



25 Countries, Housing One-quarter of the Population, Face Extremely High Water Stress

August 16, 2023 By **Samantha Kuzma, Liz Saccoccia** and **Marlena Chertock** Cover Image by: Kirsten Walla/iStock

Finding

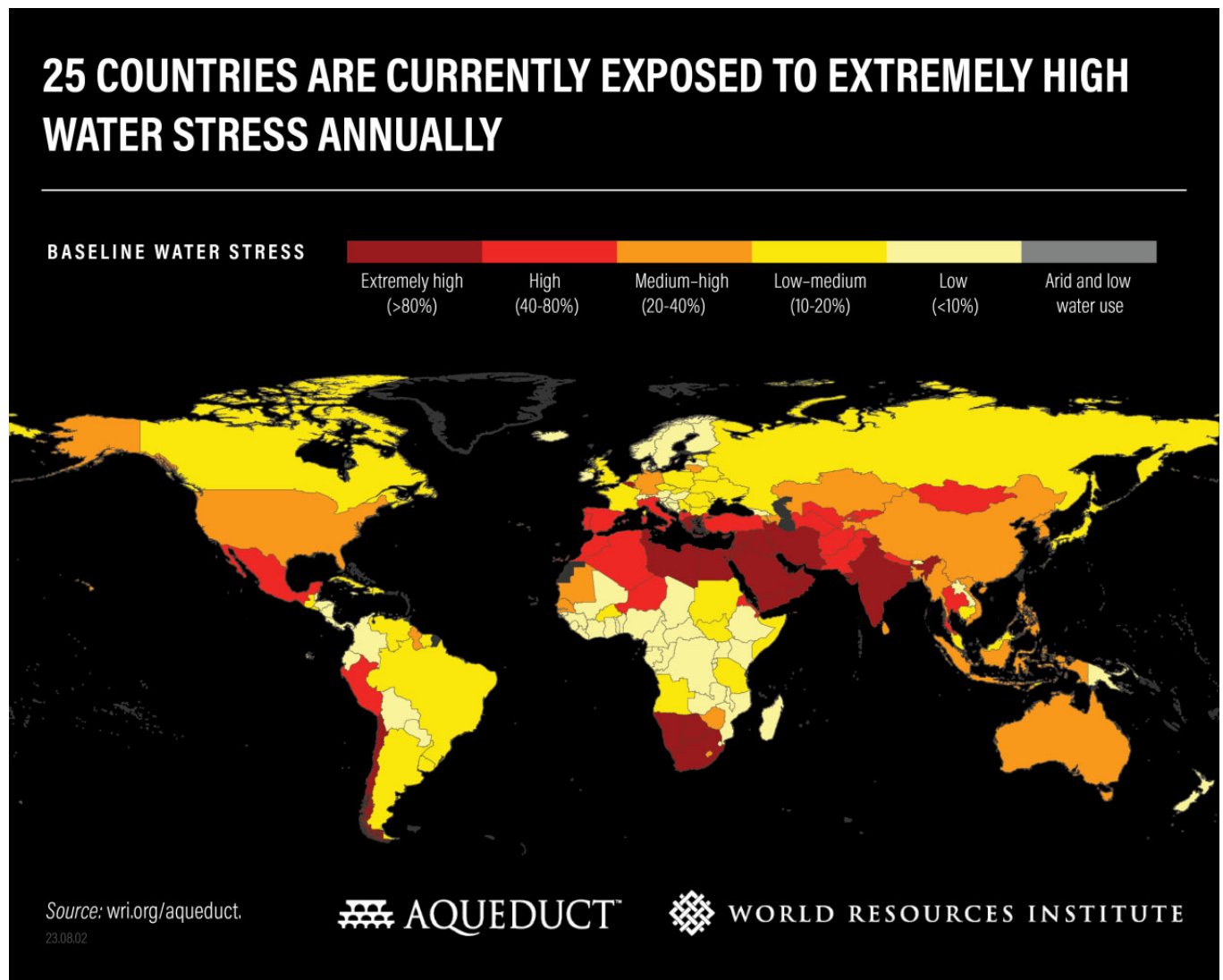
Topic **Freshwater**

New data from [WRI's Aqueduct Water Risk Atlas](#) show that 25 countries — housing one-quarter of the global population — face extremely high water stress each year, regularly using up almost their entire available water supply. And at least 50% of the world's population — around 4 billion people — live under highly water-stressed conditions for at least one month of the year.

Living with this level of water stress jeopardizes people's lives, jobs, food and energy security. Water is central to growing crops and raising livestock, producing electricity, maintaining human health, fostering equitable societies and meeting the world's climate goals.

Without better water management, population growth, economic development and climate change are poised to worsen water stress.

Here, we dive deep into what's causing growing water stress — and which countries and regions will be impacted the most.



What's Causing Global Water Stress?

Across the world, demand for water is exceeding what's available. Globally, demand has more than doubled since 1960.

Increased water demand is often the result of growing populations and industries like irrigated agriculture, livestock, energy production and manufacturing.

Meanwhile, lack of investment in water infrastructure, unsustainable water use policies or increased variability due to climate change can all affect the available water supply.

Water stress, the ratio of water demand to renewable supply, measures the competition over local water resources. The smaller the gap between supply and demand, the more vulnerable a place is to water shortages. A country facing “extreme water stress” means it is using at least 80% of its available supply, “high water stress” means it is withdrawing 40% of its supply.

Without intervention — such as investment in water infrastructure and better water governance — water stress will continue to get worse, particularly in places with rapidly growing populations and economies.

Which Countries Face the Worst Water Stress?

Our [data shows that 25 countries](#) are currently exposed to extremely high water stress annually, meaning they use over 80% of their renewable water supply for irrigation, livestock, industry and domestic needs. Even a short-term drought puts these places in danger of running out of water and sometimes prompts governments to shut off the taps. We’ve already seen this scenario play out in many places around the world, such as [England](#), [India](#), [Iran](#), [Mexico](#), and [South Africa](#).

The five most water-stressed countries are Bahrain, Cyprus, Kuwait, Lebanon, Oman and Qatar. The water stress in these countries is mostly driven by low supply, paired with demand from domestic, agricultural and industrial use.

The most water-stressed regions are the Middle East and North Africa, where 83% of the population is exposed to extremely high water stress, and South Asia, where 74% is exposed.

THE MIDDLE EAST AND NORTH AFRICA REGION IS THE MOST WATER-STRESSED IN THE WORLD

BASELINE WATER STRESS

Extremely high
(>80%)

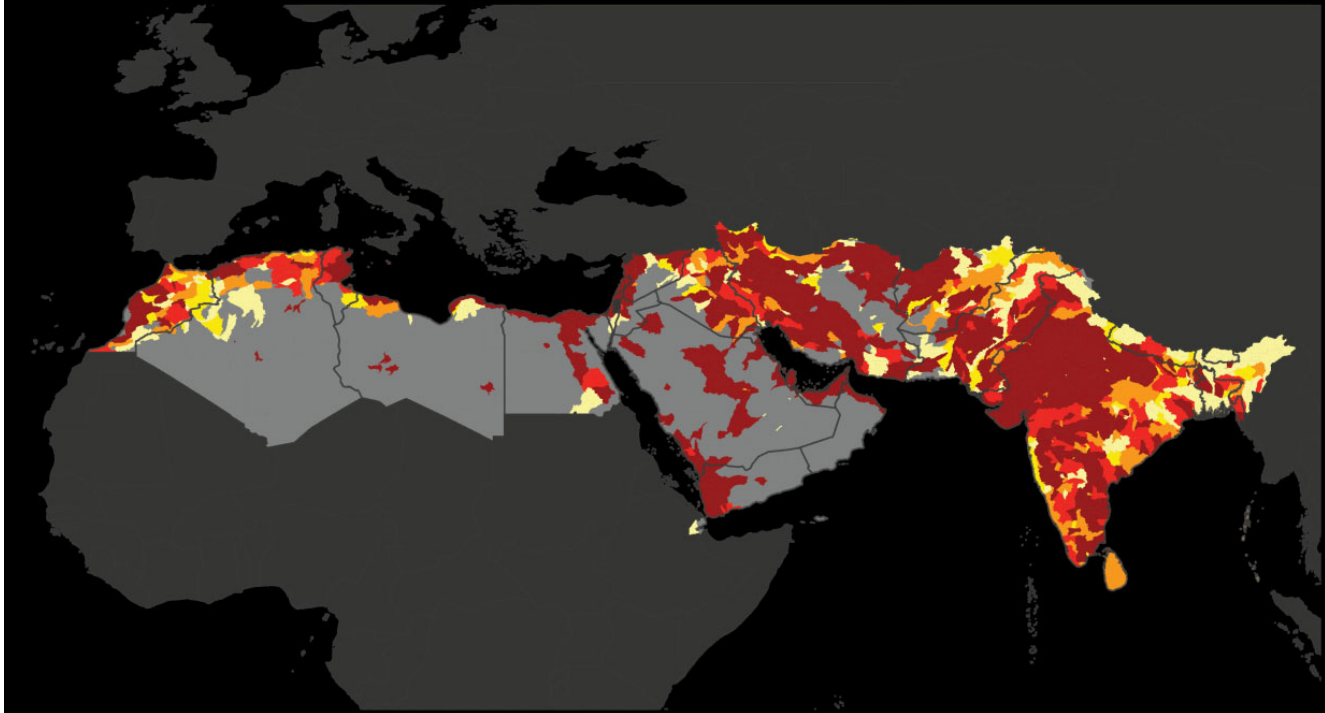
High
(40-80%)

Medium-high
(20-40%)

Low-medium
(10-20%)

Low
(<10%)

Arid and low
water use



Source: wri.org/aqueduct.
23.08.02

 AQUEDUCT™

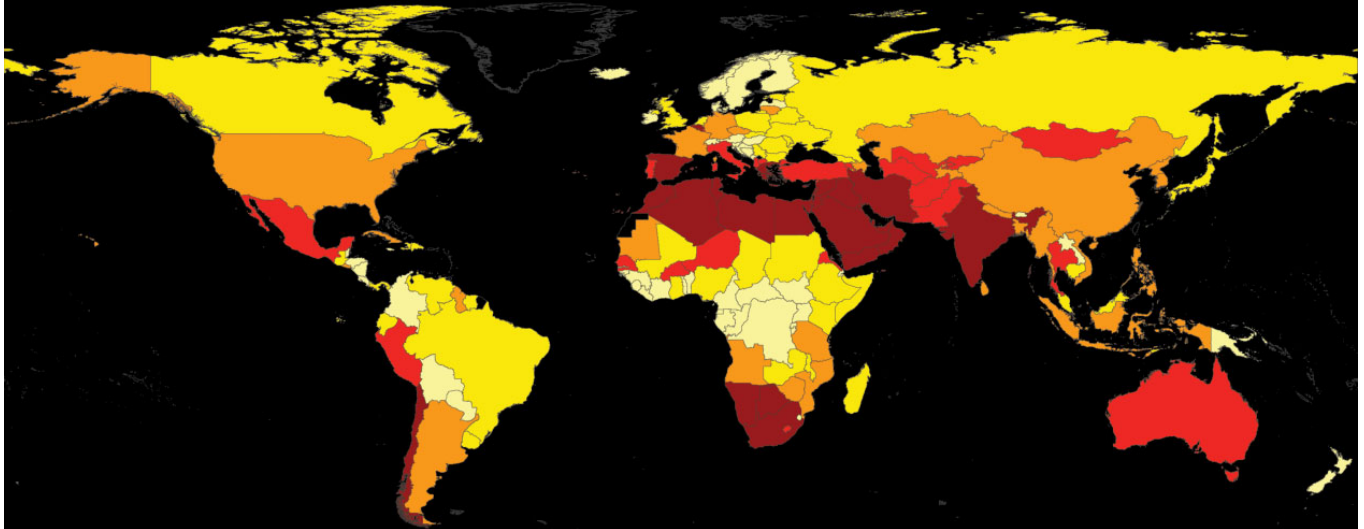
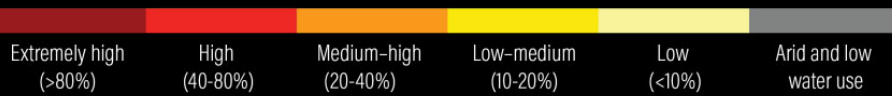
 WORLD RESOURCES INSTITUTE

The Situation is Poised to Worsen

By 2050, an additional 1 billion people are expected to live with extremely high water stress, even if the world limits global temperature rise to 1.3 degrees C to 2.4 degrees C (2.3 degrees F to 4.3 degrees F) by 2100, an optimistic scenario.

BY 2050, AN ADDITIONAL 1 BILLION PEOPLE ARE EXPECTED TO LIVE WITH EXTREMELY HIGH WATER STRESS

WATER STRESS



Source: wri.org/aqueduct.
23.08.02

 AQUEDUCT™

 WORLD RESOURCES INSTITUTE

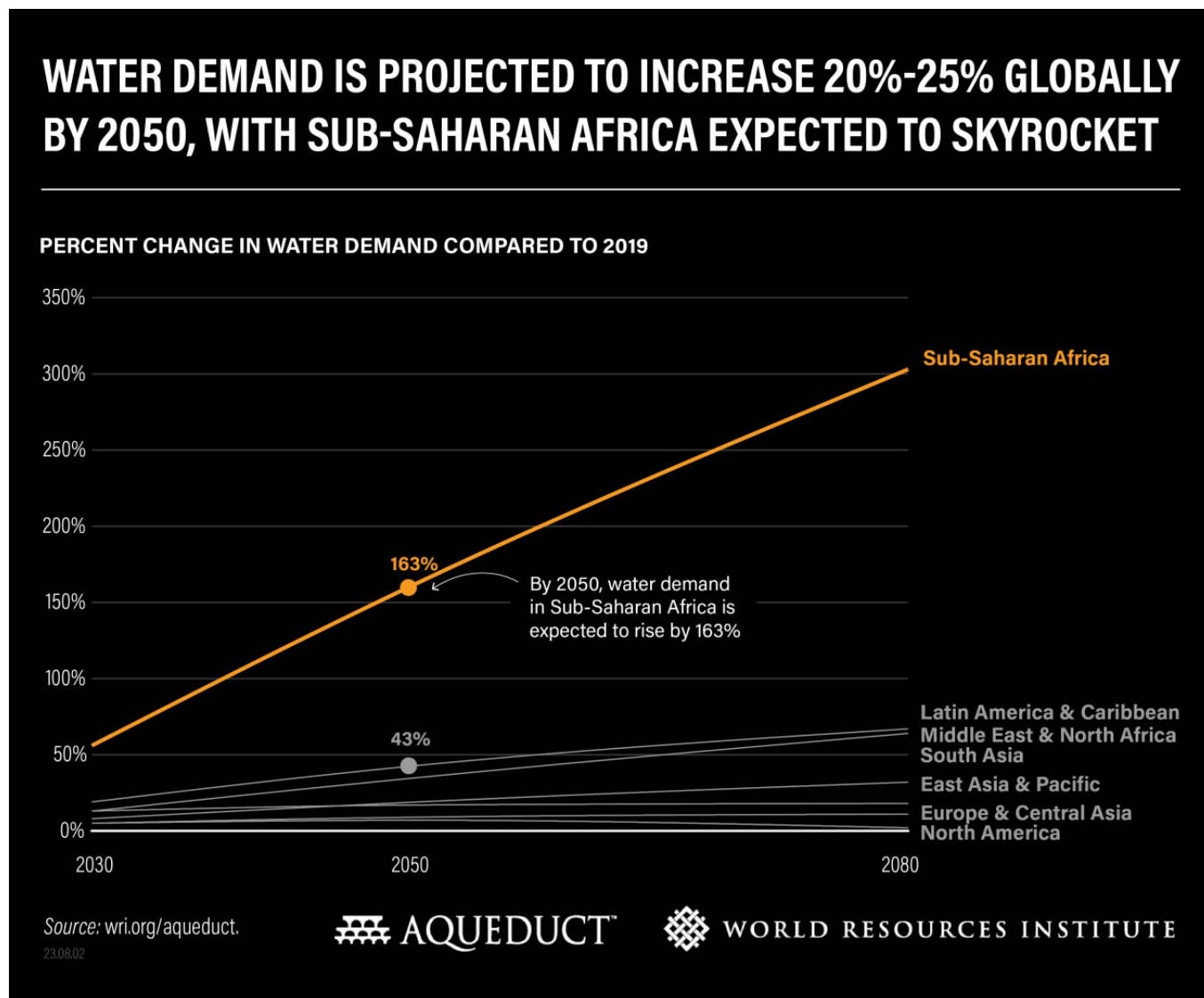
Global water demand is projected to increase by 20% to 25% by 2050, while the number of watersheds facing high year-to-year variability, or less predictable water supplies, is expected to increase by 19%. For the Middle East and North Africa, this means 100% of the population will live with extremely [high water](#) stress by 2050. That's a problem not just for consumers and water-reliant industries, but for political stability. In Iran, for example, decades of poor water management and unsustainable water use for agriculture are already [causing protests](#) — tensions that will only intensify as water stress worsens.

Water Demand Is Exploding in Africa; Plateauing in Wealthier Nations

The biggest change in water demand between now and 2050 will occur in Sub-Saharan Africa. While most countries in Sub-Saharan Africa are not extremely water-stressed right now, demand is growing faster there than any other region in the world. By 2050, water demand in Sub-Saharan Africa is expected to skyrocket

by 163% — 4 times the rate of change compared to Latin America, the second-highest region, which is expected to see a 43% increase in water demand.

This increase in water use, mainly expected for irrigation and domestic water supply, could foster major economic growth in Africa — projected to be the fastest-growing economic region in the world. However, inefficient water use and unsustainable water management also threatens to lower the region's GDP by 6%.

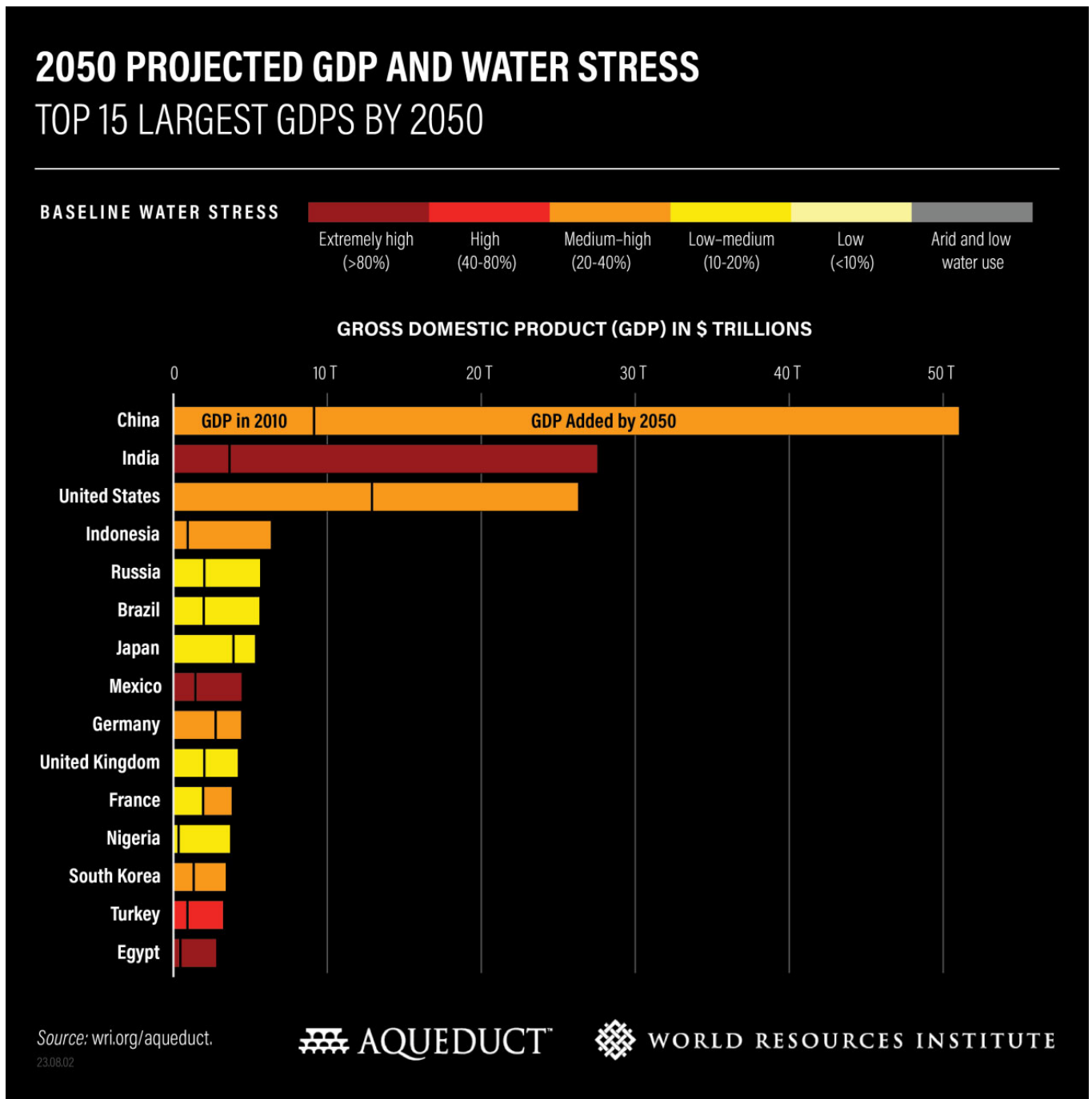


Meanwhile, water demand has plateaued in wealthier countries in North America and Europe. Investment in water-use efficiency has helped reduce in-country water use in high income countries, but water use and dependencies extend beyond national boundaries, and the water embedded in international trade from lower-middle income countries to high income countries will increasingly contribute to rising water stress in low and lower-middle income countries.

Water Stress Could Majorly Disrupt Economies and Agricultural Production

Increasing water stress threatens countries' economic growth as well as the world's food security.

According to data from Aqueduct, 31% of global GDP — a whopping \$70 trillion — will be exposed to high water stress by 2050, up from \$15 trillion (24% of global GDP) in 2010. Just four countries — India, Mexico, Egypt and Turkey — account for over half of the exposed GDP in 2050.



Water shortages can lead to industrial interruptions, energy outages and agricultural production losses — like those [already being seen in India](#), where a lack of [water to cool thermal powerplants](#) between 2017 and 2021 resulted in 8.2 terawatt-hours in lost energy – or enough electricity to power 1.5 million [Indian households](#) for five years. Failing to implement better water management policies could result in GDP losses in India, China and Central Asia of [7% to 12%](#), and 6% in much of Africa by 2050 according to the Global Commission on Adaptation.

Global food security is also at risk. Already, 60% of the world's irrigated agriculture faces extremely high water stress — particularly sugarcane, wheat, rice and maize. Yet to feed a projected 10 billion people by 2050, the world will need to produce [56% more food calories](#) than it did in 2010 — all while dealing with increasing water stress as well as climate-driven disasters like droughts and floods.

Better Management for a Water-secure Future

It's good to understand the state of the world's water supply and demand, but water stress doesn't necessarily lead to water crisis. For example, places like Singapore and the U.S. city of Las Vegas prove that societies can thrive even under the most water-scarce conditions by employing techniques like removing water-thirsty grass, desalination, and wastewater treatment and reuse.

In fact, WRI research shows that solving global water challenges is cheaper than you might think, costing the world about [1% of GDP](#), or 29 cents per person, per day from 2015 to 2030. What's missing is the political will and financial backing to make these cost-effective solutions a reality.

A few key ways to improve water management and reduce water stress include:

- **Countries** can improve their [water governance](#), incentivize water efficiency in agriculture, adopt [integrated water resource management](#), and enhance water infrastructure through [nature-based solutions](#) and [green infrastructure](#). Protecting and restoring wetlands, mangroves and forests can not only improve water quality and build resilience against droughts and floods, but also [save money](#) on water treatment costs.
- **International development banks and other lenders** should consider [strategic debt relief programs](#), like [debt-for-nature swaps](#), or debt relief in return for a commitment to invest in biodiversity or resilient infrastructure, such as mangrove restoration or wetland conservation.

These nature-based solutions can achieve positive climate and water outcomes in countries unable to afford improved water management on their own.

- **Policymakers** in water-stressed countries should prioritize water-prudent energy sources like solar and wind to avoid power shutdowns caused by water shortages.
- **Cities** should develop urban water resilience action plans, learning from the group of six African cities already piloting such approaches. Treating and reusing wastewater could also create new water sources for cities.
- **Farmers** should use more efficient water measures, such as switching to water-efficient crops or using methods like sprinkler or drip irrigation versus flooding fields.
- **Companies** should set science-based water targets, which are in line with what the science says is “enough” to stay within Earth’s limits *and* meet society’s needs, learning from a growing number of businesses that have already set such targets.

Every level of government, as well as communities and businesses, must step up to build a water-secure future for all. The world will ultimately require an all-of-the-above approach, as well as solutions specific to individual catchments and regions.

These findings may be daunting, but with the right management, every country can prevent water stress from turning into water crisis.

NATIONAL WATER STRESS RANKINGS

BASELINE WATER STRESS	COUNTRY RANKING, 2019
Extremely High (>80%)	1. Bahrain 2. Cyprus 3. Kuwait 4. Lebanon 5. Oman 6. Qatar 7. United Arab Emirates
	8. Saudi Arabia 9. Israel 10. Egypt 11. Libya 12. Yemen 13. Botswana 14. Iran 15. Jordan
	16. Chile 17. San Marino 18. Belgium 19. Greece 20. Tunisia 21. Namibia 22. South Africa
	23. Iraq 24. India 25. Syria
	26. Mexico 27. Morocco 28. Eritrea 29. Spain 30. Algeria 31. Pakistan 32. Peru
High (40-80%)	33. Turkmenistan 34. Uzbekistan 35. Thailand 36. Andorra 37. Albania 38. Niger
	39. Turkey 40. Afghanistan 41. Italy 42. Kyrgyzstan 43. Portugal 44. Nepal 45. Djibouti
	46. Mongolia 47. Macedonia
	48. Armenia 49. Lesotho 50. Luxembourg 51. Australia 52. China 53. Mauritania
	54. Guyana 55. Indonesia 56. Bangladesh 57. United States 58. Kazakhstan
Medium - High (20-40%)	59. Azerbaijan 60. South Korea 61. Sri Lanka 62. Tajikistan 63. North Korea 64. Senegal
	65. Zimbabwe 66. Lithuania 67. Myanmar 68. Vietnam 69. Germany 70. Philippines
	71. Japan 72. El Salvador 73. France 74. Tanzania 75. Cambodia 76. Czech Republic
	77. Argentina 78. Uruguay 79. Venezuela 80. Timor-Leste 81. Somalia 82. Suriname
	83. Poland 84. Cuba 85. Burkina Faso 86. Slovakia 87. Dominican Republic 88. Haiti
Low - Medium (10-20%)	89. Netherlands 90. Sudan 91. Bulgaria 92. South Sudan 93. Ukraine
	94. United Kingdom 95. Moldova 96. Serbia 97. Canada 98. Estonia 99. Romania
	100. Belarus 101. Russia 102. Angola 103. Brazil 104. Malaysia 105. Guatemala
	106. Ethiopia 107. Denmark 108. Georgia 109. Madagascar 110. Chad 111. Zambia
	112. Liechtenstein 113. Finland 114. Nigeria 115. Kenya 116. Sweden 117. Malawi
Low (<10%)	118. Panama 119. Laos 120. Montenegro 121. Mali 122. Ecuador 123. Costa Rica
	124. Latvia 125. Slovenia 126. Colombia 127. Hungary 128. Switzerland
	129. Bosnia and Herzegovina 130. Mozambique 131. Bhutan 132. Ireland 133. Guinea
	134. Swaziland 135. Guinea-Bissau 136. Austria 137. Nicaragua 138. Uganda 139. Norway
	140. Croatia 141. Bolivia 142. Honduras 143. Ghana 144. Belize 145. New Zealand
146. Gambia 147. Republic of Congo 148. Democratic Republic of the Congo	
149. Central African Republic 150. Cameroon 151. Benin 152. Togo 153. Paraguay	
154. Burundi 155. Brunei 156. Côte d'Ivoire 157. Gabon 158. Equatorial Guinea 159. Iceland	

Source: wri.org/aqueduct

Relevant Work

FRESHWATER

World's 18 Most Water-Stressed Rivers

Insights MARCH 20, 2014

FRESHWATER

Triple Threat: Water, Energy and Food Insecurity

Insights OCTOBER 19, 2020

FRESHWATER

Aqueduct 4.0 Current and Future Country Rankings

Data AUGUST 16, 2023

FRESHWATER

World's 36 Most Water-Stressed Countries

Insights DECEMBER 12, 2013

