17 Countries, Home to One-Quarter of the World's Population, Face Extremely High Water Stress

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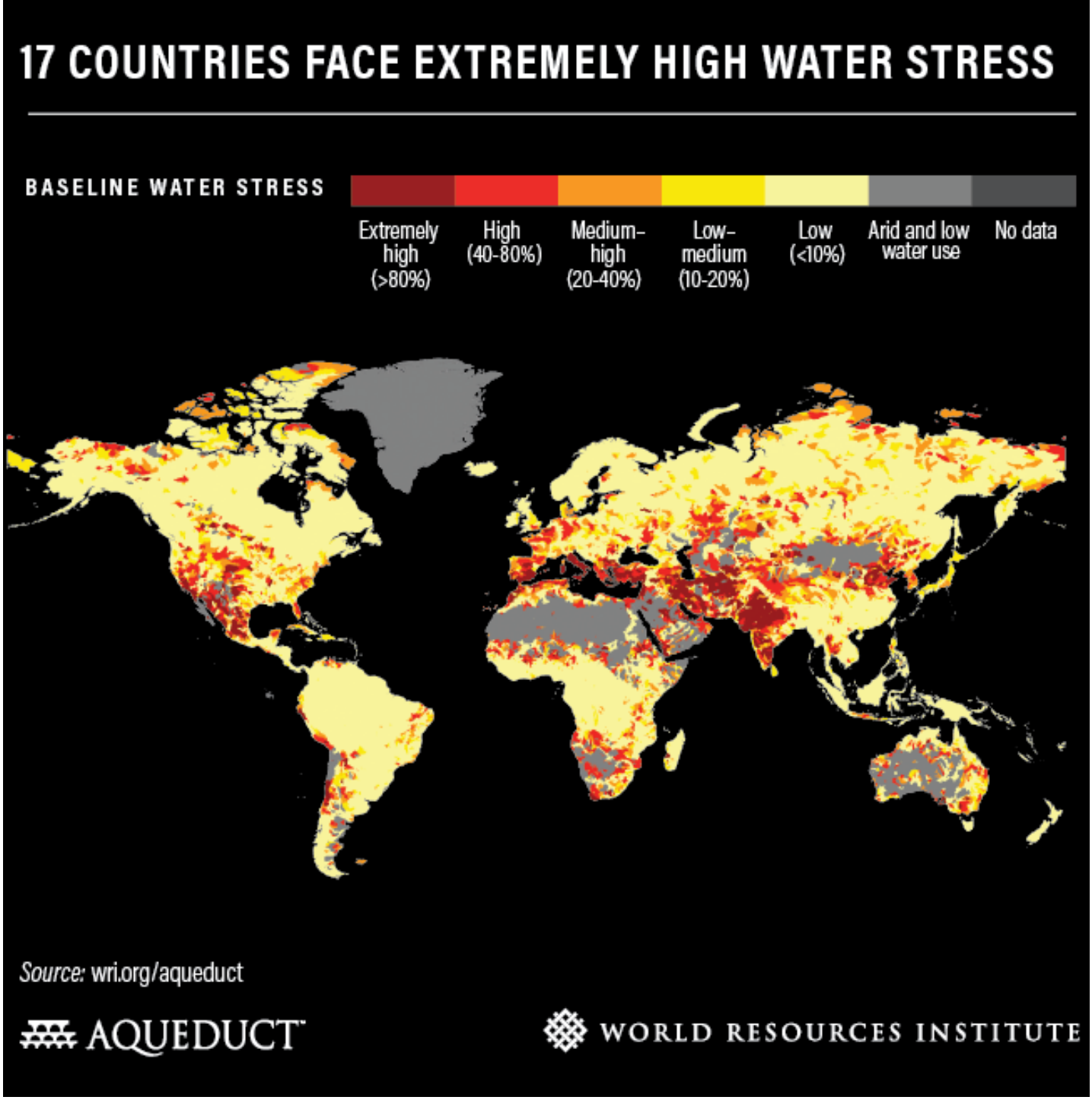
Once-unthinkable water crises are becoming commonplace.

Water withdrawals globally have more than doubled since the 1960s due to increased demand. Photo by Tim J. Keegan/Flickr

Reservoirs in Chennai, India's sixth-largest city, are nearly dry right now. Last year, residents of Cape Town, South Africa narrowly avoided their own "Day Zero" water shut-off. And the year before that, Rome rationed water to conserve scarce resources.

The reasons for these crises go far deeper than drought: Through new hydrological models, WRI found that water withdrawals globally have more than doubled since the 1960s due to growing demand – and they show no signs of slowing down.

New data from WRI's Aqueduct tools reveal that 17 countries – home to one-quarter of the world's population—face "extremely high" levels of baseline water stress, where irrigated agriculture, industries and municipalities withdraw more than 80% of their available supply on average every year. Forty-four countries, home to one-third of the world, face "high" levels of stress, where on average more than 40% of available supply is withdrawn every year. (Check your country's water stress level in the full rankings at the end of this post.) Such a narrow gap between supply and demand leaves countries vulnerable to fluctuations like droughts or increased water withdrawals, which is why we're seeing more and more communities facing their own "Day Zeros" and other crises.



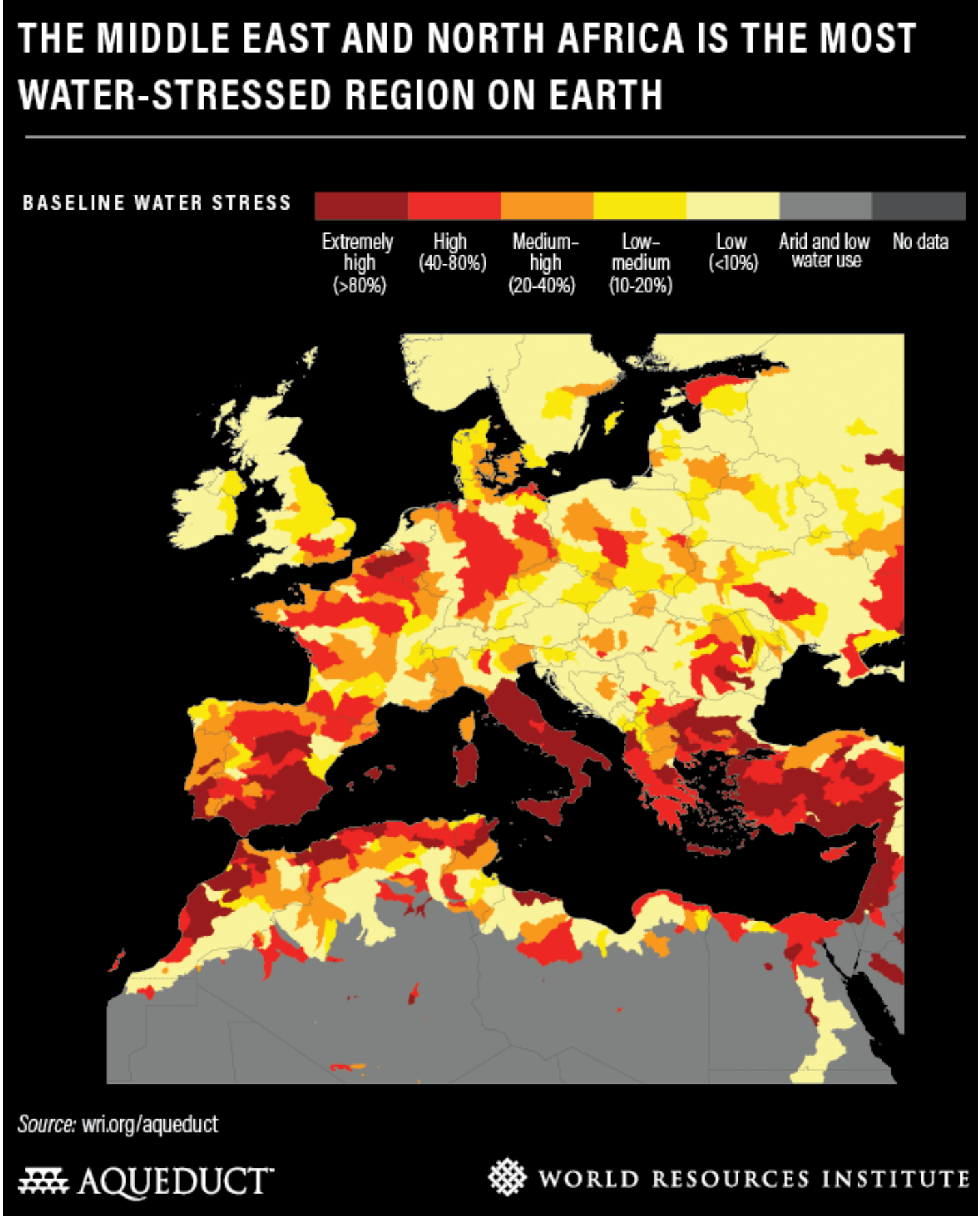
Water Stress Creates Ripple Effects Throughout Societies and Economies

Water stress poses serious threats to human lives, livelihoods and business stability. It's poised to worsen unless countries act: Population growth, socioeconomic development and urbanization are increasing water demands, while climate change can make precipitation and demand more variable.

We're already witnessing some of these impacts play out around the world. Here are four trends we're seeing in the data:

Middle East and North Africa (MENA) Is the Most Water-Stressed Region on Earth

Twelve out of the 17 most water-stressed countries are in the Middle East and North Africa (MENA). The region is hot and dry, so water supply is low to begin with, but growing demands have pushed countries further into extreme stress. Climate change is set to complicate matters further: The World Bank found that this region has the greatest expected economic losses from climate-related water scarcity, estimated at 6-14% of GDP by 2050.



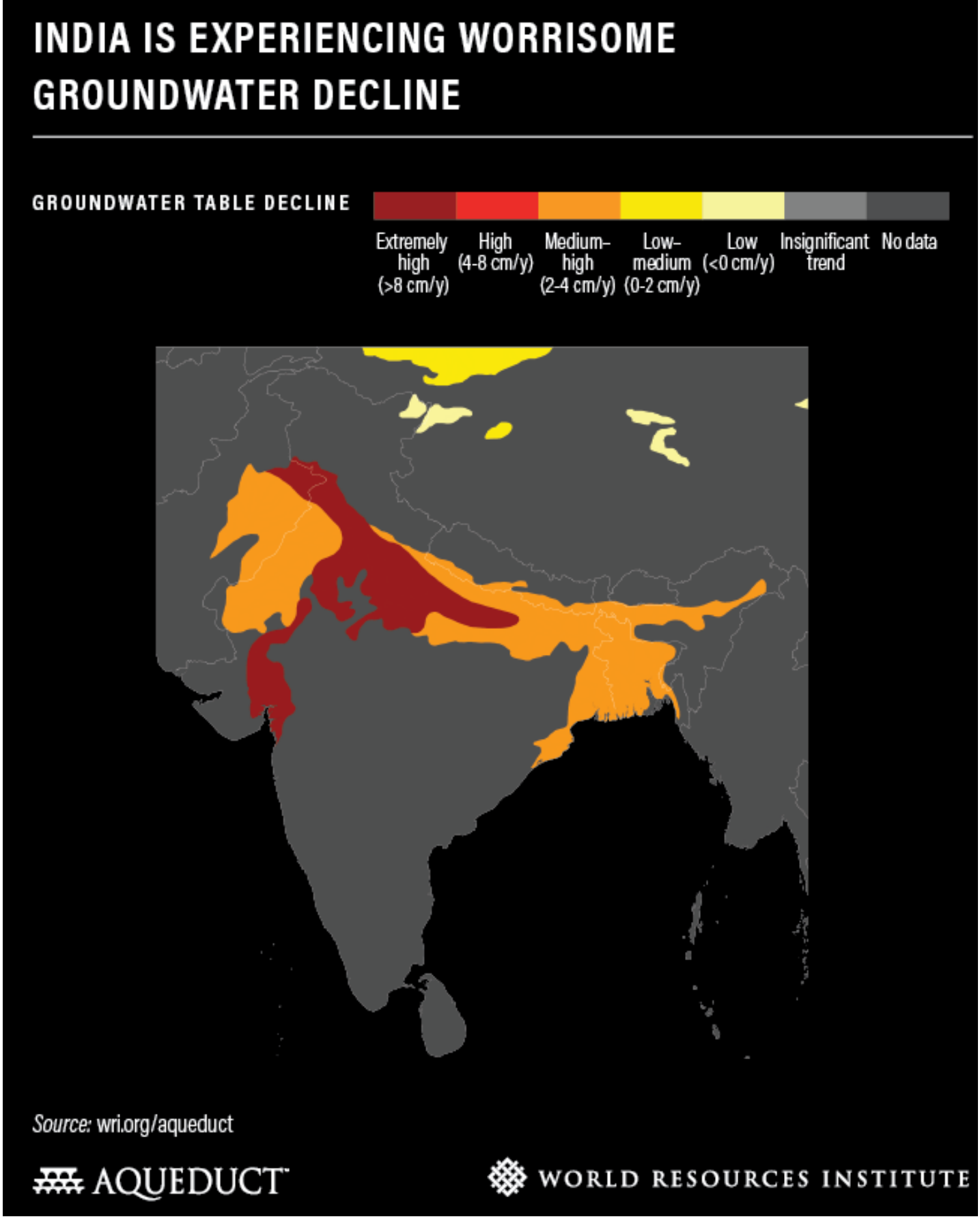
Yet there are untapped opportunities to boost water security in MENA. About 82% of the region's wastewater is not reused; harnessing this resource would generate a new source of clean water. Leaders in treatment and reuse are already emerging: Oman, ranked #16 on our list of water-stressed countries, treats 100% of its collected wastewater and reuses 78% of it. About 84% of all wastewater collected in Gulf Cooperation Council countries (Bahrain, Kuwait, Oman, Qatar,

Saudi Arabia and the United Arab Emirates) is treated to safe levels, but only 44% goes on to be reused.

India's Water Stress Goes Beyond the Surface

India's water challenges extend beyond current events in Chennai. Last year, the National Institution for Transforming India (NITI Aayog), a government research agency, declared that the country is "suffering from the worst water crisis in its history, and millions of lives and livelihoods are under threat." Aqueduct's findings put this crisis in context: India ranks 13th for overall water stress and has more than three times the population of the other 17 extremely highly stressed countries combined.

The new Aqueduct data includes both surface and groundwater stress for the first time. In addition to rivers, lakes and streams, India's groundwater resources are severely overdrawn, largely to provide water for irrigation. Groundwater tables in some northern aquifers declined at a rate of more than 8 centimeters per year from 1990-2014.

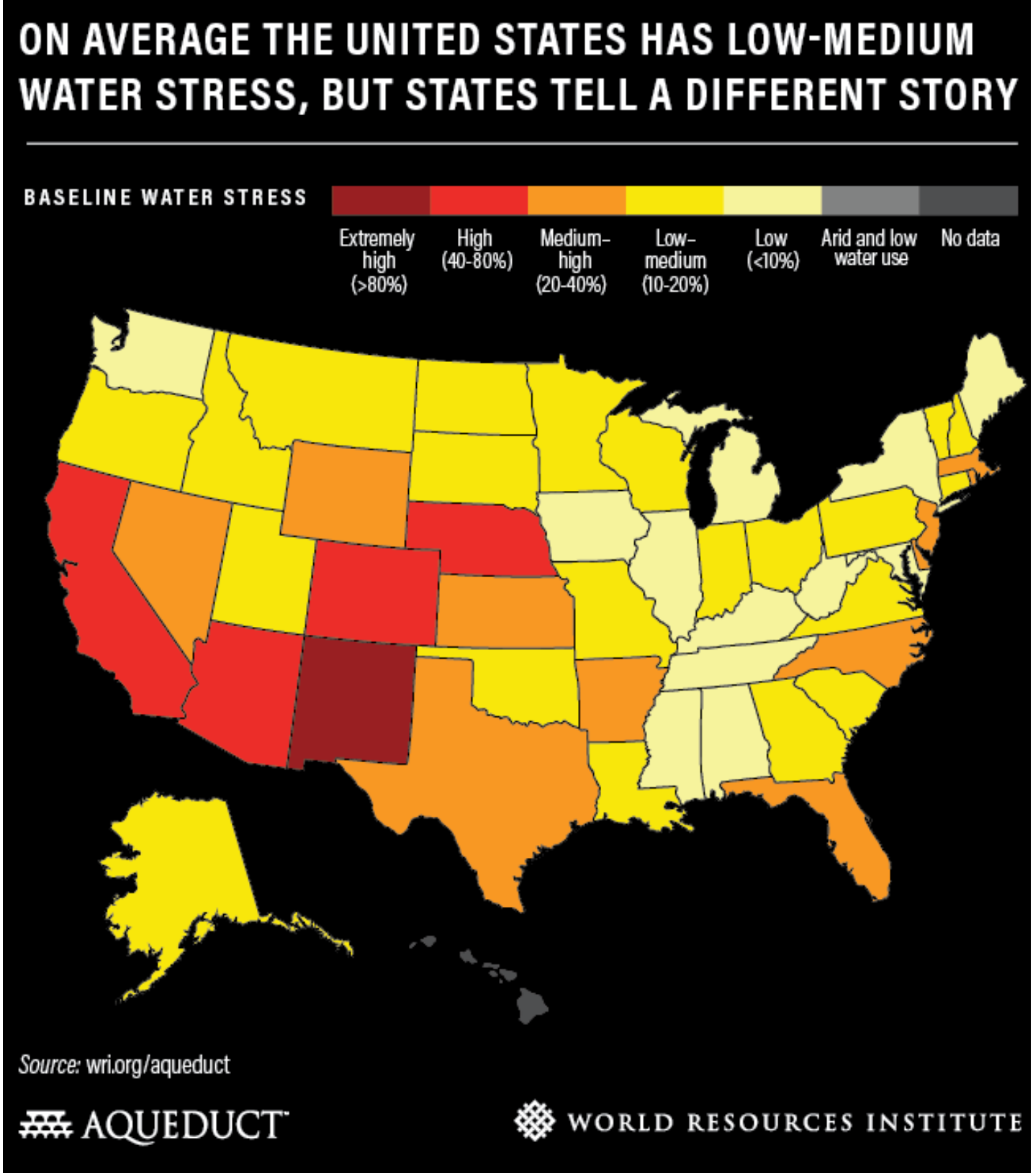


India is starting to take critical steps to mitigate water stress, including setting up the Jal Shakti Ministry to prioritize all water issues—including supply, drinking water and sanitation—under one national government umbrella. Other solutions the country could pursue include more efficient irrigation; conserving and restoring lakes, floodplains, and groundwater recharge areas; and collecting and storing rainwater.

Pockets of Extreme Water Stress Exist Even in Countries with Low Overall Water Stress

While it's helpful for policymakers to understand and take action on water stress at the national level, water is an inherently local issue. That's why in addition to ranking countries' water stress, Aqueduct includes data at the sub-national and sub-watershed levels.

It's clear that even in countries with low overall water stress, communities may still be experiencing extremely stressed conditions. For example, South Africa and the United States rank #48 and #71 on WRI's list, respectively, yet the Western Cape (the state home to Cape Town) and New Mexico experience extremely high stress levels. The populations in these two states rival those of entire nations on the list of most water-stressed countries.



Water Stress Is Not Your Destiny

Water stress is just one dimension of water security. Like any challenge, its outlook depends on management. Even countries with relatively high water stress have effectively secured their water supplies through proper management.

Saudi Arabia, ranked #8 for water stress, prices water to incentivize conservation. Its new Qatrah ("droplet" in Arabic) program sets water conservation targets and aims to reduce water usage 43% within the next decade. Namibia, one of the most

arid countries in the world, has been turning sewage water into drinking water for the past 50 years. And Australia nearly halved domestic water use to avert its own Day Zero moment during the Millennium Drought. The country's water-trading scheme, the largest in the world, allows for smart allocation of water among users in the face of variable supplies.

Why Rank Water Stress in Countries and States?

Water does not follow boundaries set by humans--rivers run across countries, and a flood may only affect a few city blocks. For this reason, most water-related information is collected at a watershed or sub-watershed scale. Yet the policy decisions required to reverse water stress – like setting withdrawal caps, encouraging wastewater treatment and establishing pricing schemes – primarily take place at an administrative scale, such as at a country, state or provincial level.

Data broken down by watershed is more useful to a scientist than a member of parliament. This presents a challenge for decision-makers keen to inform policy with the best available data on water risks. To aid with this process, WRI produces national and sub-national estimates of water stress, drought and flood risks that can help decision-makers better understand exposure to water challenges.

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3 Ways to Reduce Water Stress

In any geography, water stress can be reduced by measures ranging from common sense to cutting-edge. There are countless solutions, but here are three of the most straightforward:

1. Increase agricultural efficiency: The world needs to make every drop of water go further in its food systems. Farmers can use seeds that require less water and improve their irrigation techniques by using precision watering rather than flooding their fields. Financiers can provide capital for water productivity investments, while engineers can develop technologies that improve efficiency in agriculture. And consumers can reduce food loss and waste, which uses one-quarter of all agricultural water.

2. Invest in grey and green infrastructure: Aqueduct's new data shows that water stress can vary tremendously over the year. WRI and the World Bank's research shows that built infrastructure (like pipes and treatment plants) and green infrastructure (like wetlands and healthy watersheds) can work in tandem to tackle issues of both water supply and water quality.

3. Treat, reuse and recycle: We need to stop thinking of wastewater as waste. Treating and reusing it creates a "new" water source. There are also useful resources in wastewater that can be harvested to help lower water treatment costs. For example, plants in Xiangyang, China and Washington, D.C. reuse or sell the energy- and nutrient-rich byproducts captured during wastewater treatment.

The data is clear: There are undeniably worrying trends in water. But by taking action now and investing in better management, we can solve water issues for the good of people, economies and the planet.

WORLD RESOURCES INSTITUTE

National Water Stress Rankings

EXTREMELY HIGH BASELINE WATER STRESS

1. Qatar
2. Israel
3. Lebanon
4. Iran
5. Jordan
6. Libya
7. Kuwait
8. Saudi Arabia
9. Eritrea
10. United Arab Emirates
11. San Marino
12. Bahrain
13. India
14. Pakistan
15. Turkmenistan
16. Oman
17. Botswana

HIGH BASELINE WATER STRESS

18. Chile
19. Cyprus
20. Yemen
21. Andorra
22. Morocco
23. Belgium
24. Mexico
25. Uzbekistan
26. Greece
27. Afghanistan
28. Spain
29. Algeria
30. Tunisia
31. Syria
32. Turkey
33. Albania
34. Armenia
35. Burkina Faso
36. Djibouti
37. Namibia
38. Kyrgyzstan
39. Niger
40. Nepal
41. Portugal
42. Iraq
43. Egypt
44. Italy

MEDIUM-HIGH BASELINE WATER STRESS

45. Thailand
46. Azerbaijan
47. Sudan
48. South Africa
49. Luxembourg
50. Australia
51. Tajikistan
52. Macedonia
53. South Korea
54. Bulgaria
55. Mongolia
56. China
57. Guatemala
58. Estonia
59. France
60. Kazakhstan
61. Mauritania
62. Germany
63. Lesotho
64. Denmark
65. Indonesia
66. Peru
67. Venezuela
68. Cuba

LOW-MEDIUM BASELINE WATER STRESS

69. North Korea
70. Romania
71. United States
72. Zimbabwe
73. Dominican Republic
74. Haiti
75. Japan
76. Angola
77. Sri Lanka
78. El Salvador
79. Tanzania
80. Netherlands
81. Ecuador
82. Lithuania
83. Philippines
84. South Sudan
85. Ukraine
86. Poland
87. Chad
88. Senegal
89. United Kingdom
90. Georgia
91. Nigeria
92. Argentina
93. Czech Republic
94. Russia
95. Bolivia
96. Ethiopia
97. Bosnia and Herzegovina
98. Swaziland
99. Moldova
100. Somalia

LOW BASELINE WATER STRESS

101. Rwanda
102. Liechtenstein
103. Guinea-Bissau
104. Mozambique
105. Vietnam
106. Kenya
107. Costa Rica
108. Canada
109. Serbia
110. Zambia
111. Switzerland
112. Brazil
113. Hungary
114. Ghana
115. Belarus
116. Madagascar
117. Slovenia
118. Colombia
119. Myanmar
120. Belize
121. Montenegro
122. Malawi
123. Mali
124. Finland
125. Slovakia
126. Ireland
127. Sweden
128. Bangladesh
129. Cambodia
130. Burundi
131. Latvia
132. Malaysia
133. Honduras
134. Austria
135. Uganda
136. Panama
137. Nicaragua
138. Guinea
139. Benin
140. Croatia
141. Papua New Guinea
142. New Zealand
143. Democratic Republic of the Congo
144. Côte d'Ivoire
145. Cameroon
146. Gambia
147. Laos
148. Central African Republic
149. Sierra Leone
150. Paraguay
151. Uruguay
152. Togo
153. Norway
154. Republic of Congo
155. Bhutan
156. Timor-Leste
157. Brunei
158. Gabon
159. Equatorial Guinea
160. Guyana
161. Iceland
162. Jamaica
163. Liberia
164. Suriname

Note: This is based on UN member countries. Palestine is a non-member observer and would place between Lebanon and Iran. Some small island nations could not be added to the rankings because of limitations of the model. Scores for these countries are available separately.
Source: wri.org/aqueduct

TAGS:

Aqueduct, water, water quality, water risk, water stress

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