme will effectively impose a progressive tax that will rise alongside increased water consumption.²⁰⁶ The tax will presumably result in higher domestic bottled water prices across the board, as bottlers will pay higher fees for water extraction and purchase. This plan also pledges to keep the nation's annual water consumption within 635 billion cubic meters.²⁰⁷ Some cities in southern China are already imposing stricter water conservation measures such as surcharges on homes that use water above a certain amount.²⁰⁸ In recent years, prices for public water have doubled—standing now at roughly \$0.66/m³.²⁰⁹

In addition to consuming water, a considerable amount of energy also goes into manufacturing and producing bottled water. Estimates suggest that one-quarter of every bottle of water is figuratively oil.²¹⁰ Statistics indicate that bottled water can use “2,000 times as much energy to produce and distribute as tap water.”²¹¹ In the United States, individual-sized bottled water can use upwards of eleven to thirty-one times more energy than tap water.²¹² Although the inputs and outputs of bottled water production certainly vary between the United States and China, the outcome is the same: bottled water uses significantly more energy than tap water.

These environmental realities underscore the need for stricter adherence to sustainable methods of bottled water production and a re-evaluation of water’s true value.²¹³ Under the weight of environmental pressures, bottled water quality will invariably suffer if such issues are

204. *Id.*

205. *Id.*

206. *Id.*

207. *Id.*

208. Pan Xiaoling, *Shenzhen Water Surcharge System, Overuse Charged Double*, S. METROPOLIS DAILY (Aug. 24, 2004), <http://news.163.com/40824/2/0UH244V80001124T.html> (author’s translation).

209. *Id.*

210. Julia Whitty, *Your Water Bottle is One-Quarter Oil*, MOTHER JONES (Feb. 27, 2009, 5:12 PM), <http://www.motherjones.com/blue-marble/2009/02/your-water-bottle-one-quarter-full-oil>.

211. Noah Hall, *Bottled Water and Wasted Energy*, GREAT LAKES LAW BLOG (Feb. 27, 2009), http://www.greatlakeslaw.org/blog/bottled_water/.

212. CHRISTOPHER G. DETTORE, COMPARATIVE LIFE-CYCLE ASSESSMENT OF BOTTLED VS. TAP WATER SYSTEMS 1 (2009), available at http://css.snre.umich.edu/css_doc/CSS09-11.pdf.

213. *Id.* Currently, per capita water capacity stands at approximately 2,093 m³—in the United States, this figure is over 9,000 m³. *Renewable Internal Freshwater Resource per Capita*, FOOD AND AGRICULTURE ORG., <http://data.worldbank.org/indicator/ER.H2OINTR.PC> (last visited Apr. 21, 2014). By 2030, China is expected to have an average water capacity of 1,700 m³ per capita. *China’s Water Shortage to Hit Danger Limit in 2030*, PEOPLE DAILY.COM (Nov. 16, 2001), http://english.peopledaily.com.cn/200111/16/eng20011116_84668.shtml. The UN defines a water shortage to be any level below 1,000 m³ per person. *Water Scarcity*, UNITED NATIONS DEP’T OF ECON. & SOC. AFF., <http://www.un.org/waterforlifedecade/scarcity.shtml> (last updated Mar. 1, 2014).

mismanged. Pricing bottled water to reflect the product's environmental impact will help companies ensure continued supply and quality control in the face of an increasingly water scarce world with rising national demand. In doing so, the Chinese government must remain mindful of social justice issues to ensure that safe water remains affordable.

II. QUALITY CONTROL, CONTAMINATION SCARES, AND SUSTAINABILITY

The 2008 melamine milk scandal, which left six babies dead and more than 300,000 infants with kidney stones, still lingers in the minds of Chinese consumers.²¹⁴ After this incident and a wave of other high-profile public health scares in China's food and beverage industry, the government tightened quality control regulations. In 2009, the State Council enacted the Food Safety Law²¹⁵ to improve food safety through more stringent food product standards, product recall procedures, and severe penalties for offenders.²¹⁶ The law establishes procedures for enacting food safety standards, issuing licenses, executing food safety inspections, and managing food imports and exports.²¹⁷ The National Health and Family Planning Commission, the body charged with implementing this law, is responsible for drafting national food and beverage safety standards, including those for bottled water.²¹⁸ Before becoming law, these standards must pass through the National Food Safety Standard Review Committee (a board of medical and scientific experts).²¹⁹ For bottled water, this law increased regulatory review and licensing procedures for bottled water companies.²²⁰ China's Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) is currently revising the 2009 law, and a draft of

214. *Bosses Accused Over China's Tainted Milk Scandal in Which 6 Children Died and 300,000 Were Contaminated Go on Trial*, DAILY MAIL (Dec. 31, 2008, 5:45 PM), <http://www.dailymail.co.uk/news/article-1103462/Bosses-accused-Chinas-tainted-milk-scandal-6-children-died-300-000-contaminated-trial.html>.

215. *China Adopts Food Safety Law*, CHINA DAILY (Feb. 28, 2009, 2:12 PM), http://www.chinadaily.com.cn/china/2009-02/28/content_7522958.htm.

216. *Id.*; Calum MacLeod, *Some Skeptical of China's New Food Safety Law*, USA TODAY (Mar. 2, 2009 12:33 PM), http://usatoday30.usatoday.com/money/industries/food/2009-03-01-chinafood01_N.htm.

217. Zhonghua Renmin Gonghe Guo Shipin Anquan Fa (中华人民共和国食品安全法) [Food Safety Law of People's Republic of China] (promulgated by Standing Comm. of the Nat'l People's Cong., Feb. 28, 2009, effective June 1, 2009), http://www.gov.cn/flfg/2009-02/28/content_1246367.htm (China) [hereinafter Food Safety Law of the People's Republic of China].

218. *Id.* art. 4.

219. See *id.* art. 21 (requiring national food and beverage standards be consistent with the National Food Safety Standard).

220. See *id.* art. 27, 29 (providing safety standards for producing and selling food and beverage and permit requirements for food production, distribution, and services).

the new law was submitted to the State Council in October of this year.²²¹ The new law will likely impose stricter requirements on the food and beverage industry to ensure quality control.²²²

Despite the efforts of this law, deficiencies in quality control continue to plague China's food and beverage sector, and China's bottled water industry is no exception.²²³ In some ways, this has held true since the industry's beginning. In the early stages of China's bottled water industry, bottling operations hastily expanded and cut corners in quality control.²²⁴ These abrupt beginnings prompted the AQSIQ to require periodic quality control inspections, which are still in effect today.²²⁵ These inspections serve as the government's primary oversight of the industry.

Several bottled water companies recently failed these inspections.²²⁶ In July 2011, the Beijing Administration for Industry and Commerce, which performs random market inspections in coordination with the AQSIQ, randomly inspected bottled water brands and found that over thirty brands violated safety standards.²²⁷ One brand purportedly contained bacteria 9,000 times the permissible safety levels.²²⁸ While these recent findings only implicated large "barreled" water jugs (not individualized bottles),²²⁹ a 2009 survey conducted by China's regulatory authorities on single-use 500ml bottled water samples found elevated levels of bromate—a suspected carcinogen.²³⁰ In some cases, bromate levels read eight times the

221. Guowuyuan Fazhi Bangongshi Guanyu Gongbu Zhonghua Renmin Gonghe Guo Shipin Anquan Fa (Xiuding Caoan Songshen Gao) Gongkai Zhengqiu Yijian de Tongzhi (国务院法制办公室关于公布《中华人民共和国食品安全法（修订草案送审稿）》公开征求意见的通知) [Notice of Soliciting Comments on the Draft of China Food Safety Law Amendment] (promulgated by Legislative Affairs Office of the St. Council, Oct. 29, 2013), <http://www.chinalaw.gov.cn/article/cazjgg/201310/20131000392889.shtml> (China).

222. Guanyu Zhonghua Renmin Gonghe Guo Shipin Anquan Fa (Xiuding Caoan Songshen Gao) de Xiuding Shuoming (关于《中华人民共和国食品安全法（修订草案送审稿）》的修订说明) [General Purposes and Mandates of the China Food Safety Law Amendment] (promulgated by Legislative Affairs Office of the St. Council, Oct. 29, 2013), <http://www.chinalaw.gov.cn/article/cazjgg/201310/20131000392889.shtml> (China).

223. See Zheng Daosen (郑道森) & Liu Xiruo (刘溪若), *Qidi Pingzhuang Shui Biaozhun* (超底瓶装水标准) [Revealing Bottled Water Standards], XINJIANG NEWS (May 2, 2013, 2:30 AM), <http://www.bjnews.com.cn/finance/2013/05/02/261420.html> (China) (discussing the general concern for the quality of bottled water in the market).

224. IBISWORLD, *supra* note 82, at 5.

225. *Id.* at 5–6.

226. See *id.* at 5 (stating that between 2003 and 2006, random water sampling yielded low passage rates).

227. *Beijing Halts Sales of Tainted Bottled Water*, *supra* note 19.

228. *Id.*

229. *Id.*

230. Yiqi Zhou et al., *Simultaneous Determination of Iodate, Chlorite, and Bromate in Bottled Drinking Water by Ion Chromatography with Post-Column Reaction and UV Detection*, 25 CHINESE J. OF CHROMATOGRAPHY (2007), available at <http://www.ncbi.nlm.nih.gov/pubmed/17679446>; Yang Cih-

permissible level.²³¹ Some brands implicated were domestic, including Inner Mongolia's "King Friends Desert Water" and Harbin Pharmaceutical Group's "Pure in the Pure."²³²

The recent revelation of Nongfu Spring's regulatory noncompliance offers another example of China's supervisory shortcomings.²³³ Despite sourcing from "four of the best water sources in China,"²³⁴ the current scandal follows on the heels of accusations in 2009 that Nongfu water contained excessive levels of arsenic.²³⁵ Last summer a *Beijing Today* investigative report revealed that Nongfu Spring—which produces water in Guangdong, Zhejiang, Hubei, and Jilin²³⁶—was following a provincial standard inferior to national regulatory standards.²³⁷ Moreover, because bottlers are expected to follow the provincial standard of the province where their factory is located, Nongfu's Guangdong factory purportedly violated provincial standards by following the less stringent Zhejiang provincial standard.²³⁸ The Zhejiang standard failed to comply with the national standard for non-mineral bottled water: GB19298-2006.²³⁹ Nongfu countered that its factories adhere to both national and provincial standards and in the case of conflict, to whichever is more stringent.²⁴⁰ This more

yu, *China's Bottled Water Found to be Less Than Pure*, WANT CHINA TIMES (Sept. 9, 2011, 10:49 AM), <http://www.wantchinatimes.com/news-subclass-cnt.aspx?cid=1103&MainCatID=11&id=20110909000031>.

231. Yang Cih-yu, *supra* note 230.

232. *See id.* (describing how Inner Mongolia and Harbin Pharmaceutical Group were among the six manufacturers that tested high in bromate, a suspected carcinogen).

233. *See* Zheng Daosen & Liu Xiruo, *supra* note 223 (revealing Nongfu Spring's standards are lower than the national standard for tap water).

234. IBISWORLD, *supra* note 82, at 19.

235. *See Nongfu Shanquan Shen Chaobiao Chanpin Yisong Fujian* (农夫山泉砷超标产品已送复检) [Part of Nongfu Spring Products Were Recalled for Reexamination], SOHU.COM (Nov. 30, 2009, 7:01 PM), <http://news.sohu.com/20091130/n268582197.shtml> (China) (reporting that Nongfu water may contain excessive levels of arsenic).

236. *See generally* Bao Chengrong, *Nongfu Spring Reels After Crushing Quality Report*, BEIJING TODAY (May 12, 2013), <http://beijingtoday.com.cn/nongfu-spring-reels-after-crushing-quality-report/> (summarizing the *Beijing Times* report); *Nongfu Spring Tries to Come Clean on Charges*, SHANGHAI DAILY (Mar. 26, 2013, 11:57 PM), <http://english.sina.com/china/2013/0326/575642.html> (listing the four provinces Nongfu Spring produces its water in).

237. Bao Chengrong, *supra* note 236.

238. *Nongfu Spring Halts Beijing Barrels*, SHANGHAI DAILY (May 7, 2013), http://www.china.org.cn/business/2013-05/07/content_28746787.htm; *see also* Xiaodong, *supra* note 24 (outlining Nongfu's alleged violation of provincial bottled water standards).

239. Wang Zhenghua, *Quality Concerns Over Bottled Water*, CHINA DAILY (Apr. 17, 2013, 7:58 AM), http://usa.chinadaily.com.cn/epaper/2013-04/17/content_16414574.htm.

240. *See Zhejiang Sheng Weisheng Ting Zhijianju Huiying Nongfu Shanquan Choucha Hege Lv Baifenzhibai* (浙江省卫生厅质监局回应农夫山泉抽查合格率100%) [The Bureau of Quality and Technology Supervision under Zhejiang Department of Health Said Nongfu Spring Passed Inspection], WENHUI NEWS365.COM (May 14, 2013), http://whb.news365.com.cn/shsh/201305/t20130514_1136224.html (China) [hereinafter WENHUI] (stating that the local standard of Zhejiang province is

lenient standard suggested that tap water quality was superior to Nongfu water—which is what grabbed most media headlines—even though one quarter of China’s tap water does not comply with the new tap water standard.²⁴¹ The scandal highlights the chaos and confusion ubiquitous to China’s regulatory system and the lack of quality control assurances. One industry expert noted that provincial standards are effectively invalidated if a corresponding national standard exists.²⁴² If Nongfu was complying with national standards, as the company insists, then Nongfu did not necessarily violate any laws. With so much confusion, it is a surprise that there are not more scandals—although the country’s limited transparency presumably conceals a good deal of potential water quality violations.²⁴³ Further, Nongfu’s pending lawsuit against the *Beijing Times* for \$9.7 million (CN¥60 million) will create a chilling effect on investigative journalism.²⁴⁴

Part of the reason companies fail inspections has to do with the cost of proper filtration. State-of-the-art filtration systems, like GE Water & Process Technologies, can be financially burdensome for domestic bottlers. The water filtration equipment alone for a relatively small plant (operating

below the national GB19298 standard, and the Bureau of Quality and Technology official said Nongfu Spring passed all inspections adopting the most stringent standard).

241. See Gong Jing & Wang Haotong, *What’s Coming out of China’s Taps*, CHINADIALOGUE (July 6, 2012), <https://www.chinadialogue.net/article/show/single/en/4962-What-s-coming-out-of-China-s-taps-> (noting that out of 4,000 water treatment plants surveyed, at least 1,000 plants were supplying water that failed to meet the standard).

242. *Bottled Water Scandal Highlights Food Safety Challenges*, XINHUA (Apr. 12, 2013, 6:06 PM), http://news.xinhuanet.com/english/china/2013-04/12/c_132304484.htm. According to an official newspaper of China:

Chen Junshi, an analyst with the China National Center for Food Safety Risk Assessment, said enterprises are only allowed to adopt local standards in exceptional cases when there are no relevant national standards. Exceptions are also made for companies operating under unique regional conditions that are considerably different from elsewhere in the country.

Id. The law does not explicitly require compliance with a provincial standard if a corresponding national standard exists. Standardization Law of the People’s Republic of China (promulgated by Standing Comm. Nat’l People’s Cong., Dec. 29, 1988, effective Apr. 1, 1989), <http://www.energylabel.gov.cn/en/PoliciesandRegulations/RelatedWorkPolicies/detail/537.html>, art. 6 (China) [hereinafter Standardization Law] (permitting local standards if no national or trade standard exists). The law does state, however, that in the absence of a national regulation, a province may implement legislation to fill this absence. *Id.* Enterprise standards are an exception and may exist alongside national standards, so long as they are at least as stringent as national standards. *Bottled Water Scandal Highlights Food Safety Challenges*, *supra* note 242.

243. See Jing & Haotong, *supra* note 241 (citing many reasons for misinformation and confusion including no mechanism to force transparency from water-treatment plants).

244. *Nongfu Spring Accuses Paper of Smear Campaign*, SHANGHAI DAILY (Nov. 5, 2013), http://www.china.org.cn/business/2013-11/05/content_30499143.htm.

at 300 grams(g)/minutes(min)) can cost upwards of \$1 million.²⁴⁵ An average medium sized plant (operating at 600,000–700,000g/min) can cost closer to \$1.5–5 million.²⁴⁶ Some estimates suggest that for a bottle of water in China to meet regulatory standards it must cost a minimum of \$4.92 (CN¥30).²⁴⁷ Many 500ml domestic brands sell for under \$0.70 (CN¥10). When accounting for the raw materials, energy input, filtration technology, and environmental impact, this price does not reflect the product's cost of production. Put differently, if bottled water in China on average costs only CN¥10, when a properly treated and filtered bottle should cost CN¥30, then the bottlers must be cutting corners. This is the estimate before addressing whether bottled water for CN¥30 accurately reflects the true cost of a bottle of water. For example, mineral waters sourced from remote regions in China and Tibet²⁴⁸—which presumably offer superior water sources to their urban counterparts²⁴⁹—sell for CN¥4–6.²⁵⁰ This price is a far cry from the actual value of this increasingly scarce and polluted resource—especially given the source's politically sensitive and environmentally fragile location.²⁵¹

Water filtration processes include media filtration, microfiltration, ultrafiltration, nanofiltration, reverse osmosis, ion exchange (softening and deionizing), chlorination, irradiation (ultraviolet), and adsorption.²⁵² These filtration mechanisms target undissolved and dissolved solids, and biological and chemical contaminants.²⁵³ Depending on the original quality of the water, a series of these processes must be applied in order to ensure

245. Telephone Interview with General Electric Representatives (Oct. 2013).

246. *Id.* These figures only look at the cost of water filtration technology and not other capital or operational costs. *Id.*

247. Wu Wencong, *supra* note 19.

248. The author's references to Tibetan waters in the context of bottled water in China do not assume any political position on Tibetan sovereignty and strive to respect Tibetan autonomy.

249. *Opportunity Looms for Premier Chinese Water Brands*, BEIJING INT'L, <http://www.ebeijing.gov.cn/BeijingInformation/BeijingNewsUpdate/t1236897.htm> (last visited Mar. 9, 2014).

250. *Id.*

251. The conflict over Tibetan sovereignty has left the region politically unstable; moreover, due to the fragility of the region's ecosystem and its waters, and the area's cultural sensitivity, Chinese bottlers grossly undervalue the cost of bottled water sourced in Tibet. See *Tibet: China Responsible to Protect Fragile Ecosystem*, UNREPRESENTED NATIONS AND PEOPLES ORG. (Nov. 15, 2013), <http://www.unpo.org/article/16595> (noting that the Dalai Lama urges China to protect the ecosystem in Tibet despite the political issues regarding Tibet).

252. DOROTHY SENIOR & NICHOLAS DEGE, TECHNOLOGY OF BOTTLED WATER 133, 136 (2d ed. 2005).

253. *See id.* (providing examples of undissolved and dissolved solids and contaminants, as well as the processes used to remove them).

the water's safety.²⁵⁴ Because many of these filtration mechanisms do not target all of these groups, proper filtration typically requires a combination of processes.²⁵⁵ However, it is difficult to know which, if any, of these filtration methods are used because bottlers are not required to list their filtration method on the product's label and often do not disclose this information to the public.²⁵⁶ Bottlers often prioritize sensory and microbial indexes over heavy metal testing for economic reasons because testing for these metals can be costly. Furthermore, heavy metals are less frequently tested for because their dangers are not well known in China.²⁵⁷ This poses a significant and insidious danger to public health—side effects of low-dose exposure to heavy metals are not always apparent.²⁵⁸

The lack of institutional knowledge on water contaminants and sources of contamination among Chinese bottlers highlights another reason why bottlers are failing inspections.²⁵⁹ The head of the Institute of Drinking Water Safety Research at Tsinghua University, Liu Wenjun, publicly doubted the ability of public officials to connect water contaminants—namely organic compounds—with public health risks.²⁶⁰ In his view, China should not use basic water purification methods like those employed in Canada and Europe because Chinese waters are significantly more degraded and require more thorough filtration.²⁶¹ Current regulations do not

254. See *id.* at 132 (explaining that incoming water quality may necessitate a wide range of treatments); U.S. ENVTL. PROT. AGENCY, WATER HEALTH SERIES: FILTRATION FACTS 7 (2005), available at http://www.epa.gov/safewater/faq/pdfs/fs_healthseries_filtration.pdf.

255. *Different Filtration Methods Explained*, FREEDRINKINGWATER, <http://www.freedrinkingwater.com/water-education/quality-water-filtration-method-page3.htm> (last visited Apr. 26, 2014).

256. See FRESHFIELDS BRUCKHAUS DERINGER, BRIEFING: CHINA FOOD LAW 2 (2012), available at http://www.freshfields.com/uploadedFiles/SiteWide/Knowledge/November%202012_China%20food%20law.PDF (detailing China's new labeling requirements to take effect Jan. 1, 2013, and how disclosing filtration methods are not required).

257. Based on an original study by the authors, many Chinese believe that the boiling process removes all impurities from water, making it safe to drink. Abi Barnes & Wei Cao, Consumer Perceptions of Bottled Water in Beijing (Jan. 2013) (unpublished study) (on file with Authors).

258. See Jing & Hongqiao, *supra* note 5 (explaining how it could take ten to twenty years before noticing the effects of drinking dangerous organic compounds).

259. Cf. *id.* (noting that 98% of China's more than 4,000 water treatment plants continue to use conventional technology even though this technology is ineffective at treating the types of pollutants in the Chinese water supply).

260. *Id.*

261. See *id.* (noting that even with the most advanced treatment plants, the water would still be contaminated as a result of outdated pipes and secondary water supplies).

require testing for a number of indicators, such as acidity, and certain compounds like mercury and silver.²⁶²

Public officials are also not always familiar with groundwater and hydrological systems and water contamination risks. For example, in 2012, an official of the China Mineral Water Committee stated that “[u]nlike [China’s polluted] surface water, mineral water is usually hundreds of meters underground, so it’s free from contamination.”²⁶³ Recent data estimates that approximately 90% of China’s groundwater is polluted,²⁶⁴ suggesting that bottled water reserves are not free from contamination. The official’s statement suggests that water contamination risks, alongside filtration requirements, may not be fully understood.²⁶⁵ Mineral water is generally defined as groundwater containing a certain level of dissolved solids.²⁶⁶ Surprisingly, mineral water does not undergo water treatment.²⁶⁷ In fact, the law requires Chinese mineral water bottlers to preserve the water’s natural mineral composition.²⁶⁸ As a result, mineral water in China is bottled straight from the ground, with minimal, if any, filtration.²⁶⁹

In addition to proper filtration, bottlers must also ensure that these filtration systems are properly managed. Water purification infrastructure and machinery can be sources of contamination if the pipes and machinery are not regularly cleaned.²⁷⁰ Maintenance and upkeep are additional costs that bottlers must bear to ensure water safety.

Poor water quality is not the only public health risk facing bottled water consumers. Scandals involving the falsifying of bottled water brands

262. Patrick Boehler, *China Still Tests Bottled Drinking Water Using ‘Soviet Standards’*, S. CHINA MORNING POST, <http://www.scmp.com/news/china/article/1228136/china-still-tests-bottled-drinking-water-using-soviet-standards> (last updated Aug. 29, 2013, 4:13 AM).

263. Zheng Yangpeng, *supra* note 85.

264. Hai Nan, *Officials Blamed for Water Pollution*, RADIO FREE ASIA (Luisetta Mudie trans., Feb. 18, 2013), <http://www.rfa.org/english/news/china/water-02182013150415.html>.

265. Compare Zheng Yangpeng, *supra* note 85 (citing an official of the China Mineral Water Committee stating that mineral water was “free from contamination” because it was so far underground), with Hai Nan, *supra* note 264 (finding that 90% of China’s ground water was polluted).

266. *Do You Know Where Your Bottled Water Comes From?*, CONSUMER REP. MAG. (July 2012), <http://www.consumerreports.org/cro/magazine/2012/07/do-you-know-where-your-bottled-water-comes-from/index.htm>.

267. Yinyong Tianran Kuangquanshui (饮用天然矿泉水) [Drinking Natural Mineral Water] (promulgated by Gen. Admin. of Quality Supervision, Inspection & Quarantine of China & Standardization Admin. of China, Dec. 29, 2008, effective Oct. 1, 2009), art. 5.3.2, <http://down.foodmate.net/standard/sort/3/17569.html> (China) [hereinafter Drinking Natural Mineral Water].

268. *Id.*

269. *Id.*

270. Wu Wencong, *supra* note 19.

are also emerging from the shadows.²⁷¹ The risk is greater for barreled water because barrels can be reused as many as forty times before they are discarded.²⁷² An employee of the bottled water business reported “[a]bout 60 percent of the barreled water on the [Chinese] market is fake brands,” and “[s]ome illegal water factories fill the barrels with tap water but paste the labels of popular water brands on them.”²⁷³ Anecdotal evidence²⁷⁴ and statistical data from the China National Health Association on the national quality-grade output for polycarbonate—the material used to make the larger barrel water jugs—also support the act of mislabeling.²⁷⁵ These statistics show that sales of polycarbonate fall short of demand,²⁷⁶ inviting the questions: what material are bottlers using to make up the difference and could the material pose a risk to human health?

Serial numbers on water products are also rarely verified: just 3 out of 10,000 serial numbers are authenticated.²⁷⁷ This “leav[es] an opportunity for fake-brand water producers to recycle old serial numbers.”²⁷⁸ Lack of oversight in the bottled water industry is a fundamental problem. Director of the Beijing Institute of Public Health and Drinking Water, Li Fuxing, witnessed workers in Hebei province mix debris into the bottles before sale and commented that “[s]ome distributors simply pump tap water into the bottles that are labeled as famous brands . . . [and others] replace qualified bottles with substandard ones.”²⁷⁹ These realities create a breeding ground for counterfeit bottling and product contamination.

As the domestic bottled water market expands, improved oversight will become critical. Roughly 207 new water products entered the market

271. Cf. *Now China Points Finger at “Fake” Water*, REUTERS (Jul. 10, 2007, 09:43 AM), <http://www.reuters.com/article/2007/07/10/us-china-water-idUSPEK397820070710> (“Up to half of the water used in water coolers across China’s capital could be ‘fake,’ or not as pure as its manufacturers claim”); *Fake Bottled Water Sold in China*, YOUTUBE (May 9, 2013), <http://www.youtube.com/watch?v=EFmQfTKuCH0>.

272. Wu Wencong, *supra* note 19.

273. Li Yanhui, *supra* note 111.

274. See *Welcome to China: Here’s a Fake Bottle of Evian Water*, THELITTLECOLUMNIST (Aug. 3, 2011), <http://thelittlecolumnist.wordpress.com/2011/08/03/welcome-to-china-heres-a-fake-bottle-of-evian-water/> (relating an anecdote about a counterfeit bottle of water labeled “Evian: China’s Best Water That Is Mineral”); see also *Chicken Dies Drinking Bottled Water in China*, THE EPOCH TIMES (Sept. 11, 2007), <http://www.theepochtimes.com/news/7-9-11/59671.html> (stating that one Chinese family gave a chicken water from a bottle of water and the chicken died as a result of drinking it).

275. Wu Wencong, *supra* note 19.

276. *Id.*

277. Li Yanhui, *supra* note 111.

278. *Id.*

279. See Wu Wencong, *supra* note 19 (detailing an incident when Li saw individuals selling old DVDs and small plastic bottle granules to companies that make large water barrels).

between 2007 and 2010.²⁸⁰ In the past two years, about 220 bottled water companies emerged in Inner Mongolia—a region known for poor water quality.²⁸¹ This rise in domestic market brands and products raises questions about the capability of local regulators to ensure quality. The deputy of Inner Mongolia’s quality control bureau conceded that the company is facing quality control problems as a result of antiquated manufacturing processes.²⁸² Because Chinese bottled water regulation relies heavily on industry self-monitoring, the increase in domestic bottlers in a fractured and deregulated market will increase the odds of contamination and, thus, increase consumer health risks.

Domestic companies are not the only public health offenders. In 2012, Evian faced charges for excessive nitrates in its bottled water.²⁸³ Evian responded by highlighting the difficulty in confirming whether the affected water was, indeed, Evian water since “[the products] were not imported by an assigned official importer to the Chinese market.”²⁸⁴ This incident marked the sixth time in recent years that the company was inspected over quality-control problems.²⁸⁵ In its response to the accusations, Evian highlighted that companies lack quality control over the product once it enters China and Evian’s limited oversight over its distribution network.²⁸⁶ Foreign companies generally operate as partners with domestic manufacturers and bottlers, thereby exposing their product line to China’s deregulated distribution network.²⁸⁷

The fact that most consumers do not know where the water comes from or how it is treated further complicates the issue of Chinese bottled water quality. The labels on bottled water, often ringed with images of snow-capped mountains and azure-blue streams, project a chimerical fiction of purity. The reality may be harder to swallow. Bottled water brands worldwide often fail to disclose the water’s source, which typically bears little resemblance to images coating the bottle.²⁸⁸ Brand names can also be misleading, with labels bearing names of mountains and glaciers when the

280. NEW ZEALAND TRADE & ENTER., *supra* note 91, at 1.

281. Yang Cih-yu, *supra* note 230.

282. *Id.*

283. Zheng Yangpeng, *supra* note 85.

284. *Id.*

285. *Id.*

286. See, e.g., *id.* (“[T]he incident exposed the company’s weak control over its import chain and its vulnerability to negative news.”).

287. See, e.g., *id.* (discussing the Evian incident).

288. See GLEICK, BOTTLED AND SOLD, *supra* note 25, at 56–58 (discussing the misleading and unclear labeling on bottled water); see also Potera, *supra* note 12, at 76 (“[B]ottled waters also may not be drawn from the pristine sources suggested by their labels.”).

water actually is sourced from public municipalities.²⁸⁹ Chinese bottlers likewise provide little more than an idealistic image on the outside label as there is usually limited, if any, information about the source of the water or the filtration processes involved.²⁹⁰ Some brands do, however, disclose their source and filtration method. Nongfu Spring, for example, lists its source on its website.²⁹¹ Wahaha likewise states that its water comes from a spring in Changbai Mountain.²⁹² Wahaha additionally discloses its water purification method: reverse osmosis technology²⁹³—considered one of the most effective and advanced methods for water purification.²⁹⁴ Most bottlers, however, are not as forthcoming.²⁹⁵ Non-disclosure presents obvious public health issues, especially for a country where water sources are not subject to the same quality assurances as more developed countries. While the global bottled water industry is notorious for its lack of disclosure, it is especially important for countries with severe water pollution and infamously weak legal and regulatory enforcement to be forthcoming about the water's source and purification method.

China's recent contamination and counterfeit scandals have escalated bottled water safety concerns. Absent stricter regulatory oversight, the safety of bottled water cannot be assured, and counterfeit bottling and renegade bottling practices will only prove a more potent threat to the safety of China's bottled water.

III. THE LEGAL LANDSCAPE OF BOTTLED WATER IN CHINA

Legal ambiguities cast a shadow over much of China's bottled water law. China's labyrinthine legal system and a highly complex regulatory structure create these ambiguities. Because China's legal system remains

289. See Potera, *supra* note 12, at 76 (explaining that water advertised as "spring water" sometimes comes from a public water supply).

290. See Abi Barnes & Cao Wei, Bottled Water Research in China (unpublished survey) (on file with the Vermont Law Review) (finding only two water bottling brands out of twenty-four publish production processes on the bottle label, whereas twenty-three labels do indicate the water source).

291. See NONGFU SPRING, <http://www.nongfuspring.com/index.php/about/safeguard> (last visited Apr. 22, 2014) (China) (showing that the sources for Nongfu bottled water are located in Jilin, Guangdong, Hubei, and Zhejiang provinces).

292. *Wahaha Products*, WAHAHA, <http://en.wahaha.com/product/detail42> (last visited Apr. 22, 2014).

293. *Id.*

294. Cf. U.S. ENVTL. PROT. AGENCY, *supra* note 52 (noting that advancements in reverse osmosis filtration occurred in the 1970s and 1980s).

295. A United States company examined 170 bottled water brands to find that 20% did not disclose where their water came from and an additional 32% did not disclose any water treatment information. *The 6 Worst Brands of Bottled Water You Can Buy*, MERCOLA.COM (Jan. 21, 2011), <http://articles.mercola.com/sites/articles/archive/2011/01/21/best-and-worst-bottled-water-brands.aspx>.

relatively young²⁹⁶ and regulatory enforcement is notoriously weak,²⁹⁷ China's bottled water laws will not resolve public health and environmental problems. A dearth of information concerning the laws and agencies involved in bottled water production and distribution further obfuscates these regulations. Errors in costly industry reports—such as IBISWorld's *Bottled Water in China 2012*, which references outdated laws and regulations²⁹⁸—highlight the challenges to understanding China's bottled water regulatory system.²⁹⁹ These inaccuracies also underscore the decentralized and often-slipshod method in which Chinese laws are published or amended and draw attention to the absence of an official catalog (like the United States's Code of Federal Regulations) for locating the nation's most up-to-date and authoritative laws and regulations.³⁰⁰ This Part seeks to clarify China's bottled water legal terrain.

It is important to understand the fundamentals of law in China. The National People's Congress (NPC) or its Standing Committee issues the national laws.³⁰¹ The State Council, subordinate to the NPC, implements regulations.³⁰² Ministries under the State Council issue rules.³⁰³ These rules are less authoritative than laws and regulations.³⁰⁴ In addition to laws, regulations, and rules, there are standards, which follow the Standardization Law and are promulgated by the Administration of Quality Supervision, Inspection, and Quarantine (AQSIQ) in coordination with the less authoritative Standardization Administration of China (SAC).³⁰⁵ Beyond this national framework, local governments at various levels (that is, provincial, city, and prefecture) implement a local body of law.³⁰⁶

296. See IBISWORLD, *supra* note 82, at 28 (observing that the new standards for drinking water were only implemented in 2012).

297. See Hai Nan, *supra* note 264 (explaining that the country's environmental protection legislation has not been enforced).

298. IBISWORLD, *supra* note 82, at 28.

299. IBISWorld's market report, *Bottled Water Production in China*, *supra* note 82, fails to reference the most recent laws and regulations. The report cites Drinking Natural Mineral Water GB8537-1995, which should read GB8537-2008; Hygienic Standard of Bottled Purified Water for Drinking GB17324-1998, which should read GB17324-2003; and Standard of Bottled Purified Water for Drinking GB17323-1998, which is outdated. IBISWorld also fails to include other relevant regulations, such as GB19298-2003, which applies to bottled water that is not mineral water or purified bottled water. See IBISWORLD, *supra* note 82, at 28.

300. See CHARLES McELWEE, ENVIRONMENTAL LAW IN CHINA: MANAGING RISK AND ENSURING COMPLIANCE 44–49 (2011) (outlining the many legislative bodies in China and the labyrinth of enacting, amending, and interpreting various rules, regulations, and laws).

301. *Id.* at 44–45.

302. *Id.* at 44–45, 78.

303. *Id.* at 100.

304. *Id.* at 78, 100 n.70.

305. *Id.*

306. *Id.* at 108–11.

Several laws, regulations, and agencies oversee the life cycle of a bottle of water in China.³⁰⁷ Which laws, regulations, and agencies govern depends on the water's source and stage of manufacture.³⁰⁸ Generally speaking, only a handful of laws apply to bottled water, whereas a myriad of regulations and local ordinances apply.³⁰⁹ A bottler may withdraw mineral water, non-mineral water, or purchase and purify tap water from a municipality.³¹⁰ Depending on the source, the bottled water is subject to one of three regulatory routes because each water source has a separate legal status.³¹¹ Mineral and non-mineral water, for example, require extraction licenses, whereas purified tap water does not.³¹² Other laws and agencies, as well as bottled water standards, come into effect during the commoditization stage. First, this Part explores water regulation at the extraction stage and the regulatory schemes underlying each of the three water sources. Second, this Part will examine the regulatory process for bottled water at the commodity stage.

A. Extraction and Compensation

1. Mineral Water

China currently supports roughly 3,000 qualified mineral water sources³¹³ and has approximately 100 major domestic producers.³¹⁴ Unlike non-mineral and purified tap water, mineral water is considered a mineral and is subject to the authority of the Ministry of Land and Resources (MLR) and the Mineral Resources Law of the People's Republic of China (Mineral Resources Law).³¹⁵ Three pieces of legislation govern mineral

307. Cf. Wang Xiaodong, *supra* note 24 (noting that bottled water companies adhere to a variety of standards, including national, local, and company-made standards).

308. See *infra* Part III.A; see also *infra* notes 365–67 and accompanying text.

309. *Id.*

310. *Id.*

311. *Id.*

312. See Regulation on the Administration of the License for Water Drawing and the Levy of Water Resource Fees (promulgated by St. Council, adopted Feb. 21, 2006, effective Apr. 15, 2006), art. 1 [hereinafter Regulation on the Administration of the License for Water Drawing], available at faolex.fao.org/docs/texts/chn64808.doc (supplementing the Water Law).

313. Wu Wencong, *supra* note 19. Statistics from the China Mineral Water Committee suggest that China has 4,400 identified sites that qualify for producing mineral water. Zheng Yangpeng, *supra* note 85.

314. Zheng Yangpeng, *supra* note 85.

315. See Zhonghua Renmin Gonghe Guo Kuangchan Ziyuan Fa Shishi Xize (中华人民共和国矿产资源法实施细则) [Rules for Implementation of the Mineral Resources Law of the People's Republic of China] (promulgated by St. Council, Mar. 26, 1994), <http://www.mlr.gov.cn/zwgk/flfg/>

water law: the Mineral Resources Law Rules for Implementation (1994), Provisions on Mineral Resources Compensation, and Procedures for Registration to Mine Mineral Resources.

Under the Mineral Resources Law, the government fully controls underground minerals and also issues permits for their extraction.³¹⁶ Companies and individuals interested in extracting minerals first must register and obtain a license to extract water.³¹⁷ These entities or individuals also must pay resource taxes as well as additional compensatory fees.³¹⁸ Four types of government compensation typically accompany mineral water extraction: (1) purchase of a general mining right; (2) costs accompanying any government-performed land surveys; (3) payment for the mineral water based on the quantity extracted (mineral resource fee); and (4) a mineral sales tax.³¹⁹ Non-mineral water extraction, alternatively, only requires paying the mineral resource fee.³²⁰

To bear the “mineral” label, Chinese laws require that the water be drawn “from deep underground . . . with a certain amount of minerals, trace elements or other constituents, and without contamination.”³²¹ Mineral water should not be confused with mineral-fortified water, which is either

kczylfg/200406/t20040625_293.htm (China) [hereinafter Rules for Implementation of the Mineral Resources Law] (listing mineral water as a kind of mineral resource).

316. *Id.* art. 3.

317. Regulation on the Administration of the License for Water Drawing, *supra* note 312, art. 2, 4.

318. *Id.* art. 28.

319. See, e.g., Kuangchan Ziyuan Kaicai Dengji Guanli Banfa (矿产资源开采登记管理办法) [Procedures for Administration of Registration of Mining of Mineral Resources] (promulgated by St. Council, Feb. 12, 1998, effective Feb. 12, 1998), http://www.mlr.gov.cn/zwgk/flfg/kczylfg/200601/t20060119_72222.htm, art. 9 (China) [hereinafter Procedures for Administration of Registration of Mining of Mineral Resources] (providing the method of calculating the cost of mining permit); Kuangchan Ziyuan Buchang Fei Zhengshou Guanli Guiding (矿产资源补偿费征收管理规定) [Provisions on the Administration of Collection of the Mineral Resources Compensation] (promulgated by St. Council, Feb. 27, 1994, effective Apr. 1, 1994), art. 5, <http://www.chinaacc.com/new/63/73/131/2006/5/zh2170151957121560022730-0.htm> (China) [hereinafter Provisions on the Administration of Collection of the Mineral Resources Compensation] (providing the method of calculating the fee for extracting mineral resources by private parties); Zhonghua Renmin Gonghe Guo Ziyuan Shui Zanxing Tiaoli (中华人民共和国资源税暂行条例) [Provisional Regulations on Resources Tax of the People's Republic of China] (promulgated by St. Council, Dec. 25, 1993, effective Jan. 1, 1994), <http://www.chinaacc.com/new/63/67/88/2005/10/ad34128111720150021472.htm>, art. 5 (China) [hereinafter Provisional Regulations on Resources Tax of the People's Republic of China]; Zhonghua Renmin Gonghe Guo Ziyuan Shui Zanxing Tiaoli Shishi Xize (中华人民共和国资源税暂行条例实施细则) [Detailed Rules for the Implementation of the Provisional Regulations of the People's Republic of China on Resource Tax] (promulgated by Ministry of Fin., Dec. 30, 1993, effective Dec. 30, 1993), <http://www.chinaacc.com/new/63/67/81/2005/12/dr110212264510321500210538-0c.htm>, art. 4 (China) [hereinafter Implementing Provisional Rules of China on Resource Tax].

320. Regulation on the Administration of the License for Water Drawing, *supra* note 312, art. 28.

321. Drinking Natural Mineral Water, *supra* note 267 (translation).

purified tap water or non-mineral water with added minerals.³²² Fortified mineral water must comply with either of the two primary bottled water standards for purified tap or non-mineral water, as well as GB2760-2007 (Standards for Food Additives).³²³ Mineral water bottlers acknowledge that their water generally receives minimal filtration because it is perceived to have “virtually no impurities.”³²⁴ Once a site is designated for mineral water extraction, local governments must protect the integrity of the water and prevent contamination by imposing land restrictions.³²⁵ For example, human activities are severely constrained and tourism and development in the area are outright prohibited.³²⁶

Mineral water has a historically complicated legal status in China. Although the Ministry of Water Resources (MWR) originally oversaw mineral water,³²⁷ the MLR also believed that it should oversee mineral water extraction and receive compensation fees.³²⁸ Mineral water’s high economic value and the lack of coordination between these government agencies made this issue more acrimonious.³²⁹ The matter was resolved in 1998,³³⁰ and as indicated above, mineral water is now regulated under the MLR. However, the lack of cooperation between government agencies in China continues to hamper environmental efforts throughout the country.

322. See *Kuangwuzhi Shui* (矿物质水) [Mineral Fortified Water], BAIDU BAIKE, http://baike.baidu.com/link?url=DTHYnbqdoGCI5TNKhw50tLML8uMUSMpfaMWMxpdtbTL0iP0Hc_NYpVPLu9OZzy (China) (last visited Feb. 13, 2014) (defining mineral fortified water).

323. See *id.* (stating that mineral fortified water generally complies with two standards: GB2760-2007, standard for food additives, and GB19298-2003, standard for bottled water).

324. Zheng Yangpeng, *supra* note 85.

325. Rules for Implementation of the Mineral Resources Law, *supra* note 315, art. 24, 27.

326. See *id.* art. 29 (requiring parties to study the feasibility of extraction, complete a plan for extraction, employ environmental protection measures, and obtain relevant permits before extracting any mineral resources).

327. Zhongyang Jigou Bianzhi Weiyuanhui Bangongshi Guanyu Kuangquan Shui Dire Shui Guanli Zhize Fengeng Wenti de Tongzhi (中央机构编制委员会办公室关于矿泉水、地热水管职责分工问题的通知) [The Notification on Division of Management Responsibility of Mineral Water and Geothermal Energy from Central Office of Government Setup Committee] (issued by St. Comm’n Office for Pub. Sector Reform, Dec. 16, 1998, effective Dec. 16, 1998).

328. See Rules for Implementation of the Mineral Resources Law, *supra* note 315 (stipulating that mineral water is a mineral in the appendix).

329. For example, in the 1990s, a number of mineral water companies were uncertain as to which government agency should receive compensation fees. Different courts had different opinions on the issue. See Liu Jian Dong, Zhang Wei Ling & Meng Jun, *Water Resources or Mineral Resources: The Argument over the Legal Nature of Mineral Water*, XINJIANG LEGAL DAILY (Jun. 30, 2010).

330. In 1998 the government issued the Notification on Division of Management Responsibility of Mineral Water and Geothermal Energy, stipulating that an applicant must first apply to the water resources administration for a water collection license before applying to the Mineral Resources Administration. This notification further stated that miners were required to compensate the MLR and need notify the MWR. See *supra*, note 320.

2. Non-Mineral Water

Non-mineral water extraction follows a separate regulatory route. Like mineral water, however, regulations at this stage focus primarily on withdrawal, licensing, and extraction and resource fees.³³¹

Chinese law defines non-mineral water as water drawn “directly from rivers, lakes or underground with the use of water drawing engineering structures or facilities.”³³² The two main laws governing non-mineral water extraction and compensation are the Water Law of the People’s Republic of China (last modified in 2002)³³³ and the Regulation on the Administration of the License for Water Drawing and the Levy of Water Resource Fees (2006).³³⁴

The MWR is the leading authority on non-mineral water resource management.³³⁵ The Ministry’s administrative departments at the county level or above, which include provincial, city, and prefecture Environmental Protection Bureaus (EPBs), implement and administer non-mineral water extraction laws and withdrawal licenses.³³⁶ The Ministry of Environmental Protection (MEP), alternatively, controls water pollution, but coordination between these two agencies is effectively non-existent.³³⁷ Keeping these agencies separate impairs regional resource management policies and water pollution control efforts.³³⁸

The MWR is composed of a network of water administration departments and watershed authorities that regulate different water bodies depending on the size, significance, and geographic composition of the water body.³³⁹ When a body of water spans several administrative districts, the government creates a specific river basin commission, such as the

331. See, e.g., Regulation on the Administration of the License for Water Drawing, *supra* note 312, art. 2 (requiring licenses and fees for drawing water).

332. *Id.*

333. See Zhonghua Renmin Gonghe Guo Shui Fa (中华人民共和国水法) [Water Law of the People’s Republic of China] (promulgated by Standing Comm. of the Nat’l People’s Cong., Aug. 29, 2002, effective Oct. 1, 2002), http://www.gov.cn/ziliao/flfg/2005-08/31/content_27875.htm, art. 1, 2 (China) [hereinafter China’s Water Law] (dictating how water resources are managed and allocated for economic use and oversees water development, utilization, protection, and preservation of resources). This law also applies only to surface water and groundwater. *Id.*

334. Regulation on the Administration of the License for Water Drawing, *supra* note 312.

335. Cf. Yong Jiang, *supra* note 9, at 3191 (explaining that the MWR “oversees water resources planning, including designating water functional zones for different uses and establishing corresponding water quality standards.”).

336. Regulation on the Administration of the License for Water Drawing, *supra* note 312, art. 3; China’s Water Law, *supra* note 333, art. 7.

337. Jiang, *supra* note 9, at 3191.

338. *Id.*

339. China’s Water Law, *supra* note 333, art. 12.

Yangzte River Conservancy, to oversee regulation and permitting.³⁴⁰ However, these commissions have a reputation for kowtowing to local politicians and possess “limited power to allocate water resources, coordinate water resource exploitation and conservation, and enforce water resource planning at the basin level.”³⁴¹ As a result, broad-based water management of surface waters in China is weak and “local myopic decision-making” prevails.³⁴² Moreover, China’s Water law “does not clearly define the authority of local governments and river basin management commissions . . . caus[ing] a vacuum of authority.”³⁴³ This dysfunction undercuts efforts to manage water extraction quotas.

Water withdrawal regulations require applicants to consider the environmental impacts of their operations and to provide a report detailing the source, purpose of the water withdrawal, and the “impacts to the ecology and environment, etc.”³⁴⁴ As this regulation illustrates, China’s acceptance of “etc.” as permissible legal language complicates legal interpretation and obfuscates the intent and scope of these laws. China’s water laws also call for the “conservation and reasonable exploitation and utilization of water resources.”³⁴⁵ These efforts, however, are rarely executed in earnest and what defines “reasonable” is seldom clear.

Apart from a handful of exceptions, non-mineral water withdrawals require a license.³⁴⁶ To obtain a license, a bottler must apply to the local government water administration and, where applicable, regional watershed authorities.³⁴⁷ Licenses are issued in accordance with China’s Water Law, comprehensive water planning and withdrawal quotas, and the central government’s “medium and long-term planning for the supply and demand of water and the functional division of water.”³⁴⁸ The amount of water allocated for withdrawal is based on previously agreed-upon water allocation schemes and industrial water-use quotas determined by regional administrative departments.³⁴⁹

Unfortunately, due to enforcement obstacles, even the most stringent water regulations offer little protection to China’s waters. This is largely

340. *Id.*

341. Yong Jiang, *supra* note 9, at 3191.

342. *See id.* (explaining that the fragmented river basin management scheme is based on political boundaries and not watersheds).

343. XIE ET AL., *supra* note 22, at xxii.

344. Regulation on the Administration of the License for Water Drawing, *supra* note 312, art. 11.

345. *Id.* art. 1.

346. *Id.* art. 2, 4.

347. Yong Jiang, *supra* note 9, at 3191.

348. Regulation on the Administration of the License for Water Drawing, *supra* note 312, art. 6.

349. *Id.* art. 15, 16.

because Chinese laws are drafted “to operate at a level of generality that provides flexibility to those who are required to enforce them.”³⁵⁰ For example, the addition of the word “etc.” at the end of the above-referenced regulation suggests a casual attitude towards the environmental consequences of water extraction. China’s reputation for favoring policies that prioritize economic growth reinforces this assumption.³⁵¹ Ambiguities in the law’s provisions further magnify the difficulty of interpreting and enforcing environmental rules and regulations. For example, China’s Water Law states that water resource development “shall follow the principle of promoting benefits while eliminating disasters.”³⁵² Although this is a translation, the original text likewise lends itself to various interpretations.³⁵³ Nepotism and cronyism (part of a cultural norm in China referred to as *guanxi*) permeate China’s governing institutions, leaving law enforcement agencies weak and susceptible to corruption.³⁵⁴

In addition to obtaining a license, non-mineral bottlers must also pay a water resources fee.³⁵⁵ Local (county and municipality) water administrations collect these fees.³⁵⁶ Various provincial, regional, and municipal administrations decide fee rates and the national government approves them.³⁵⁷ In Zhejiang Province, for example, the Price Bureau and Department of Finance set the water withdrawal fees at \$0.82/m³ (CN¥5)

350. MCÉLWEE, *supra* note 300, at 8.

351. R. Edward Grumbine, *China’s Emergence and the Prospects for Global Sustainability*, 57 BIOSCIENCE 249, 250 (2007).

352. China’s Water Law, *supra* note 333, art. 20; see *Water Law of the People’s Republic of China (the modified edition)*, GLOBAL LAW, available at <http://policy.mofcom.gov.cn/english/claw!fetch.action?id=e03169>, for translation.

353. See *supra* text accompanying notes 350–52.

354. MCÉLWEE, *supra* note 300, at 8.

355. According to Article 2,

[t]he term ‘water drawing’ as mentioned in the present Regulation shall refer to the drawing of water resources directly from rivers, lakes or underground with the use of water drawing engineering structures or facilities. Any entity or individual that draws water resources shall, except for the circumstances prescribed in Article 4 of the present Regulation, apply for a license certificate for water drawing, and pay water resource fees.

Regulation on the Administration of the License for Water Drawing, *supra* note 312, art. 2.

356. See Shui Zi Yuan Fei Zheng Shou Shi Yong Guan Li Ban Fa (水资源费征收使用管理办法), [Administrative Measures for the Levy and Utilization of Water Resource Fees] (promulgated by Ministry of Finance, Nat'l Dev. and Reform Comm'n, Nov. 1, 2008) (China) [hereinafter Administrative Measures for Water Resource Fees] (setting forth the process for applying for water drawing licenses and the associated fees).

357. *Id.* art. 8.

(surface water) and \$1.64/m³ (CN¥10) (groundwater).³⁵⁸ Water fees must comply with various environmental, economic, and social principles. For example, licensing laws require that water withdrawal fees comply with “principles of publicity, fairness, justice, [and] high efficiency.”³⁵⁹ Fees must also “promot[e] the reasonable exploitation, utilization, conservation and protection of water resources.”³⁶⁰ The efficacy of these provisions, how they are interpreted, and the frequency of their enforcement is uncertain. What can be said with certainty is that these fees fail to accurately reflect the environmental, social, and economic costs of withdrawals.

3. Purified Tap Water

The final water category is purified water, which is defined as water that “compl[ies] with the living standards of hygiene . . . through electrodialysis, ion exchange, reverse osmosis ion or distillation and other appropriate processing, [such as] sealing . . . and do not contain any additives.”³⁶¹ Purified tap water is essentially filtered municipal water. Bottlers purchasing tap water are expected to draw from municipalities whose water complies with GB5749-2006—the standard for tap water.³⁶² The bottled water standard for purified tap water, however, is GB17324-2003, which is more stringent than its tap water counterpart.³⁶³

Since bottlers of purified tap water do not technically withdraw surface or groundwater, like non-mineral bottlers, they bypass licensing requirements and extraction fees. Accordingly, the municipality (not the bottler) obtains the license to extract and pays the government a water

358. Guanyu Tiaozheng Shui Ziyuan Fei Biaozhun de Tongzhi (关于调整水资源费标准的通知) [Notification on the Adjustment of Water Resources Fees] (promulgated by Zhejiang Province Price Bureau & Dep’t of Fin., effective July 1, 2004), http://www.zjwater.com/pages/document/34/document_524.htm (China).

359. Administrative Measures for Water Resource Fees, *supra* note 356, art. 8 (author translation).

360. *Id.* art. 29 (author translation).

361. Zhonghua Renmin Gonghe Guo Guojia Biaozhun Ping (Tong) Zhuang Yinyong Chunjing Shui Weisheng Biaozhun (中华人民共和国国家标准瓶（桶）装饮用纯净水卫生标准) [Hygienic Standard of Bottled Purified Water for Drinking] (promulgated by Ministry of Health of the People’s Republic of China & Standardization Admin. of the People’s Republic of China, Sept. 24, 2003, effective May 1, 2004), [http://www.szehs.com/uploads/gb/%E7%93%B6\(%E6%A1%B6\)%E8%A3%85%E9%A5%AE%E7%94%A8%E7%BA%AF%E5%87%80%E6%B0%B4%E5%8D%AB%E7%94%9F%E6%A0%87%E5%87%86GB17324-2003.pdf](http://www.szehs.com/uploads/gb/%E7%93%B6(%E6%A1%B6)%E8%A3%85%E9%A5%AE%E7%94%A8%E7%BA%AF%E5%87%80%E6%B0%B4%E5%8D%AB%E7%94%9F%E6%A0%87%E5%87%86GB17324-2003.pdf) (China) [hereinafter Hygienic Standard of Bottled Purified Drinking Water] (author translation).

362. See Wang Zhenghua, *supra* note 239 (noting that the government adopted a national standard for drinking water quality in 2006).

363. PATRICIA COELHO, THERMO SCI., ANALYSIS OF TOXIC ELEMENTS IN DRINKING AND BOTTLED WATERS USING THE THERMO SCIENTIFIC ICAP 7200 ICP-OES 1, available at <https://static.thermoscientific.com/images/D21758~.pdf> (last updated 2013).

resource fee—like non-mineral and mineral water bottlers.³⁶⁴ The municipality then sells its water to bottlers (and residents) at a price that reflects these compensatory costs.

B. Commodification

1. National Laws, Regulations, Ministries, and Standards

After the water is drawn from one of these three sources, it becomes a commodity and is subject to additional domestic regulations and standards. A substantial number of national laws, regulations, ministries, and standards govern this process.

Any seller (domestic or foreign) of bottled water must obtain a sales or production permit from the National Center for Health Inspection and Supervision.³⁶⁵ Water sourced locally requires an additional permit.³⁶⁶ Imported bottled water must proceed through the China Entry-Exit Inspection and Quarantine Bureau (CIQ).³⁶⁷ However, introducing new foreign products into the Chinese bottled water market has become less common in recent years, as trade barriers and regulatory restrictions make it increasingly difficult for foreign business to expand in China.³⁶⁸

After obtaining a permit, bottled water companies must ensure that their product complies with national laws and regulations. The most important law for quality control and public health is the Food Safety Law and its implementing regulation. Under the Food Safety Law, the State Council established a Food Safety Committee and charged the health agency with creating food safety standards.³⁶⁹ The law also established a food safety risk assessment system with an expert committee to evaluate public health risks in the food and beverage industry.³⁷⁰

364. See Regulation on the Administration of the License for Water Drawing, *supra* note 312, art. 28 (requiring any “water drawing entity” to pay a water resource fee to the government).

365. NEW ZEALAND TRADE & ENTER., *supra* note 91, at 1.

366. *Id.*

367. *Id.*

368. See, e.g., *id.* at 1–2 (noting that regulators can refuse imported food and beverage if they lack Chinese language labeling). But see Meng Jing, *supra* note 92 (“[A]n increasing number of international brands are entering the country, looking at the market potential in the high-end bottled water industry.”).

369. Food Safety Law of the People’s Republic of China, *supra* note 217, art. 4.

370. Yinyong Tianran Kuangquanshui Jianyan Fangfa (饮用天然矿泉水检验方法) [Methods for Examining Mineral Water] (promulgated by St. Admin. for Quality Supervision & Inspection and Quarantine & Standardization Admin., Dec. 29, 2008, effective Apr. 1, 2009), <http://down.foodmate.net/standard/sort/3/17569.html> (China).

Bottlers must also adhere to national standards—several of which come from the directives and objectives of these laws. National standards or “GB (国标guo biao) standards” begin with either GB (mandatory) or GB/T (voluntary).³⁷¹ There are nearly 5,000 national food standards.³⁷² The three main standards for bottled water are³⁷³ GB8537-2008 for mineral water, GB17324-2003 for purified tap water, and GB19298-2003 for non-mineral water (see Table 1).³⁷⁴

Additional applicable standards include the Standard for Drinking Water Quality (GB5749-2006), which applies to tap water quality and subsequently to purified bottled water; the Hygienic Standard of Bottled Water for Drinking (GB19298-2003), which has twenty-one indicators for measuring water quality; and the National Food Safety Standard for Nutrition Labeling of Prepackaged Foods (GB28050-2011), which prescribes labeling requirements for prepackaged foods.³⁷⁵ Mineral water must comply with two additional standards: the Methods for Testing Mineral Water (GB/T8538-2008), which specifies how mineral water is to be tested and the Hygienic Code for Mineral Water Factories (GB16330-1996), which imposes hygienic requirements on the factory conditions of bottlers.³⁷⁶

The main three bottled water standards, as well as several standards listed above, generally stipulate contamination, physiochemical, and

371. Standardization Law, *supra* note 242, art. 7. Standards begin with the letters GB and are followed by a series of numbers and end with a hyphen and the date the standard was issued—or, if the standard was amended, the date it was most recently amended.

372. Wang Xiaodong, *China Consolidates Food Safety Standards*, CHINA DAILY (Aug. 21, 2013, 8:54 PM), http://www.chinadaily.com.cn/china/2013-06/21/content_16645526.htm.

373. China issued its first bottled water standard in 1987: the Standard for Natural Drinking Mineral Water of the People’s Republic of China (GB8537-1987). *Bottled Water from China*, *supra* note 78. At the time, this standard applied only to mineral water, as it was the only bottled water commercially available. *Id.* Two years later, China revised this standard to include both soft drinks and bottled water: GB10789-89. Not long thereafter, standards were issued for both purified tap and non-mineral bottled waters. *Id.*

374. Drinking Natural Mineral Water, *supra* note 267, art. 5.2.1–8.4.3; Hygienic Standard of Bottled Purified Drinking Water, *supra* note 361, art. 3.1–9.3.

375. See Wang Zhenghua, *supra* note 239 (discussing GB5749-2006); see *Standards for Bottled Water 80% Lower than for Regular Tap Water in China?!*, ECHINACITIES (May 9, 2013), <http://www.echinacities.com/news/Standards-for-Bottled-Water-80-Lower-than-for-Regular-Tap-Water-in-China> (discussing GB19298-2003); see Echo Cao, *GB 28050-2011 National Food Safety Standard General Standard for the Nutrition Labeling of Prepackaged Foods*, CHEMLINKED (June 17, 2013), <https://chemlinked.com/en/regulatory-database/gb-28050-2011-national-food-safety-standard-general-standard-nutrition-labeling-prepackaged-foods> (discussing GB28050-2011).

376. Zhonghua Renmin Gonghu Guo Guojia Biaoqu Yinyong Tianran Kuangquan Shui Chang Weisheng Guifan (中华人民共和国国家标准饮用天然矿泉水厂卫生规范) [Hygienic Code for Mineral Water Factories] (promulgated by Ministry of Public Health, June 19, 1996, effective Sept. 1, 1996), <http://www.lnxhkq.com/xiangguan/g3.htm> (China).

microbial indexes, sensory requirements (that is, properties detectable through human senses), and guidelines for water treatment, storage, and transportation.³⁷⁷ Several of these standards impose maximum contaminant levels (MCLs) for quality control purposes.

Table 1: Water Standard's Maximum Permissible Levels (ppm)

	GB5749:2006 Tap Water	GB8537:2008 Mineral Bottled Water	GB17324:2003 Purified Bottled Water	GB3838:2002 Surface Water
Arsenic	0.01	0.01	0.01	0.05
Cadmium	0.005	0.003	-	0.001
Hexavalent Chromium	0.05	0.05	-	0.01
Copper	1	1	0.01	0.01
Iron	0.3	-	-	0.3
Lead	0.01	0.01	0.01	0.01
Mercury	0.001	0.001	-	0.00005
Nickel	0.02	0.02	-	0.02
Zinc	1	0.2	-	0.05

The national ministries that oversee the commodification stage of bottled water are too numerous for this section to address in any great detail. These ministries include the State Food and Drug Administration (SFDA); the AQSIQ; the National Health and Family Planning Commission (previously Ministry of Health); the State Administration for Industry & Commerce; and the National Development and Reform Commission (NDRC).³⁷⁸ The roles and responsibilities of these agencies vary and in many cases overlap.

The most relevant of these ministries, for purposes of this Article, is the AQSIQ. This agency creates standards in China as well as inspects the production sector.³⁷⁹ Local divisions of the AQSIQ will typically perform

377. Drinking Natural Mineral Water, *supra* note 267, art. 5.2.1–8.4.3; Hygienic Standard of Bottled Purified Drinking Water, *supra* note 361, art. 3.1–9.3.

378. See *Guojia Zhijian Ju Choucha Biaoming Sishi Liu Zhong Pingzhuang Yinyong Shui Bu Hege* (国家质监局抽查表明46种瓶装饮用水不合格) [AQSIQ Testing Indicates that 46 Bottled Water Brands Failed Inspections], SOHU.COM (Jul. 11, 2001, 11:05), <http://health.sohu.com/33/69/harticle15116933.shtml> (China) (reporting the results of the random market inspection conducted by AQSIQ).

379. *Id.*

spot checks or random inspections of local bottlers to ensure compliance with national and local bottled water standards.³⁸⁰ The Administration for Industry and Commerce (AIC) also has authority to carry out random market inspections.³⁸¹ The AIC also checks for counterfeit products and ensures that bottlers possess a sales permit.³⁸²

Following the recent Nongfu scandal, the government proposed consolidating provincial, corporate, and national standards into one national bottled-water standard.³⁸³ According to China's National Center for Food Safety Risk Assessment,³⁸⁴ “[t]he National Health and Family Planning Commission is speeding up its consolidation of current standards on bottled water, and new national standards will be published.”³⁸⁵ The government expects to release this unified standard in 2015.³⁸⁶ China has over 5,000 standards for regulating food quality and hygiene, and many of these standards contradict one another and overlap.³⁸⁷ According to experts, a unified standard ensures that bottled water standards are known both to the public and food authorities who supervise quality control.³⁸⁸ Yet, while the objective of unification would be to improve bottled water safety, a unified standard could very well have the opposite effect. Through unification, China undermines federalism and the ability of provinces to implement more stringent bottled water standards. Currently, ambiguities in the language of the Standardization Law obscure the relationship between national and provincial standards.³⁸⁹ The government's announcement to unify bottled water standards will effectively eliminate provincial ones, which were already required to adhere to appropriate national standards based on the water's source.³⁹⁰ If the government seeks simplicity, it makes sense to create one unified standard that applies to all bottled mineral, non-

380. *Id.*

381. See *Mission*, STATE ADMIN. FOR INDUS. & COM. OF THE PEOPLE'S REPUBLIC OF CHINA, <http://www.saic.gov.cn/english/aboutus/Mission/index.html> (last visited Apr. 8, 2014).

382. *Id.*

383. Wang Xiaodong, *supra* note 24.

384. This is a government-funded organization formed in 2011 dedicated to food safety. *China Forms Food Safety Risk Assessment Center*, ENGLISH.NEWS.CN (Oct. 14, 2011, 12:49 PM), http://news.xinhuanet.com/english2010/china/2011-10/14/c_131191294.htm.

385. Wang Xiaodong, *supra* note 24.

386. Xinhua, *China to Unify Bottled Water Quality Standards*, GLOBAL TIMES (May 4, 2013), <http://www.globaltimes.cn/content/779119.shtml>.

387. Wang Xiaodong, *supra* note 24.

388. See *id.* (describing the confusion sown among the public and food quality authorities by multiple bottled water standards).

389. See *id.* (discussing confusion among national, local, and company-specific quality standards).

390. See *id.* (“Food safety standards made by local governments should be stricter than national standards, according to the law.”).

mineral, and purified tap water. This way, companies could not circumvent the filtration process just because the water comes from deep underground—as is currently the law governing China’s mineral water.³⁹¹

If a more stringent standard emerged from consolidation, this outcome could minimize public health risks by putting out of business those bottlers unable to afford the costs of compliance. But as indicated earlier, the efficacy of these proposed standards (assuming they reflect modern public health risks) will also depend on how rigorously they are enforced. If tap water quality standards are any indication of how a new—and more stringent—bottled water standard will fare, there is reason for pessimism. China’s newly revised tap water standard is considered largely unattainable and critics suggest that it will not result in major improvements to China’s tap water.³⁹² The new tap water standard increases the number of quality indicators from 35 to 106³⁹³—rivaling European Union standards—however, reports indicate that only about 50% of urban areas meet the required standards.³⁹⁴ Accordingly, China can boast the most impressive and stringent of standards on paper, but if they are not adhered to, or if they are poorly enforced, these standards are little more than words on a page. China may possess the desire that gets the laws on paper, but the country sorely lacks the conviction needed to enforce laws.

2. Local and Industry Standards

In addition to national laws and standards, bottlers must also adhere to local and business standards where applicable. Local standards are primarily issued at the provincial level.³⁹⁵ Provincial standards must comply with national standards but may impose more stringent regulations for the province.³⁹⁶ If a national standard exists, a provincial standard is legally subordinate to its national counterpart; alternatively, if a national standard is absent, the local standards prevail.³⁹⁷

391. Drinking Natural Mineral Water, *supra* note 267, art. 3.1.

392. RESPONSIBLE RESEARCH, WATER IN CHINA: ISSUES FOR RESPONSIBLE INVESTORS, *supra* note 79, at 54; Jing & Haotong, *supra* note 241.

393. *China’s New Drinking Water Standards in Effect*, CCTV NEWS (Jul. 1, 2012, 2:49 PM), <http://english.cntv.cn/program/news-hour/20120701/105621.shtml>.

394. Jing & Hongqiao, *supra* note 5.

395. Only provinces, autonomous regions (for example, Tibet and Xinjiang), and municipalities operating directly under the central government (for example, Shanghai and Chongqing) can issue local standards. Standardization Law, *supra* note 242, art. 6.

396. *See id.* (promoting stricter industry standards when compared to national standards).

397. Wang Zhenghua, *supra* note 239. According to Article 6 of the Standardization Law:

As with national standards, there are mandatory and voluntary local standards. Currently, there are approximately 1,200 local standards in the food and beverage sector.³⁹⁸ The Nongfu case shed light on the legal implications of provincial standards.³⁹⁹ At issue in the Nongfu case was the Zhejiang province standard for non-mineral drinking water: DB33/383-2005.⁴⁰⁰ Because bottlers are required to follow mandatory national and local standards, Nongfu violated the law by relying on a provincial standard that fell below national standards.⁴⁰¹ The standard was also less stringent than the applicable provincial standard Nongfu was required to follow for that factory—the Guangdong provincial standard.⁴⁰²

At the national level, the three primary standards govern mineral, non-mineral, and purified bottled water.⁴⁰³ However, provinces have also developed local types of bottled water—mountain spring water and natural water.⁴⁰⁴ Guangdong and Zhejiang provinces have recently issued standards for “natural water;”⁴⁰⁵ and in 2011, Guangdong province launched a new

Where, in the absence of both national and trade standards, safety and sanitary requirements for industrial products need to be unified within a province, an autonomous region or a municipality directly under the Central Government, local standards may be formulated. Local standards shall be formulated by departments of standardization administration of provinces, autonomous regions and municipalities directly under the Central Government and reported to the department of standardization administration and the competent administrative authorities under the State Council for the record, and shall be annulled on publication of the national or trade standards.

Standardization Law, *supra* note 242, art. 6.

398. FRESHFIELDS BRUCKHAUS DERINGER, *supra* note 256, at 2.

399. Nongfu filed a lawsuit against the Beijing Times based on its reporting and is demanding \$32.8 million for the report’s alleged reputational damage. Lu Nengneng, *Nongfu Spring Sues Over Articles on Water Quality*, SHANGHAI DAILY (Nov. 30, 2013), <http://www.shanghaidaily.com/Business/consumer/Nongfu-Spring-sues-over-articles-on-water-quality/shdaily.shtml>.

400. *Nongfu Spring Halts Beijing Barrels*, *supra* note 238.

401. See WENHUI, *supra* note 240 (revealing that the local standard of Zhejiang province is below the national GB19298 standard).

402. *Nongfu Shanzuan Xian Biaozhun Men Xiaofeizhe Qidai Quanwei Shuosa* (农夫山泉陷“标准门”消费者期待权威说法) [Consumers Are Expecting a Response from the Authority Regarding Nongfu Spring’s Standard Violation], XINHUA NET (Nov. 30, 2009, 7:01 PM), http://news.xinhuanet.com/fortune/2013-04/11/c_115357225.htm (China).

403. See *supra* notes 371–74, 377 and accompanying text (describing the three main national standards for bottled water).

404. See Li Fei (李飞), *Yinyong Tianran Shui Biaozhun Hunluan* (饮用天然水标准混乱) [Bottled Water Standards are in Disarray], LEGAL WEEKLY (Apr. 16, 2013, 11:59 PM), <http://www.legalweekly.cn/index.php/Index/article/id/2513> (China) (discussing the chaos of local standards for bottled water).

405. Pingzhuang Yinyong Tianran Shui Zhejiang Sheng Difang Biaozhun (瓶装饮用天然水浙江省地方标准) [Local Standards for Bottled Water in Zhejiang Province] (promulgated by Zhejiang Bureau of Quality and Tech. Supervision, Oct. 13, 2005, effective Jan. 1, 2006),

standard for “mountain spring water” (DBS44/001-2011).⁴⁰⁶ Although the Standardization Law is vague on the issue of province-based labeling requirements, bottlers are expected to follow these local and province-based rules, presumably because there are no corresponding national standards for these specific water types. Less clear is the legal authority of provincial standards when a corresponding national standard exists. The Standardization Law explicitly allows provinces to enact standards when national standards are absent,⁴⁰⁷ but does not explain what legal authority provincial standards possess when national standards exist.

When it comes to unique province-based varieties of bottled water that have no equivalent at the national level—like Guangdong’s mountain spring water—the Standardization Law suggests that bottlers should follow provincial-based standards. In Guangdong, for a bottler to brand its water mountain spring water, the water must come from mountain streams (not ground-level lakes or rivers) in Guangdong and proceed through a basic filtration process that allows the water to retain certain natural properties and elements.⁴⁰⁸ The standard prohibits adding any elements to the water.⁴⁰⁹

http://wenku.baidu.com/link?url=3R8eUDg7OyYmtBpDKKbFkr62hWP_cOAOJ-Xak357gpv3d5pqYnSRHr9jMvMH61wENLZfai4_s3hYo4HN48FHF3VcU7ZY5m6gn9rsMBONeH3 (China).

406. Guangdong Sheng Shipin Anquan Difang Biaozhun Yinyong Tianran Shanquan Shui (广东省食品安全地方标准饮用天然山泉水) [Guangdong Province Local Standard for Drinking Natural Spring Water] (promulgated by Guangdong Dep’t of Health, Dec. 1, 2011, effective May 1, 2012), http://wenku.baidu.com/link?url=zXMgJBGspPIWr01ohc57aRZrZWRqNKd4kyLT_gRfkUSd9l4bT_yLbk6SAwwT9CUWi443pnRcBQ3JGpROBonYLJDX_ujKV_qmYBLmvWWly (China) [hereinafter Guangdong Standard for Drinking Natural Spring Water].

407. Standardization Law, *supra* note 242, art. 6.

Where, in the absence of national standards, technical requirements for a certain trade need to be unified, trade standards may be formulated. Trade standards shall be formulated by competent administrative authorities under the State Council and reported to the department of standardization administration under the State Council for the record, and shall be annulled on publication of the national standards. Where, in the absence of both national and trade standards, safety and sanitary requirements for industrial products need to be unified within a province, an autonomous region or a municipality directly under the Central Government, local standards may be formulated. Local standards shall be formulated by departments of standardization administration of provinces, autonomous regions and municipalities directly under the Central Government and reported to the department of standardization administration and the competent administrative authorities under the State Council for the record, and shall be annulled on publication of the national or trade standards.

Id.

408. *Id.* art. 3.1.

409. *Id.*

Major provincial bottlers, including Dinghu, Lansong, and Wangzishan are presumably subject to this new standard.⁴¹⁰

One-third of China's most popular bottled water brands adhere to internal industry standards⁴¹¹ and there are over 2,900 food and beverage industry standards.⁴¹² These standards are generally more stringent than the national and local standards.⁴¹³ Nestlé, for example, follows national standards as well as internal standards.⁴¹⁴ Of course, as in the United States, the industry self-monitors and enforces its own standards—not government regulators.⁴¹⁵ This approach works in the United States but is arguably riskier for a country like China, where there is little government oversight of industry, no free press, and (perhaps as a result of the latter two realities) severe water pollution. Recently, media reports suggested that Coca-Cola's mineral water standards in Yunnan followed an internal industry standard (Q/KKK0003 S-2009) that violated GB19298-2003 because the standard did not test for radioactivity (gross beta/gross alpha) and cadmium—as required under this national standard.⁴¹⁶

It is hard to gauge compliance with little information on company standards and confusion surrounding national and provincial regulations. Bottlers are not typically forthcoming with details on their internal standards: Nestlé, Uni-President, Coca-Cola, and Master-Kang all refuse to disclose their standards in the name of trade secret confidentiality⁴¹⁷—even though withholding this information violates Article 26 of China's Food Safety Law, which requires publically available standards.⁴¹⁸

IV. LAW AND POLICY RECOMMENDATIONS

This Article submits the following recommendations to address public health and environmental concerns surrounding bottled water in China: (1) stricter bottled water transparency requirements, more frequent independent testing, and greater regulatory enforcement efforts to ensure quality control;

410. Guangdong Standard for Drinking Natural Spring Water, *supra* note 406.

411. Zheng Daosen & Liu Xiruo, *supra* note 223.

412. FRESHFIELDS BRUCKHAUS DERINGER, *supra* note 256, at 2.

413. Zheng Daosen & Liu Xiruo, *supra* note 223.

414. Zhang Ye, *Uncharted Waters*, GLOBAL TIMES (Apr. 22, 2013, 2:38 PM), <http://www.globaltimes.cn/content/776474.shtml#.UZFWcr-vsY4>.

415. *See id.* (noting that many companies follow their own standards).

416. *Kekou Kele Quechao deng Ju Gongkai Yinyong Shui Qiye Biaozhun* (可口可乐、雀巢等拒公开饮用水企业标准) [Coca-Cola, Nestle, and Others Refuse to Disclose Internal Bottled Water Standards], XINHUA NET (May 6, 2013, 10:21 AM), http://news.xinhuanet.com/yuqing/2013-05/06/c_124667789.htm (China).

417. *Id.*

418. Food Safety Law of the People's Republic of China, *supra* note 217, art. 26.

(2) a tax on bottled water to reflect the product's social and environmental costs that goes towards freshwater resource protection and water pollution remediation; (3) greater coordination and cooperation between government agencies involved in water resource management; (4) an updated water pricing system that reflects water availability and the cost of servicing safe water while eliminating incentives that discourage efficient water consumption and recycling; and finally (5) greater capital and technological investment in the quality and safety of municipal water supplies. The latter two recommendations are complementary—assuming that a rise in bottled water price will trigger greater investment in public water supplies.

In the first recommendation, China should implement more stringent label disclosure requirements, such as the water's method of filtration and source. China should also ensure that agencies testing water quality are independent from the water treatment plants being tested. Currently, a small number of agencies that perform water quality testing operate independently. Bottled water quality testing should also occur more frequently, with the test results made publicly available. Even though bottled water is largely unregulated worldwide,⁴¹⁹ countries struggling with severe water pollution and weak regulatory and enforcement systems—such as China—must use stricter and more transparent policies to protect public health. The potential for severe water contamination scares and counterfeit bottling is greater in these countries, thus creating a stronger need for regulation to manage these risks.

Second, bottled water pricing should more accurately reflect the product's environmental and social costs. To ensure adequate quality control and sustainability, the central government should impose a “luxury” tax on bottled water to compensate for the product's negative externalities—the energy (and carbon) used to create it, the water supplies it depletes, and the waste it produces. Increasing the price of bottled water while simultaneously improving public water quality will help China manage water demand, promote conservation and efficient water consumption, and provide clean water access to the general public.

419. The United States should not necessarily serve as an example. Of the top ten most popular water bottled brands in the United States, nine of them do not specify either their water source, the treatment method used, or provide contact information for consumers seeking water quality data. NNEKA LEIBA, SEAN GRAY & JANE HOULIHAN, ENVTL. WORKING GRP., 2011 BOTTLED WATER SCORECARD 4 (2011), available at <http://static.ewg.org/reports/2010/bottledwater2010/pdf/2011-bottledwater-scorecard-report.pdf>. A 2010 survey found that 18% of bottled water does not disclose the water source and 32% fails to indicate the method of filtration. *Id.* In a 2009 study looking at 188 bottled water brands, only two provided the source name and location, treatment process, and level of purity. *Id.* at 5.

Third, China's current water management system requires significant restructuring. Presently, water pollution control and water resource planning are two separate administrative bodies: the MEP manages water quality and the MWR manages water allocation and planning.⁴²⁰ This disconnect impairs efforts to promote efficient water use, ensure quality control, and advance environmental sustainability. Further, a host of different agencies at various administrative levels manage river basins, resulting in a fragmented and disjointed water management system.⁴²¹ Water resource management is horizontally and vertically fractured with overlapping responsibilities, ultimately creating an “unwieldy system” that undermines administrative coordination.⁴²² The World Bank advised China to segregate the MWR from river basin management commissions and permit the latter to have independent intergovernmental authority with accountability exclusively to the State Council.⁴²³ Although the World Bank's recommendations to developing countries are hardly foolproof, this is a sound suggestion as it would help minimize administrative congestion and allow for more effective regional planning.

Emphasizing broad-based water management will improve efficiency and ensure that proper water management takes precedent over factional political interests. The Chinese government should additionally develop its water rights system to ensure the efficacy of the permit process and lawful water extraction.⁴²⁴ Basin commissions should have overarching authority to regulate regional water bodies and issue permits. These commissions should also condition permits on performing comprehensive Environmental Impact Assessments (EIA), which should show that the proposed water withdrawals will not adversely affect the environment and that the permits comply with water withdrawal quotas. The current water management system should rely on scientific data and EIAs more. Currently, such system management approaches are often unavailable or unsophisticated and China would benefit from greater investment in these technologies.⁴²⁵

Fourth, bottled water prices presently conflict with market signals and environmental realities.⁴²⁶ China's current method for determining water's economic value is skewed. Local governments generally set water prices

420. Yong Jiang, *supra* note 9, at 3191 & n.3.

421. *Id.* at 3191.

422. XIE ET AL., *supra* note 22, at xxii.

423. *Id.* at xxiv.

424. Yong Jiang, *supra* note 9, at 3193, 3195.

425. Cf. *id.* at 3195 (discussing that “[w]ith its impressive economic development, China is able to pursue more sophisticated research with cutting-edge scientific methods” and can afford to invest in such research).

426. See *supra* Part I.B.

with guidance from the National Development and Reform Commission—the national government agency that oversees and implements economic and social development policies.⁴²⁷ The average price of water in thirty-six of China's cities is \$0.30/m³ (CN¥ 1.76/m³), and according to the World Bank, water rates cannot fall below \$0.33/m³ (CN¥2/m³) to recover costs.⁴²⁸ Basic filtration is estimated to cost an average of \$0.16–0.25/m³ (CN¥1–1.5/m³).⁴²⁹ In terms of water productivity rates, China stands at roughly \$3.60/m³, which pales in comparison to middle-income and high-income countries—averaging \$4.80/m³ and \$35.80/m³, respectively.⁴³⁰ Although the government steadily increased water tariffs since the early 1990s, studies indicate that water prices still fail to adequately reflect environmental and scarcity costs and are insufficient to recover service costs.⁴³¹ China's staunch fear of triggering social unrest with a hike in water prices remains a key obstacle to instituting water-pricing reforms.⁴³² However, failing to effectively address the nation's water pricing and allocation system now will only strengthen the likelihood of social unrest and political upheaval.

To address this issue, local governments could demand higher fees from bottlers for extracting water.⁴³³ These water resource fees could then be converted to taxes, shifting revenue from local governments to the central government.⁴³⁴ These funds would then help facilitate regional and nationwide water conservation and sustainability projects.⁴³⁵ Besides, China has a strong financial interest in conserving water, as the economic burden of water scarcity costs China approximately 1.3% of its GDP.⁴³⁶ Although

427. *Main Functions of the NDRC, NAT'L DEV. & REFORM COMM'N, PEOPLE'S REPUBLIC OF CHINA*, <http://en.ndrc.gov.cn/mfnndrc/> (last visited Apr. 22, 2014).

428. CHINA DEV. RESEARCH FOUND., CHINA'S NEW URBANIZATION STRATEGY 219 (Peter Noland ed., 2013); see *U.S. Dollar to Chinese Yuan Exchange Rate*, MARKET DAILY, http://ycharts.com/indicators/chinese_yuan_exchange_rate (last visited Apr. 22, 2014) (listing the exchange rate at CN¥6.14 for every 1 USD).

429. For example, households in Xi'an province pay approximately CN¥1.6/m³ for water, while the actual cost (that is, filtration, extraction, etc.) of the water is CN¥5/m³. Yong Jiang, *supra* note 9, at 3192; XIE ET AL., *supra* note 22, at 36.

430. XIE ET AL., *supra* note 22, at 137.

431. *Id.* at xxvi.

432. LEE, *supra* note 23, at 214.

433. See XIE ET AL., *supra* note 22, at xxvi (describing the reluctance of local governments to raise fees on water consumption legally authorized).

434. *Id.* at xxvii.

435. *Id.*

436. *Id.* at 21. This figure is believed to be much higher, however, this percentage does not reflect ecological impacts, such as the disappearance of wetlands and rivers, and the "amenity loss" of water pollution. *Id.*

there are ethical concerns surrounding market-based water pricing,⁴³⁷ as it will lead to higher water costs, it is important that the price of water more accurately reflect its market value while ensuring widespread public access.

Last, the government should inject greater investment into public water supplies. Chinese citizens cannot escape water pollution simply by drinking clean water—a common misconception. Indeed, showering, bathing, and brushing one's teeth are all exposure pathways to pollution either through skin absorption, inhalation, or incidental ingestion.⁴³⁸ Efforts to increase the price of water through the proposed new water pricing model will likely help generate tax revenue to fund needed upgrades and renovations to water systems, thereby mitigating public health risks.⁴³⁹

If water extraction and filtration become more costly, the price of bottled water will rise, which could lead to issues of social injustice for those who can only afford municipal water. Rising prices might also lead to increasing bottled water counterfeiting and piracy, which should be met with greater oversight and regulatory control. As far as ensuring equal access to potable water, the Chinese government should subsidize the cost of safe and clean municipal drinking water. This would make bottled water a luxury commodity except in cases where water is either unavailable or contaminated—in such event it should become a free government-provided service. For a country that considers itself communist, giving access to ostensibly safe drinking water only to those who can afford its purchase seems drunk on irony. The environmental and social implications of globalized water markets, including ethical considerations, while beyond the scope of this Article, are important considerations in any discussion involving bottled water.⁴⁴⁰

CONCLUSION

In the years ahead, China's bottled water market will need to respond to increased demand, water scarcity, and public health concerns. Without a firm commitment to quality control and the environment, the survival and success of China's bottled water industry sits on shaky ground. Bottled water cannot sustainably support the daily water needs of China's population under its current paradigm. Bottlers should consider the

437. See, e.g., *id.* at 91 (considering the impact of market-based pricing on poor consumers).

438. Jing & Hongqiao, *supra* note 5.

439. See *China to Adopt Progressive Water Pricing*, *supra* note 203 (outlining a progressive pricing scheme based on water consumption).

440. See Noah D. Hall, *Protecting Freshwater Resources in the Era of Global Water Markets: Lessons Learned from Bottled Water*, 13 U. DENV. WATER L. REV. 1, 2–3 (2009) (discussing global water markets and water resource protection).

environmental and energy inputs and create bottled water products that are water-energy-waste neutral. And without stricter regulations and enforcement mechanisms, the safety of China's bottled water will remain in doubt. Ensuring that bottled water consumers are drinking from reliable and safe sources is paramount to China's economic and social progress. To that end, the Chinese government must update its bottled water regulation and water policies to reflect needed improvements in quality control.

More importantly, Chinese reliance on bottled water as a drinking resource is a symptom of a larger and more serious disease: China's extremely polluted water resources. China is home to some of the most polluted freshwater resources in the world, and its municipal water systems are in desperate need of repair and modernization. To date, the government has failed to provide its own people with access to safe drinking water—one of the building blocks of life. The government must address water quality problems in its freshwater resources and municipal water systems. If it fails to do this, safe and clean drinking water will only be available to those who can afford it, which will increase social unrest and further tarnish China's already tainted public image.

