

The Coming Water Crisis: Investing for Another Kind of Liquidity

Water use has been growing globally at more than twice the rate of population increase in the last century, and an increasing number of regions are reaching the limit at which water services can be sustainably delivered, especially in arid regions.

~Water Scarcity, United Nations

In Australia's Darling River, millions of fish have died in recent months. Intensified agriculture and overuse of the Murray Darling Basin, plus recent flooding and a heat wave, have caused a nauseating disaster that endangers the drinking water for communities up and down the river.

In western France, violent protests have broken out over the government's decision to build hundreds of "mega reservoirs" and fill them with water pumped from the region's groundwater supplies to sustain the country's grain farmers and winemakers in the face of increasingly frequent summer droughts.

Decades of mismanagement in India have left the country in danger of depleting its precious and irreplaceable groundwater resources, as the country tries to balance the agricultural water use needed to feed the world's most populous country and the growing municipal water demands of an expanding middle class with the harsh reality that it has 17% of the world's population but only 4% of the world's freshwater resources.

At least 60% of Uruguay is afflicted by extreme drought. The government has estimated that this has caused nearly \$1.2 billion in losses, much of it incurred by the agricultural and livestock industries.

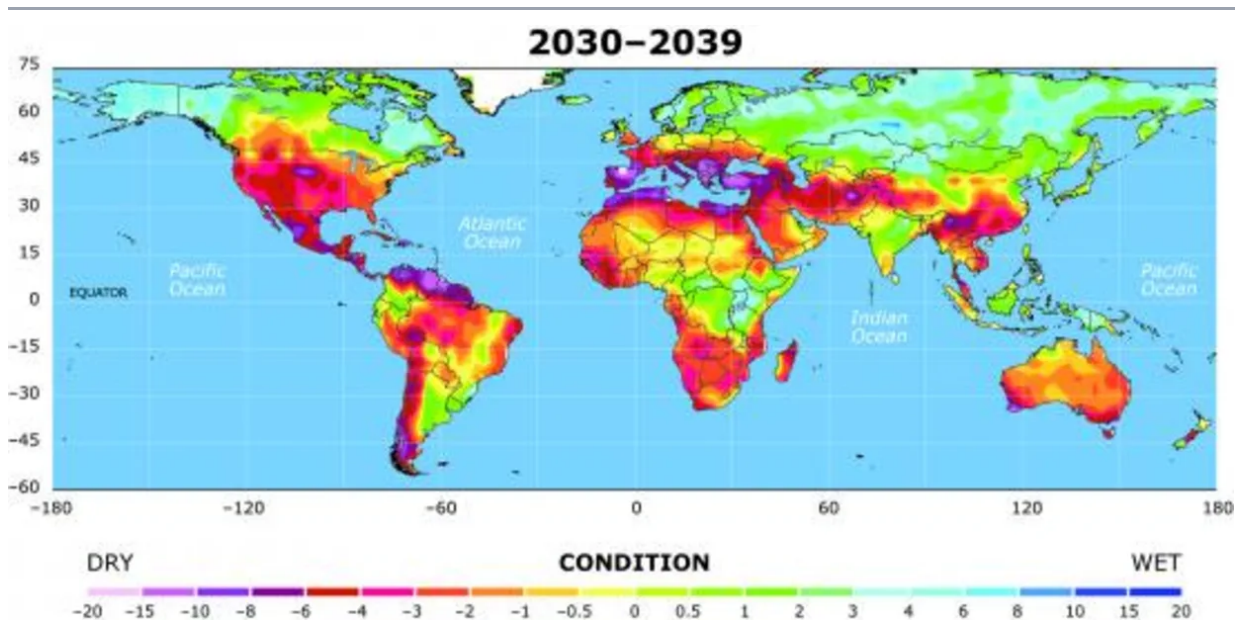
The United Nations World Water Development Report predicts that as many as 6 billion people will suffer from clean water scarcity by 2050, and some critics believe that forecast is a significant underestimation. Much of the water crisis can be attributed to simple math. Less than 2% of the water on this planet is usable freshwater. With current technologies, that's unlikely to increase.

Demand does, however. The world population has grown steadily over the past century and while the rate has slowed in recent years, it has not stopped—in fact, it topped the 8 billion mark in November 2022, just 12 years after it passed the 7 billion mark.

But that alone doesn't tell the whole story. Over the past century, global water use has increased at twice the rate of population growth, and while the gap is narrowing, demand for water is expected to continue to outpace population increases.

That is because as living standards improve, water usage goes up. The industries that drive economic development are water-intensive. For example, it takes 2,600 gallons of water to produce a single pair of jeans. Each car requires about 40,000 gallons of water to manufacture, not counting components. The semiconductor industry that makes the chips that go into so many of our devices is a thirsty one as well: Taiwan Semiconductor Manufacturing Corporation, the world's leading semiconductor foundry, uses 18.5 billion gallons of water a year. On average, it takes 275 gallons of water to manufacture each chip.

Meanwhile, climate change has altered weather patterns in such a way that many longstanding sources of freshwater are well on their way to drying up. Aquifers and surface water sources of freshwater that were once replenished by regular and plentiful seasonal precipitation are now becoming depleted as droughts increase in both frequency and intensity. That trend is expected to continue.



Source: Wiley Interdisciplinary Reviews, redrawn by University Consortium for Atmospheric Research

A reading of -4 or below is considered an extreme drought. Areas in the red and purple spectrum are considered at high risk of unusually intense drought in the near future.



On every continent, in every kind of terrain, rich and poor countries alike are already experiencing difficulties in providing or sourcing the water required by their people, their farms, and their businesses. That struggle will only intensify—even in the U.S.

Surging population and economic growth in Texas, along with sustained droughts, have left reservoirs in Texas down to 67% of capacity. Experts estimate that within half a century, Texas will face a yearly deficit of 2.6 trillion gallons of water.

In Nevada, Las Vegas officials have imposed a water-saving and water-recovery regimen in response to steadily declining levels at the Lake Mead reservoir, which provides as much as 90% of the city's water. (Lake Mead, which also supplies water to millions of people in seven other states, is currently at its lowest levels since 1937.)

Lake Mead Monthly Elevation at Hoover Dam (ft)



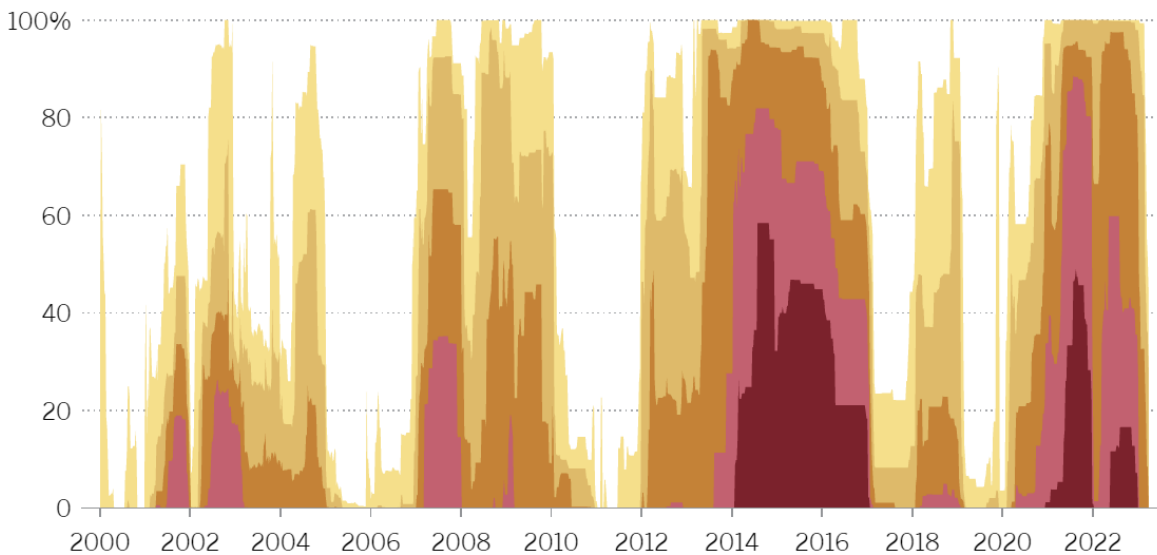
Source: NASA Earth Observatory

Speaking of California, it was hoped that huge storms that caused flooding throughout California earlier in 2023 would at least alleviate the statewide drought conditions that have afflicted Californians for the better part of the last two decades. The relief, however, was partial. While many water-usage restrictions were lifted after the most recent of the 12 storms (as of this writing), most scientists said it would take several more seasons of the same kind of extreme precipitation to restore the state's depleted aquifers and groundwater supplies after years of being drained by 39.2 million thirsty Californians and an agricultural sector that accounts for 46% of the country's fruit and nuts, 40% of the country's vegetables, and 20% of the country's dairy.

Drought in California since 2000

Percentage of area in each U.S. Drought Monitor category

Abnormally dry Moderate drought Severe drought Extreme drought
Exceptional drought



Data as of March 28
[U.S. Drought Monitor](#)

Sean Greene LOS ANGELES TIMES

Water shortages aren't limited to the southwestern United States. Even in parts of the country that aren't arid, communities are finding themselves struggling to supply their populations with dependably clean water. Aging water-treatment systems well past their intended life cycles, industrial/agricultural pollution, and other issues have caused water emergencies in towns and cities across the country—in Hawaii and Maryland, Texas and New York, and perhaps most infamously, in Flint, Michigan and Jackson, Mississippi.

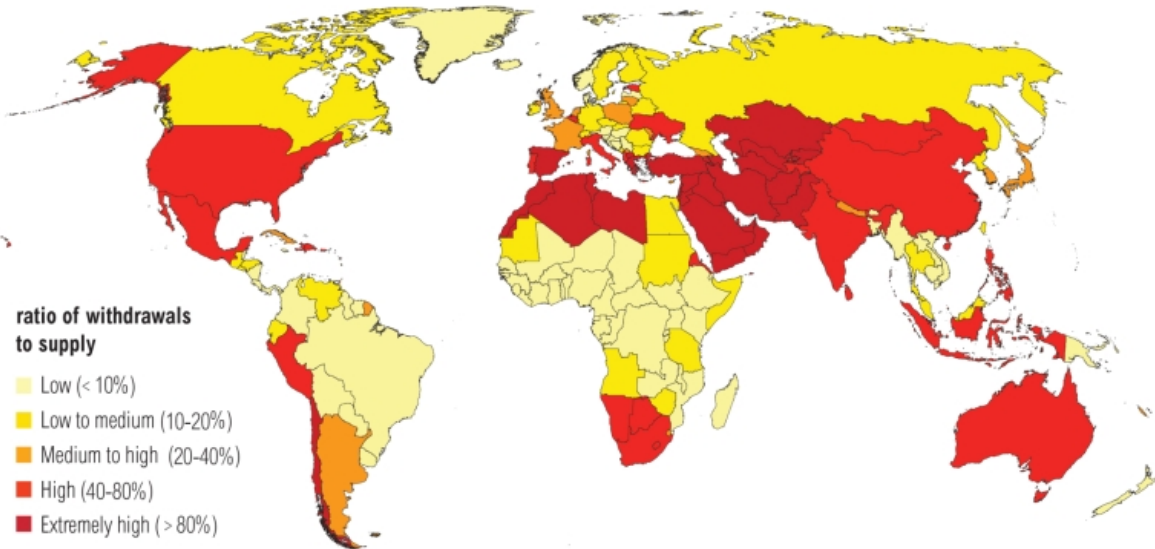
“In totality, each of the components [of the U.S. water infrastructure] is aging and failing, and the reliability of service in each component is now a question mark. This is why one has to think about how they can collectively be upgraded,” according to Prof. Upmanu Lall, an engineer and hydro-climatologist at Columbia University.

Nevertheless, there will come a time when officials will no longer be able to punt the problems further down the road. Prof. Lall’s colleague at Columbia, Shannon Marquez, explained: “Unfortunately, we only hear [about water-supply problems] in the news when there are these extreme events when cities have boil water advisories. But the lack of financing to rehabilitate old water systems means that systems have been neglected for years.” Prof. Marquez, Columbia’s dean of global engagement and professor of water, sanitation, and hygiene, estimates “the cost of fixing America’s drinking water infrastructure will be nearly \$480 billion over the next 20 years.”

When those costs become unavoidable, companies that can help communities, farms, and businesses meet their water requirements will be positioned to benefit, and so will their shareholders. In particular, companies that can differentiate themselves with innovative and effective solutions to help customers increase their supply of usable water—whether through recovery, improved efficiency, or some other means—will likely be poised to achieve significant gains.

Each of the names introduced here should—as with any companies mentioned in this publication—not be viewed as stock recommendations, but as ideas worth further exploration because of the uniqueness of what they offer. Furthermore, because of the nature of how the water crisis is expected to unfold around the world, the companies mentioned here have potential that will likely take years to develop.

Water Stress by Country: 2040



NOTE: Projections are based on a business-as-usual scenario using SSP2 and RCP8.5.

For more: ow.ly/RiWop



Xylem Inc. (\$XYL)

Xylem is a leading provider of water and wastewater solutions, including treatment, transportation, dewatering, water reuse, and pipeline analytics. It is known globally for its expertise in agricultural irrigation solutions. The company’s products and services include biological treatment technology, membrane filtration systems, and desalination solutions. Xylem recently added to its portfolio with a \$7.5B acquisition of Evoqua, a leading provider of industrial wastewater treatment solutions. Evoqua is notable for its range of remediation solutions for PFAS contamination, a source of increasing scientific, public, and media concern due to what appears to be its near-ubiquitous presence in our drinking water. Xylem’s global presence makes it well-positioned to take advantage of opportunities in both wealthy countries and emerging markets.

The Dow Chemical Company (\$DOW)

It might be surprising to see a company like Dow being mentioned here, since the chemicals industry is one of the largest consumers of water—arguably part of the problem. But the water processing group of Dow might be part of the solution. Dow is a world leader in ion exchange and membranes for water purification. It makes a range of filtration devices for the removal of bacteria, suspended solids, and other particulates. These devices feature innovative technologies such as ion exchange resins and adsorbents and contaminant-removing catalysts.

Tetra Tech (\$TTEK)

Tetra is a global engineering, consulting, and construction-management company. The company's One Water solution takes a multidisciplinary approach to address complex water challenges in a way that considers disparate issues including population pressures, climate change, agricultural and industrial pollution, cybersecurity, and more.

Veolia Environnement SA (\$VEOY)

This French conglomerate is a global leader in solutions for water reuse, reclamation, and sanitation. Its extensive client base includes municipalities and industries, and it boasts a portfolio of hundreds of proprietary technologies aimed at addressing the various causes of water scarcity.

Roper Technologies (\$ROP)

A promising and emerging solution for the growing water crisis is the introduction of smart water meters. There are few players in this space, but such devices have proven to be surprisingly effective at helping utilities and institutions quickly identify leaks and sources of water waste in real time and, when widely deployed, many believe they can have a startlingly significant cumulative impact—both from a resource perspective and in a financial sense. Roper is a leading maker of such devices, though as a diversified manufacturer, it also has a robust presence in a range of niche areas such as scientific instruments, imaging software, oil-drilling equipment, medical devices, and ruggedized electronics.

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