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Water Scarcity and Its Impact on Water Rights: A Real Concern for Multinational Companies?

by Vail T. Thorne

> "When the well is dry, we [will] learn the worth of water."
> —Ben Franklin, a U.S. Founding Father[1]

Water is vital to most things in life. Business operations are no exception to this rule. Companies across all industrial sectors, from consumer products to energy production to agriculture to high technology, use large quantities of water every day for production and other processes, as an ingredient or raw material, and for other purposes. In fact, without access to sufficient quantities of water, most industrial or commercial concerns could not operate and would have to close up shop. Therefore, business leaders and their attorneys should understand existing and potential risks to their water supply, evaluate those risks relative to a company's specific operations and future plans, and take action to mitigate the risks, or, if possible, to ensure that they never materialize.

Today, such risks are looming on the horizon due to the emerging issue of water scarcity. This Article: (1) examines those risks; (2) provides an overview of legal regimes around the world governing access to and use of water; (3) highlights how a company's water rights may be impacted by water scarcity concerns even under current law, or by future changes in the law; and (4) finally discusses practical measures that a company should take to prepare and protect itself.

Water Scarcity in the 21st Century—Is It a Real Concern or Just Hype?

Former Gov. Christine Todd Whitman (R-N.J.), and soon to be former Administrator of the U.S. Environmental Protection Agency (EPA), observed: "I have come to believe . . . that water quality and quantity issues will pose the greatest environmental challenge of the 21st century."[2] She is not alone in her belief. According to the World Watch Institute and others, "[w]ater scarcity may be the most underappreciated global environmental challenge of our time."[3]

Also sharing this view is the Global Environmental Management Initiative (GEMI), a nonprofit organization made up of prominent global companies dedicated to "fostering environmental, health and safety excellence worldwide."[4] A recent GEMI report states:

> In areas around the world an imbalance is growing between supply and demand for clean freshwater. Supplies of freshwater are being stretched to meet the needs of growing populations, increasing industrial development and agricultural production, and ecosystems and wildlife protection. While the world is not running out of water, supplies of clean freshwater are not always in sufficient availability where and when needs arise. . . . The collective experience of GEMI member companies indicates that the business case for strategically and sustainably addressing water challenges continues to strengthen across many business sectors and regions.[5]

Water Facts

Still skeptical about the potential for water scarcity? Here are some facts. "Many people have an image of the world as a blue planet, for 70[%] of it is covered with water."[6] However, in fact, less than 1% of our planet earth's water is available for human consumption and use. And,

> [t]here is essentially the same amount of freshwater on the planet today as there was 2,000 years ago. Yet this supply, which was then shared by no more than 300 million people, today must sustain a population of over [6] billion that is projected to grow to almost 10 billion by 2050.[7]

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1. *See* Global Environmental Management Initiative (GEMI), Connecting the Drops Toward Creative Water Strategies—A Water Sustainability Tool i (Preface) (2002) [hereinafter GEMI Water Sustainability Tool], where the author obtained this quote from Ben Franklin. The quote appears in the 1746 version of Poor Richard's Almanac.
2. GEMI Water Sustainability Tool, *supra* note 1, at 47.
3. *See* World Watch Inst., *Water*, *at* http://www.worldwatch.org/topics/people/water/ (last visited May 13, 2003).
4. GEMI Water Sustainability Tool, *supra* note 1, at cover page. GEMI member companies represent most industrial sectors, including: 3M; FedEx; Bristol-Myers Squibb Company; Merck & Company, Inc.; ConAgra Foods; Dow Chemical Company; Dupont; Duke Energy; Southern Company; Eastman Kodak Company; General Motors Corporation; Goodyear Tire & Rubber Company; Georgia-Pacific Corporation; Hewlett-Packard Company; Intel Corporation; Motorola, Inc.; Halliburton Company; Occidental Petroleum Corporation; Johnson & Johnson; Proctor & Gamble Company; and Coca-Cola Company.
5. GEMI Water Sustainability Tool, *supra* note 1, at 47.
6. United Nations (U.N.), The Comprehensive Assessment of the Freshwater Resources of the World ¶ 33 (1999), *available at* http://www.un.org/esa/sustdev/ (last visited May 13, 2003) [hereinafter U.N. Freshwater Assessment].
7. Pamela LeRoy, *Troubled Waters: Population and Water Scarcity*, 6 Colo. J. Int'l Envtl. L. & Pol'y 299, 299 (1995). *See also Global Baby Bust*, Wall St. J., Jan. 24, 2003, at B1 (world population is estimated to be between 9 and 10 billion by the mid- to late 21st century).

Because 97.5% of the earth's water is ocean salt water, only 2.5% is freshwater or fit for drinking, most industrial uses, and agricultural irrigation.[8] Significantly:

> Nearly 70[%] of that freshwater is frozen in the icecaps of Antarctica and Greenland, and most of the remainder is present as soil moisture, or lies in deep underground aquifers as groundwater not [currently] accessible to human use. As a result, less than [1%] of the world's freshwater, or about 0.007% of all water on earth, is readily accessible for direct human uses. . . . Only this amount is regularly renewed by rain and snowfall, and is therefore available on a sustainable basis.[9]

Today, more than 1.2 to 1.5 billion people (one-sixth of the world's population) lack access to safe drinking water, and nearly 2.5 billion people do not have viable sanitation services.[10] Approximately 460 million people currently suffer serious water shortages; and if current consumption rates continue, an additional 25% of the world's population will become water stressed.[11] By 2025, 48% to 66% of the projected world population may face water scarcity or stress.[12]

What is causing water scarcity or the potential for water shortages and stress? Our use of water during the 20th century grew "at more than twice the rate of the population increase."[13] Between 1900 and 1995, water withdrawals and use increased by four to six times.[14] The United Nations reported that

> [a] driving force [behind the increased water consumption was the] increasing consumption of food and industrial goods produced using water. Irrigation already accounts for 70[%] of the water taken from lakes, rivers, and underground sources, and there will be pressure to use more water to produce food [and industrial goods] for the increasing population.[15]

Industrial and commercial uses consume 20% to 25% of the available water; and households actually use the least at 5% to 10%.[16] Certain studies show that, without changes like more efficient use of water generally, "current trends will lead to a more than doubling of the 1995 industrial water use by 2025."[17]

More Than Just a Limited Regional Issue

The issue of water scarcity is not just limited to a few obvious regions of the world like the Middle East or Africa or certain parts of Asia. Rather, all regions of the world are experiencing issues relating to whether water resources are or will be adequate.

In North America, for example, the United States and Canada are among the "water wealthiest," but also are the largest per capita users of water globally. Demand on North American water resources has steadily increased due to population growth, municipal use, and the expansion of industry and agriculture. The region has begun to experience some water availability issues due to drought, changing weather patterns, point source and nonpoint source, e.g., agricultural runoff, contamination of surface and groundwaters, and other issues.[18]

In Europe, lack of access to drinking water affects many parts of eastern Europe. More than one-half of Europe's cities are overexploiting their groundwater reserves. Industrial and urban uses are approximately 55% of the total water use in the region, and current use levels are expected to double by 2025. In addition, many European countries report significant groundwater contamination impacting watersheds.[19]

In Latin America, groundwater contamination and depletion is growing due, among other things, to the release of chemicals, heavy metals, nutrients, and hazardous wastes from mining, other industry, and agriculture.[20] In Asia and the Pacific Rim countries, aquifer depletion has led to a drop in water availability per capita by more than 50% (10,000 cubic meters in 1950 to 4,200 cubic meters in the 1990s). Western Asia faces particular pressure on groundwater resources because water withdrawals far exceed the natural recharge rates. In addition, unchecked water pollution continues throughout the region.[21]

In Africa, 25 countries are expected to face water stress or scarcity by 2025. Over 300 million people already lack access to safe drinking water. Fourteen African countries currently are experiencing water stress. Pollution of both surface and groundwater resources also is a significant issue throughout the region.[22]

What does this all mean for business? If water scarcity trends and concerns continue, pressure may be brought to bear on businesses to adjust their water use and related practices, by not only increasing their water use efficiency, but also by accepting less of a share of the water supply or even foregoing water supply in certain geographic regions. This may negatively impact a company's ability to operate and restrict its commercial growth or expansion.

8. U.N. Freshwater Assessment, *supra* note 6, ¶ 33; LeRoy, *supra* note 7, at 300; *see also* Stephen C. McCaffrey, *Water, Water Everywhere, But Too Few Drops to Drink: The Coming Fresh Water Crisis and International Environmental Law*, 28 Denv. J. Int'l L. & Pol'y 325, 329 (2000).
9. U.N. Freshwater Assessment, *supra* note 6, ¶ 33. *See also* LeRoy, *supra* note 7, at 301; McCaffrey, *supra* note 8, at 329.
10. World Health Organization, Global Water Supply and Sanitation Assessment (2000).
11. *Id.*
12. *Id. See also* U.N. Freshwater Assessment, *supra* note 6, ¶ 2; GEMI Water Sustainability Tool, *supra* note 1, at 42 ("40% of the world will live in water-scarce regions by 2025").
13. U.N. Freshwater Assessment, *supra* note 6, ¶ 2; LeRoy, *supra* note 7, at 302.
14. U.N. Freshwater Assessment, *supra* note 6, ¶ 42; LeRoy, *supra* note 7, at 302.
15. U.N. Freshwater Assessment, *supra* note 6, ¶ 13; *see also* GEMI Water Sustainability Tool, *supra* note 1, at 43; LeRoy, *supra* note 7, at 303.
16. *See* GEMI Water Sustainability Tool, *supra* note 1, at 43; LeRoy, *supra* note 7, at 303.
17. U.N. Freshwater Assessment, *supra* note 6, ¶ 81. *See also* GEMI Water Sustainability Tool, *supra* note 1, at 42 ("Factors likely to contribute to these predicted water shortages include population growth and unsustainable rates of water withdrawal.").
18. *See generally* Rosalie Gardiner, *Freshwater: A Global Crisis of Water Security and Basic Water Provision*, *in* Towards Earth Summit 2002: Environment Briefing No. 1 (2003), *available at* http://www.earthsummit2002.org/es/issues/Freshwater/freshwater.rtf (last visited May 13, 2003).
19. *Id.*
20. *Id.*
21. *Id.*
22. *Id.*

Global Overview of Water Rights Law—What Are a Company's Rights Today?

Legal rights regarding access to and use of water generally are controlled by rapidly evolving national or state/provincial laws and therefore vary from country to country. However, some general, common themes or trends exist in water rights law around the world.

These norms are: (1) the water itself generally is not subject to private ownership, but rather is publicly owned or considered a common right or interest, even in most civil code countries; (2) what is recognized as a private property right is the right to access and use of water, usually through a permit or concession system; and (3) generally, water users are entitled only to a reasonable share of the available water or to a share that will not harm the general welfare or in some jurisdictions will not harm certain higher uses or interests (as locally defined).[23]

What follows is an overview of the laws governing access to and use of water around the world, as exemplified by general regional discussion or discussion of water rights in specific, select countries. The above-noted common themes or trends may be culled from the overview.

North America—The United States

Water law in the United States "can be grouped roughly into three doctrines: riparian rights; prior appropriation; and hybrid states."[24]

In eastern U.S. states, where the riparian rights doctrine applies, water generally is "a public resource, held in trust for use by the people of the state," whether it is surface water or groundwater.[25] "A riparian [land]owner[, e.g., one whose land is adjacent to a body of surface water,] does not have an ownership right, but rather a fundamental right to a reasonable use of the water and to be free from unreasonable uses of others that cause him harm."[26]

This riparian right is not a right to a defined quantity of water, but rather "[t]he riparian rule allows property owners with riparian access to use [surface] water in a way that is 'reasonable' relative to the demands of others."[27] This rule of "reasonable use" generally also now applies to groundwater withdrawals because "the rights of adjacent landowners are similar, and their enjoyment in the use of groundwaters is dependent upon the action of other overlying landowners, [and therefore] each landowner is restricted to a reasonable exercise of his own rights and reasonable use of his own property."[28]

As the riparian rights doctrine developed over time in the United States:

> [T]here have been a number of significant changes in the water law of the states accepting the . . . doctrine which can be summarized into two major components: (i) establishment of a permit system to allocate water among certain users; and (ii) creation of administrative machinery to assess the water supplies and requirements and to allocate and manage the state's water resources through the permit system.[29]

Today, in states governed by the riparian rights doctrine, water withdrawal/use permits also are available to nonriparians, i.e., to those whose property is not adjacent to a body of surface water.[30] In addition, a permit generally is required to withdraw and use groundwater in states that follow the riparian rights doctrine.[31]

In western U.S. states, where the prior appropriation doctrine applies, "most . . . jurisdictions consider water to be a public resource owned by no one," again, whether it is surface water or groundwater.[32] However, as to all water users, both with respect to surface water and groundwater, the rule is "that 'first in time is first in right' so that the first person to use water acquires the right to its future use as against later takers."[33] The so-called later takers are entitled to "use whatever water [is] left after the first user . . . satisfie[s] his needs."[34]

In order to maintain a prior appropriation right, however, the water used must be put to a "beneficial use," which includes industrial or commercial uses.[35] But, "the manner in which [the water] is used must be reasonable."[36] "The right to use water does not include the right to waste it."[37] So, for example, "it may no longer be reasonable to irrigate a crop by flooding when another method is readily available which will grow the crop as well or better but will save some of the water being used."[38]

Under the prior appropriation doctrine, the predominant system used to administer water rights "is the permit system," where a formal application, administrative review, and, if appropriate, the imposition of conditions of use are required.[39] This applies to the use of both surface water and

23. *See* Stefano Burchi, *Water*, *in* Law and Sustainable Development Since Rio–Legal Trends in Agriculture and Natural Resource Management 147, 150-54 (Food and Agriculture Organization Legislative Study No. 73, Rome 2002) (private ownership rights in water "have been steadily eroded by the ever-expanding sphere of 'public' waters" and "ownership rights of individuals have been eroded, and generally they can only claim user rights [via] a permit, license, concession or like instrument"). Analogously, under international law, water rights and water disputes between various countries are governed by the principle known as the "doctrine of equitable utilization or apportionment." *See* Patricia Wouters et al., *The Legal Response to the World's Water Crisis: What Legacy From the Hague? What Future in Kyoto?*, 4 U. Denv. Water L. Rev. 418, 419-24 (2001); A. Dan Tarlock, *Safeguarding International River Ecosystems in Times of Scarcity*, 3 U. Denv. Water L. Rev. 231, 236-45 (2000).

24. David Getches, Water Law in a Nutshell 1-6 (3d ed. 1996).

25. Dante A. Caponera, Principles of Water Law and Administration: National and International 126-27 (1992). *See also* Getches, *supra* note 24, at 247-54.

26. Caponera, *supra* note 25, at 126-27. *See also* Getches, *supra* note 24, at 247-54.

27. Steven L. Erickson & Brian J. King, Fundamentals of Environmental Management 115-16 (1999).

28. Caponera, *supra* note 25, at 129-30. *See also* Getches, *supra* note 24, at 247-54.

29. Caponera, *supra* note 25, at 126-27. *See also* Erickson & King, *supra* note 27, at 115-16.

30. Getches, *supra* note 24, at 15.

31. *Id.* at 247-54.

32. *Id.* at 74-77, 247-54.

33. Caponera, *supra* note 25, at 127, 129-30. *See also* Getches, *supra* note 24, at 247-54.

34. Caponera, *supra* note 25, at 127.

35. *Id.* at 127-29.

36. *Id.*

37. Getches, *supra* note 24, at 74-77.

38. Caponera, *supra* note 25, at 127-29.

39. *Id. See also* Erickson & King, *supra* note 27, at 116-17.

groundwater.[40] In addition, some states have adopted the "public trust doctrine," which does "not . . . allow water to be used inconsistently with public purposes."[41] "The public trust doctrine may negate even existing appropriations that are contrary to the public interest."[42] Therefore, "state officials [may have] authority to deny or condition permits to promote the public interest."[43]

To address water shortages, some prior appropriation states also have developed a system of "preferred uses"[44]:

> In times of water shortage a preferred use may condemn a non-preferred use in order to supply water for the higher use. Compensation must, however, be paid for the taking of a right. Another important function of establishing preferences is that it serves as criteria for the allocating agency when applicants for different uses are competing for the same unappropriated water. While orders of preference vary somewhat from state to state, all jurisdictions place domestic uses (which include municipal uses generally) as the highest.[45]

Other U.S. jurisdictions, e.g., California and Texas, are known as "hybrid states." These jurisdictions follow a mixture of the prior appropriation and riparian rights doctrines, but, generally speaking, prior appropriation-type rules are dominant today. Each hybrid state, however, has its own specific and unique rules governing water access and use.[46]

Europe

In Europe, water rights law differs from country to country depending on its history, climate, and particular system of law, i.e., common law, civil code, or other. Generally speaking, however, "there is a tendency in [modern] European water legislation either to abolish or to restrict the concept of private ownership of water, and to extend government control on all water uses and activities."[47] In addition, "[p]ermits are required for most water uses, subject to the payment of water rates and fees."[48]

In France, surface water and groundwater generally are considered a common resource and, as such, the right to use water belongs to all. Therefore, French governmental authorities are empowered to regulate individual and business uses of water. However, certain types of waters in France still are subject to private ownership (currently referred to as "non-dominial waters"), but even these are subject to legal duties regarding protection of third-party interests and the water resource itself.[49]

In Spain, both surface water and groundwater are part of the public domain and water use is therefore regulated.[50] In Italy, "all waters are public and constitute a resource to be protected and utilized in accordance with [the public interest]," thereby subjecting water users to governmental regulation.[51]

"In the United Kingdom [(U.K.)], [where the riparian rights doctrine originated,] a permit system was introduced by the Water Resources Act of 1963."[52] "Under other [U.K.] legislation, no license for the abstraction of surface or underground water may be granted without prior public notice being given, so that persons affected in their rights or interests are able to file their objections."[53]

Similarly, in Germany, "[t]he use of a body of water requires a permit . . . or approval . . . from the [governmental] authorities. . . ."[54] "The [German water use] permit shall grant the revocable authorization to use a body of water for a specific purpose . . . and to an extent that is specifically defined."[55] It "shall be denied provided that a restriction to the general well-being, particularly a threat to the public water supply, is to be expected from the intended usage."[56]

"In the former Soviet Union[, i.e., the Russian Federation,] and in Eastern European [and Central Asian] countries, . . . all water resources [generally] are state property."[57] For example, in Romania, "[w]aters are an integral part of the public patrimony [or estate] . . . [and] protection, revaluation and sustainable development of the water resources are actions of general interest."[58] Any right to use surface water or groundwater in Romania is conditioned on first obtaining a water management license from a public company known as "Romanian Waters."[59] Specific Romanian legislation expressly provides: "Meeting the population's water requirements shall take priority over the use of water for other purposes[; and] [i]t is forbidden to reduce the drinking water use for the population to the benefit of other activities."[60]

In the Republic of Kyrgyzstan, "[a]ll water objects . . . form the state water fund[, and] [t]he right of ownership of the water fund . . . is vested in the . . . Republic."[61] All water users in Kyrgyzstan "shall . . . use water objects rationally," "provide for the economic use and restoration of water resources," "prevent the violation of rights accorded to other water users," and ensure "priority of life and health of the people."[62] The law of water rights is similar in the Republic of Kazakhstan, where "[w]aters in the Republic . . . are the exclusive property of the [s]tate" and any use of such waters "shall be carried out under agreement" with the state.[63]

Latin America

In Latin America, as in Europe, water rights vary from country to country. But "[m]any countries in the region have in-

40. *See* Getches, *supra* note 24, at 247-54.
41. *Id.* at 74-77.
42. *Id.*
43. Kenneth R. Wright, Water Rights of the Eastern United States 10 (American Water Works Association 1998).
44. Caponera, *supra* note 25, at 127-29.
45. *Id.*
46. *See generally* Erickson & King, *supra* note 27, at 116, 191-92; Getches, *supra* note 24, at 191-92.
47. Caponera, *supra* note 25, at 114.
48. *Id.*
49. *See id.* at 78.
50. Water Law (1995) (Spain).
51. Law No. 36 (1994) (Italy).
52. Caponera, *supra* note 25, at 114.
53. *Id.*
54. Act on Managing Water Resources, art. 2 (F.R.G.).
55. *Id.* art. 7(1).
56. *Id.* art. 6.
57. Caponera, *supra* note 25, at 114.
58. Water Law, No. 107, art. 1(1) (1996) (Rom.).
59. *Id.* art. 9Ñ(1).
60. *Id.* art. 10Ñ(1) & (2).
61. Law on Water, arts. 4 & 5 (1994) (Kyrg.).
62. *Id.* arts. 3 & 24.
63. Water Code, art. 4 (1993) (Kaz.).

troduced new water laws and water codes in recent years, and the process of legislative and administrative change where water is concerned continues."[64] In addition, Latin American countries "are increasingly interested in the preservation of water resources, both quantitatively and qualitatively."[65]

> While in some countries public ownership has been extended to all water resources (Chile, Colombia, Mexico, Panama, Peru[, Ecuador]), other countries also recognize private ownership [of surface water] in specified cases, generally in association with land ownership, up to the point where it flows out of the property concerned (Argentina, Bolivia, Brazil, Paraguay, Uruguay[, Venezuela]). . . . As regards groundwater, in some cases it belongs to the owner of the land where it is encountered (Bolivia, Venezuela). . . . In Brazil[, El Salvador, Panama, and Mexico], however, . . . it comes under the administration of the federal government [or] belongs to the public domain. . . .
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> With the extension of public ownership of water, individual [and business] water use rights have been limited and subjected to control by the public authorities in order to secure the protection of the resource. Rights [to] publicly owned water may be acquired by virtue of water use authorizations, permits or concessions granted by the competent administrative authorities. . . . Where private ownership is recognized, free use of water may be made, [but] subject to the rules prescribed by law. . . .[66]

"As a general rule [in all Latin American countries], domestic and drinking water needs range first [in priority and will be protected]."[67] In addition, "provisions are to be found in [Latin American] water statutes aimed at preventing the squandering or other improper uses of water [and] the obligation to use water rationally, efficiently or economically."[68]

Specifically, in Mexico, the Constitution of Mexico declares that all surface waters and groundwaters found in Mexico are inalienably owned by the "nation" or the public.[69] Under Mexico's National Waters Law and its implementing regulations, any individual or business that seeks access to and use of national waters must apply for and obtain a water use concession and allocation from Mexico's National Water Commission (CNA).[70] The CNA will allocate a specific quantity of water under a concession, but all concessionaires must use the water in compliance with the terms of the concession and ensure that their activities do not negatively impact third parties or the relevant water basin or aquifer.[71]

Mexico's Ecology Law also requires that the CNA take into account the basic flows of surface waters and the capacity of groundwaters to replenish themselves in granting water use concessions.[72] In addition, although water use concessions are transferable in Mexico, prior CNA authorization is required when third-party rights may be affected or hydrological or ecological conditions of the impacted water basin or aquifer may be altered or modified.[73] The above requirements are intended to act as a check on unreasonable or unsustainable uses of water.

Africa

For various reasons, "[w]ater laws and institutions in Africa are often inadequate to meet the needs" of citizens or business.[74] However, the law regarding water rights that does exist in Africa usually depends on the legal system or systems that serve as the basis for local law: local custom; civil law in those countries that are former Belgian, French, Italian, Portuguese, or Spanish colonies; common law in those countries that are former British colonies; or Islamic law.

Under African customary law, the predominant principle is that "land and water belong to the community and, therefore, the individual has only a right to use water [and] private ownership of water usually is unknown."[75] In African countries that follow a civil code system, e.g., the Democratic Republic of the Congo, Mozambique, and Rwanda, "all waters [generally] are placed in the public domain [and] every use of public water is subject to [obtaining] an administrative authorization, permit or concession."[76]

In African countries with legal regimes based on common law, e.g., Kenya, South Africa, and Zimbabwe, "water [generally] is *res communis omnium* (common to all), of which the riparian landowner can make use." However, with the exception of South Africa, "generally no centralized water administration exists" in these countries so most specific uses of water are or have been dealt with via "special legislation."[77] For those African countries influenced by Islamic law, "all waters were declared to belong to the state, the crown or the public domain . . ., and every use of water other than for drinking purposes . . . was brought under government control."[78]

African countries today, however, generally are putting more emphasis on good management of water resources and, therefore, are beginning to enact comprehensive water legislation. For example, South Africa's new constitution declares that "[e]veryone has the right to have access to sufficient . . . water."[79] The South African National Water Act of 1998 also makes it clear that water belongs to the public domain, is to be administered in trust by the government, and is to be administered and allocated via a system of administrative licenses.[80] In addition, Zimbabwe recently enacted legislation declaring that water is public property (specifically vested in Zimbabwe's Office of the President), cannot be privately owned, and is to be administered and allocated by certain "Catchment Councils."[81]

64. Caponera, *supra* note 25, at 109.
65. *Id.* at 112.
66. *Id.* at 110-11.
67. *Id.* at 111.
68. *Id.* at 112.
69. Mex. Const. art. 27.
70. Law on National Waters, art. 20 (1992) (Mex.); Official Mexican Standards, art. 29 (NOM-001-ECOL-1996, NOM-002-ECOL-1996, NOM-003-ECOL-1997).
71. Official Mexican Standards, arts. 28 & 29.
72. General Law of Ecological Balance and Environmental Protection, arts. 88 & 89 (1996) (Mex.).
73. Official Mexican Standards, art. 33.
74. Caponera, *supra* note 25, at 97.
75. *Id.* at 98.
76. *Id.* at 99.
77. *Id.*
78. *Id.* at 102.
79. South Africa Const., art. 27(1)(b) (1996).
80. *See* National Water Act, chs. I & IV (1998) (S. Afr.).
81. *See* Water Act, arts. 3 & 23 (1998) (Zimb.).

Asia Pacific

Similar to Africa, Asia Pacific water rights law is influenced by legal regimes foreign to the region as a result of former colonial systems, e.g., the common law and civil code. But through local adaptation and necessity, the specifics of water rights law in the region are becoming unique and vary from country to country. Nevertheless, there are some common themes that can be gleaned from Asian Pacific water laws.

Cambodia, Laos, and Vietnam, which were influenced by the French civil code system, "recently declared all water resources as public [and have] provisions governing the waste and misuse of water."[82] In Australia, a country influenced by the English common-law system, provincial legislation formally abolished the riparian rights doctrine in many states, "vested in the Crown all right to the use, flow and control of water in any watercourse," and "introduced a water withdrawal/use permit system."[83] Such action was taken due to the country's arid nature and the need to ensure proper water allocation.

In Japan, "watercourses belong to the public domain," and water rights are administered by the government via a water use permit system.[84] In the People's Republic of China, "all water resources are public property belonging to the State," and "[p]lanned allocation of water and strict water conservation" are administered and enforced by the government.[85]

In the Philippines, specific legislation and implementing regulations declared that all waters belong to the state and that appropriation and use of water is to be administered through an administrative concession or permit system.[86] Vietnam regulates the management, protection, and exploitation of water resources, both surface and groundwater, through a water use permit system administered by the Ministry of Agriculture and the province and city People's Committees.[87] Indonesia also regulates the exploitation and use of water through a licensing system.[88]

Are Water Access and Use Rights of Business Concerns at Risk in the Future?

If water scarcity concerns continue and water stress increases around the world continues to increase, the answer is "yes." As a result of its study of the issue, GEMI reported:

> Many companies now realize that even greater risks lie in the potential for water-related constraints on business activity. Current "allocations" of water rights for use . . . are not assured into the future. In many regions of the world, pressures are growing to give higher priority to ecosystem and basic human needs for water. Changing local water supply and quality levels, combined with increasing competition for clean, freshwater resources, make past allocations vulnerable to disruption and revision.[89]

"What lies ahead on the agenda of water laws for the new century is the further refinement of water allocation mechanisms, which must strike a dynamic balance between equity and efficiency in allocation and use [and] reflect the uncertainties of water availability."[90] Therefore, water use by business concerns may, and is in fact likely, to get caught up in this debate. It is conceivable that in the future companies may be asked to take less of a share or to use less water, or even to potentially forego their water supply in certain regions.

Governments and communities around the world may already have the legal or regulatory authority to restrict a company's share or use of water. The preceding discussion of water rights around the world demonstrates that today water itself generally is viewed as part of the public domain rather than private property. In order to obtain the right to withdraw and use water, whether from surface or groundwaters, one must apply for and obtain a permit or concession from the government in most instances. Today, that license often specifically delineates the quantity of water to which the licensee is entitled. Usually such permits or concessions also are not indefinite in duration; rather, they are for a period of years only, e.g., five years.

In addition, a water user today generally is entitled to a "reasonable" share of the water based on the general welfare and the needs of others. As a result, under existing law, a company's allocated share of available water may change or be subject to amendment over time, depending on the local circumstances and community needs.[91]

Another looming risk to business is that many countries and governments are actively revisiting their water rights and use laws to determine whether they require amendment to adapt to the changing circumstances and the issue of water scarcity. For example, the preamble to the recently enacted European Union (EU) Water Framework Directive (Directive) states: "Waters in the Community are under increasing pressure from the continuous growth in demand for sufficient quantities of good quality water for all purposes."[92]

The Directive therefore requires, among other things, that EU Member countries analyze their water resources, the uses to which they are put, and in particular those resources used for drinking water purposes in order to protect and preserve them for the future.[93] The purpose of the Directive's requirements is, among other things, to provide for a "sufficient supply of good quality surface water and groundwater as needed for sustainable, balanced and equitable water use."[94] As a result, a number of EU member countries currently are evaluating the sustainability of and equities relating to their various water uses and rights.

Therefore, companies need to be mindful that existing legal regimes governing water access and use may be subject

82. Caponera, *supra* note 25, at 103.

83. *Id.* at 104.

84. *Id.* at 106.

85. *Id.* at 105.

86. *See* Water Code, chs. II & III (1976) (Phil.).

87. *See* Water Resources Law No. 8/1998/QH10, art. III (1998) (Vietnam).

88. *See* Law on Water Resources Development (Law No. 11), art. 3 (1974) (Indon.); Indonesian Government Regulation on Water Management (Law No. 22), arts. II, III & V (1982).

89. GEMI Water Sustainability Tool, *supra* note 1, at 2.

90. Burchi, *supra* note 23, at 161.

91. *See generally infra* notes 23-88 and accompanying text.

92. EU Directive 2000/60/EC, 2000 O.J. (L 327) 1 (pmbl. ¶ 4) (the Directive "establish[es] a framework for Community action in the field of water policy," and was enacted on October 23, 2000) [hereinafter the EU Water Framework Directive].

93. *Id.* at 11-12 (arts. 5 & 7).

94. *Id.* at 5-6 (art. 1).

to change in the future. Such changes may negatively impact a company's water rights and access to a sufficient supply of water. A potential, significant catalyst for such change may be looming on the horizon. Many experts and nongovernmental organizations are putting forth the argument that the peoples of the world are entitled to a basic water supply as a "human right" and that government should guarantee and provide for this right.[95] In fact, the United Nations Committee on Economic, Cultural, and Social Rights recently "agreed to designate water as a human right."[96] If this principle takes hold and is generally adopted, water rights laws in many countries may be adjusted to reflect the principle, thus potentially impacting business access to and use of water.

What Should a Company Do to Avoid, Minimize, or Prepare for Water Scarcity-Related Risks?

What should business leaders and their attorneys do to get ahead of the emerging water scarcity issue, prepare for it, and avoid or minimize related business and legal risks? Practically speaking, they should consider the following:

Understand the Company's Water Uses

Water is required to produce just about any product, whether it is energy, consumer goods, or something else. Many companies, however, including their business managers and attorneys, frequently do not thoroughly understand how, where, and why their companies use water nor how much they use. Procurement of water supply often is not handled with the same importance afforded to other key company ingredients, raw materials, or procurement items. Companies often do not keep track of the costs associated with procuring and using water. Maintaining a sufficient supply of water often is taken for granted, i.e., there is an assumption that it will be readily available whenever and wherever needed.

The first step in assessing whether the company may be at risk relative to the water scarcity issue, therefore, is to learn about the various uses made of water by the company. Most companies use water in their facilities and operations for a number of things, e.g., production, intermediate processes, equipment and other cleaning, and cooling or heating. Many people are surprised to learn that water is essential to most production and other manufacturing processes, and also just how much water is needed for these processes. "Understanding how a product, facility, or company is connected to water—through direct and indirect water use . . . is the critical first step in determining how an organization should respond to water risks and opportunities in a sustainable manner."[97]

Therefore, the company should "identify" all of its water uses.[98] In doing so, the company should "think broadly about water use . . . from raw material or production stages, through customer use and final disposition."[99]

Next, the company should "characterize" all of its water uses.[100] That is, the company should determine "the quantity of water used, the quality of the water used, the purpose of the water use, the source of the water used, and seasonal or other fluctuations in water use."[101] In addition, the company should evaluate how efficiently or inefficiently it uses water, e.g., for every gallon of product produced, how many gallons of water are used?

Understand the Company's Water Supply Shortage/Interruption Risks

It is important for companies to understand and analyze the various business, legal, and other risks that may result from water supply shortages or interruptions. This is a critical second step in evaluating whether the water scarcity issue may play a significant role in a company's future or have the potential to substantially impact the company. These risks are not always obvious and should be analyzed from a holistic standpoint.

For example, Anheuser-Busch Inc. (AB), the world's largest brewer of beer, recently experienced the following:

> In 2001, [AB] experienced business impacts from unexpected water shortages affecting its supply chain. A temporary drought in the U.S. Pacific Northwest increased the price and reduced the availability of key inputs to [AB's] brewery operations—barley and aluminum. An unusually dry winter, coupled with a turbulent West Coast electricity market that is highly dependent on water for power generation, created intense short-term competition for limited freshwater resources. Reduced allocations of water for irrigation in Idaho resulted in reduced acreages of barley, a key brewery ingredient. At the same time, aluminum production, which relies on large amounts of low-priced energy generated in hydroelectric dams in the region, was drastically reduced as electricity prices skyrocketed. This experience in facing water-related challenges along the supply chain . . . expanded [AB's] business case for taking a more comprehensive, strategic, and sustainable approach to water issues.[102]

Therefore, companies should ask and answer "[w]hat are the [key] risks linked to the organization's water uses," "[w]hich risks are most significant," what is the probability associated with each risk, and if risk-related events occur, what will be the impact(s) on the business?[103] For example, if water is needed for facility production purposes and available water is not adequate, what will happen at the facility? Will it have to cease or modify operations? How expensive will this be? How much money will be lost or wasted? How many jobs will be affected? What will be the impact on customer relationships? Will the local water stress increase tensions with the local community? What contractual, legal, or other requirements may not be met, etc.?

Conducting a thorough risk assessment relative to the water scarcity issue is important because:

> A business would be highly sensitive to a change if it, or the company's response options, would result in signifi-

95. *See* Peter Gleick, *The Human Right to Water*, 1 WATER POL'Y 487 (1999), *available at* www.pacinst.org (last visited May 13, 2003).

96. *See Safe Drinking Water Designated Basic Human Right by U.N.*, INDUSTRY OUTLOOK, Dec. 2, 2002, at 1.

97. GEMI WATER SUSTAINABILITY TOOL, *supra* note 1, at 9.

98. *Id.* at 10.

99. *Id.*

100. *Id.*

101. *Id.* ("A 'water balance' [analysis] is a helpful means of documenting water uses within a facility or process.").

102. *Id.* at 12 (GEMI case study).

103. *Id.* at 15-16.

> cant business constraints. External changes [like water scarcity] can result in steep increases in water costs, production delays, limits on production, or strong community opposition to company activities. For each water use, the company should consider how sensitive the business is to a change in (1) water price, (2) water availability, (3) water quality, or (4) the loss of a specific [water] source.[104]

At the same time, to generally reduce a company's risk profile relative to water use or scarcity, business managers should continuously take action to improve the company's and its facilities' and operations' water use efficiencies, e.g., use of less and less water over time. Many companies set water use efficiency improvement goals and objectives with specific timetables attached to act as a catalyst for improving such efficiencies.

Understand Local Water Availability/Stress Issues and Plan Accordingly

A key third assessment issue relating to a company's potential to be affected by the water scarcity issue is whether and to what extent the local water resources where the company conducts business may be vulnerable or subject to water stress? To do this, one must "identify and assess [all current and potential] water sources" in the area, i.e., surface water, groundwater, and/or other water sources, e.g., public water supply infrastructure.[105] A company should ask and answer the following questions:

> What are the primary [and potential backup] water resources connected to the company's water uses or impacts?
>
> To what degree is the water source(s) under stress[, or is there a future potential for it to be subject to stress, i.e., what is the source's capacity today and in the future taking into account future development in the area]?
>
> To what degree does [the company and that of other neighboring companies] affect this source through [their individual and collective] water use or impacts?[106]

In answering these questions, one should

> consider information such as the general description of the source, the size of [the] source, the source's rate of replenishment, [how is the source replenished,] the source's quality, [and] other industrial, agricultural, domestic, commercial, and ecosystem demands on the source, as well as climatic conditions or weather patterns, such as drought.[107]

The above water source analysis should then be factored into company business planning. For example, corporate-wide and facility-specific contingency plans should be drafted in case water scarcity or stress occurs or water supply is decreased or interrupted. The analysis should also factor into assessments of where to site new facilities and water management plans at existing facilities.[108]

104. *Id.* at 16.

105. *Id.* at 11.

106. *Id.*

107. *Id.* at 11-12.

108. *See id.* at 31-32 (GEMI case study involving Intel Corporation noting Intel water management initiatives "[b]ecause the company operates water-intensive manufacturing plants [and] has had to share limited resources with competing water needs in the local community").

Understand Local Water Rights Law and How It May Impact the Business

A fourth assessment area in determining whether a company may be vulnerable and should take action regarding the water scarcity issue is to research and understand local water rights law in the jurisdictions where the company operates. As discussed above, in many countries, existing law already may provide authorities with the ability to affect or amend the company's legal rights regarding access to and use of water, even where the company may have a long-standing right to a certain quantity of water.[109]

For example, many jurisdictions have or are in the process of adapting their laws to specify that individual water users have a right to only a "reasonable" share of the available water, or may only use the water for "beneficial and reasonable" uses.[110] What is "reasonable" is often a fact-based analysis depending on the circumstances of the day. Interpretations of what is "reasonable" may be subject to change over time. Therefore, it is in a company's best interest to have a keen appreciation of local water rights law, how it may change in the future, and how existing and future laws may impact the company.

Positively Reach Out to the Local Community on Water Issues

Finally, to prepare for, minimize, or avoid risks relating to water scarcity, a company should consider taking action to positively reach out to the local communities in which it operates. "[I]ncreased community awareness and recognition of local water challenges can alter public acceptance of and support for a company's strategic plans or water-related practices," and thereby put the company's local "license to operate" at risk.[111] A company, therefore, should engage proactively with local communities in areas experiencing, or that may have the potential to experience, water scarcity or stress. The alternative of "just lying low" or "keeping one's head down" can lead to bigger trouble later.

What does this entail? First, a company should participate in, or even sponsor, public dialogue about water, the available and projected local water supply, and the current and projected local water uses. Mutual understanding by interested parties of varying perceptions, needs, and practices can go a long way toward promoting mutually beneficial and acceptable solutions to issues, and preventing later conflicts based on ignorance or lack of information. This dialogue should include educating local government officials and the public regarding a company's business and operations, its water needs and uses, its efforts to use water efficiently and to continuously improve its efficiency, and its monetary and other contributions to the community, e.g., jobs, etc.

Second, a company should consider whether it should provide voluntary assistance to the community(ies) regarding water-related issues. For example, a company may conclude that it is in its best interest to help fund local water supply or other infrastructure (particularly if the company's local operations may somehow benefit), to support local water availability or quality initiatives, to provide or license water-related technology for use in the local community, to assist in educating the public on water issues, or to help de-

109. *See infra* notes 23-88 and accompanying text.

110. *Id.*

111. GEMI Water Sustainability Tool, *supra* note 1, at 3.

velop local water management plans. The specific nature and extent of a company's engagement with the local community, however, depends on the state of that company's current relations with the community, the specific circumstances of the business, and the community's current or potential situation relative to water supply.

Conclusion

Water scarcity and stress is an emerging issue of concern around the world for communities, governments, and business. Business leaders and their attorneys should become educated on the issue because it has the potential to substantially impact business operations and growth in many regions of the world. Part of this exercise should involve understanding what rights business has today regarding access to and use of water, and also how those rights may be affected or altered in the future. Finally, because water is vital to most things in life, including most business operations, business leaders and their attorneys should take action to prepare for, minimize, or avoid water scarcity or water stress-related risks.