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TECHNICAL NOTE

AQUEDUCT PROJECTED WATER STRESS COUNTRY RANKINGS

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EXECUTIVE SUMMARY

Changes in climate, economic development, urbanization, and population growth will impact water availability around the world. To prepare for these changes, decision-makers need to consider future scenarios of global water supply and demand. Investors, policymakers, companies, and development organizations can use such projected estimates to quantify future impact, hedge risks, and adapt to changes at relevant scales. For certain decisions and analysis, the national scale may be important, and to the best of our knowledge, no up-to-date, country-level projections currently exist in the public domain.

WRI's Aqueduct Water Stress Projections,[1] released in June, 2015, allow users to analyze different future demand and supply scenarios at a sub-catchment level, based on the latest data from the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report (AR5). In the current analysis, we utilize a spatial aggregation methodology[2] to bring the sub-catchment scale Aqueduct Water Stress Projections up to the country scale.

These global country-level projections are best suited to making comparisons among countries for the same year, as well as among decades and scenarios for the same region. As with Aqueduct's previous projections and country rankings, these country-level future scenarios might not be as accurate as those using higher resolution data or more localized scenarios. These indicators also should not be seen as predictions, but rather as potential outcomes under specific climate and socio-economic trajectories, which are subject to uncertainties. Nor do the indicators attempt to account for existing governance and invest-

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Technical notes document the research or analytical methodology underpinning a publication, interactive application, or tool.

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ment in the water sector. These country-level water stress projections are intended to provide useful information about potential future water situations that can help drive improved water management at the international scale. The full results of all scenarios are available at: http://www.wri.org/resources/data-sets/aqueduct-projected-water-stress-country-rankings.

INTRODUCTION

This analysis follows the methodology used in Gassert et al.[3] to calculate country rankings of baseline water stress, seasonal and inter-annual variability, flood occurrence, and drought severity for the year 2010. We employ a spatially weighted aggregation methodology that brings Aqueduct's sub-catchment risk estimates up to the country scale. This method generates rankings of water stress and other indicators for all water users as well as sector-specific rankings for agricultural, domestic, and industrial users.

Aqueduct's country-level indicators are valuable when it comes to national risk benchmarking and comparison, and have already proven their usability through their incorporation into the evaluation models of companies like MSCI Inc., and analyses and databases of organizations like the World Economic Forum and FAO (AQUASTAT). International organizations and financial institutions also need such indicators, because many water-related political, international aid, and investment decisions are made across political or administrative boundaries.[4] By aggregating these data to the national level, the indicators bridge this gap, enabling investors to consider water stress across their entire portfolio, and other users to make consistent comparisons across multiple countries at the same time.

While the Gassert et al. country rankings provide information on current water risk, there is a growing demand for information that projects future global water supply and demand scenarios. Both private and public sectors see the need to plan for potential changes in water availability caused by climate change and economic development in the coming decades.[5]

In this analysis, we calculate projected water stress information for countries from the sub-catchment scale Aqueduct Water Stress Projections. WRI's Aqueduct Water Stress Projections, released in June 2015, are based on the latest data from the Intergovernmental Panel on Climate Change (IPCC), and allow users to analyze different future demand and supply scenarios at a sub-catchment level.

Box 1 | IPCC Scenarios

The scenarios in this report are based on a combination of representative concentration pathways and shared socio-economic pathways from IPCC 5th Assessment Report, which are used to project estimates of future water supply and demand.

REPRESENTATIVE CONCENTRATION PATHWAYS (RCPS) are scenarios of the increase in radiative forcing through 2100. These drive the climate factors in the General Circulation Models from CMIP5.

- **RCP8.5** is a "business-as-usual" scenario of relatively unconstrained emissions. Temperatures increase 2.6–4.8°C by 2100 relative to 1986–2005 levels.
- **RCP4.5** represents a "cautiously optimistic" scenario. Temperatures rise 1.1–2.6°C by 2100.

SHARED SOCIOECONOMIC PATHWAYS (SSPS) are scenarios of socioeconomic drivers.

- **SSP2** is a "business-as-usual" scenario.
- **SSP3** is a "pessimistic" scenario with higher population growth, lower GDP growth, and a lower rate of urbanization.

These pathways were combined into overall "optimistic" (RCP4.5 and SSP2), "business-as-usual" (RCP8.5 and SSP2), and "pessimistic" (RCP8.5 and SSP3) scenarios.

Source: Luck, M., M. Landis, F. Gassert. 2015. "Aqueduct Water Stress Projections: Decadal Projections of Water Supply and Demand Using CMIP5 GCMs." Technical Note. Washington, D.C.: World Resources Institute. Available online at: http://www.wri.org/publication/aqueduct-water-stress-projections.

They provide estimates of water stress, demand, supply, and seasonal variability for the years 2020, 2030, and 2040, targeted toward decadal scale planning, adaptation, and investment.[6] The projections in the current paper are based on the Aqueduct framework, and account for upstream-downstream interactions and spatial relationships between human activities and water resources.[7]

The resulting country water stress projections include thirty-six datasets that look at three time periods—2020, 2030, and 2040—and three combined climate and socioeconomic scenarios—optimistic, business-as-usual, and pessimistic (Box 1) from IPCC. Total water stress levels for each country are provided, along with water stress exposed by domestic, industrial, and agricultural sectors.

We hope that these datasets, which take into account the relative impact of climate and socio-economic changes on water availability, can help international organizations, businesses, and financial institutions to take steps to mitigate risks and more effectively adapt to plausible future climate change and water demand scenarios.

METHODOLOGY

We followed the aggregation method in Gassert et al., 2013, which took three spatially explicit inputs (Figure 1)—source indicators, gridded weights, and target regions—and calculated a spatially weighted average of source-indicator values for each target region. For each scenario under each future year, water stress was used as the source indicator. Water stress is defined as the ratio between total water withdrawals and available renewable surface water at a sub-catchment level. Higher scores on the scale from 0 to 5 correspond to greater competition among water users relative to available surface water resources (Table 1).

Gridded water-withdrawal datasets were chosen as weights because they indicate where human demand for water is the highest. This technique gives greater weight to the areas where socioeconomic dependency on water resources is most critical. Gridded withdrawals were further divided into three sectors (agricultural, domestic, and industrial) to allow us to measure each sector's exposure to water stress.

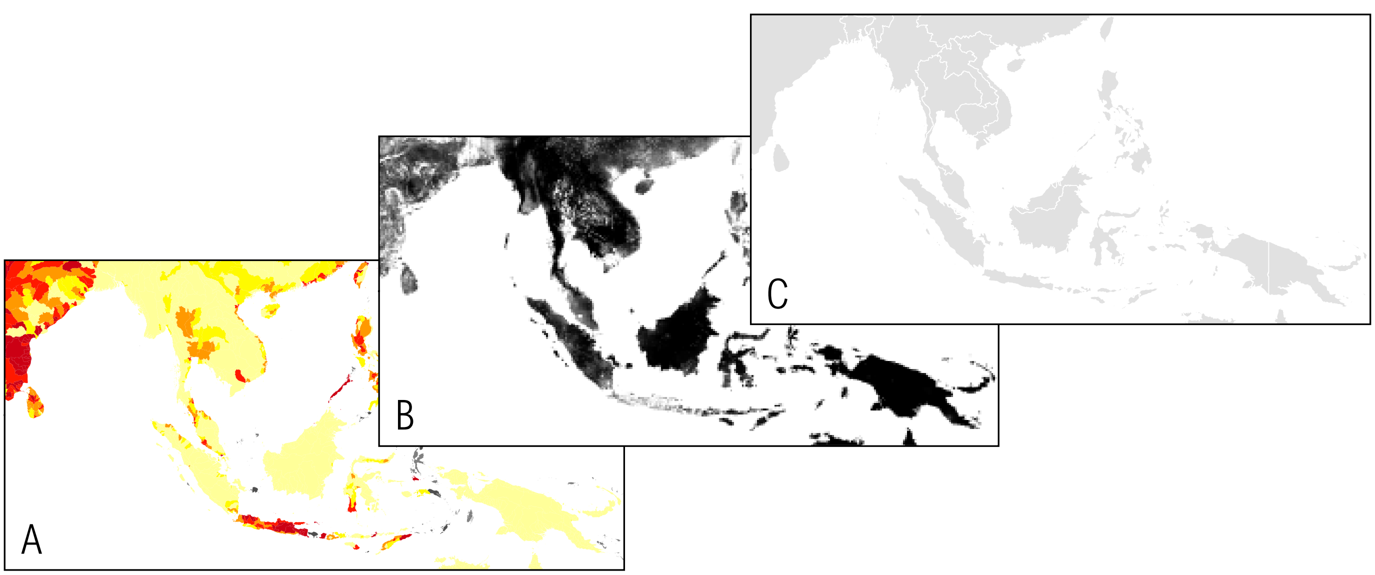
Table 1 | **Aqueduct Water Stress Thresholds**

CATEGORY	SCORE	RATIO OF WITHDRAWALS TO AVAILABLE WATER (PERCENT)
Low	0–1	<10
Low to medium	1–2	10–20
Medium to high	2–3	20–40
High	3–4	40–80
Extremely high	4–5	>80

For example, the domestic water withdrawals datasets identify areas where households and others drawing from municipal sources are projected to use water; these data are used as a weight to measure the exposure of domestic water users to water stress. Thus, country-level baseline water stress, weighted by domestic withdrawals, can be interpreted to show which countries have the most or least stressed domestic sectors. The same approach is used for agricultural and industrial withdrawals.

Within each target region, values of the source indicators were resampled into grids to match the cell size of weighting grids. The weighted average (s_r) was then computed by multiplying the resampled source indicator grids (s_p)

Figure 1 | **Source Indicators—Water Stress (A), Gridded Weights—Withdrawal Distribution (B), and Target Regions—Countries (C)**



by the weighting grids (w_p), summing, and dividing by the sum of the weighting grids across the target region (r).

$$S_r = \frac{\sum_{p \in r} w_p s_p}{\sum_{p \in r} w_p}$$

The data for this analysis were extracted from publicly available sources (Table 2).

RESULTS

The results of projected country water stress in 2040 under the business-as-usual scenario are included in the Appendix Tables A1. An update of the baseline water stress country ranking for 2010,[8] using Aqueduct Global Maps 2.1, is also included in Appendix Table A2. Figure 2 provides a map of the 2040 business-as-usual data. A few countries were excluded due to data limitations: the Global Land Data Assimilation System dataset we used for estimating runoff does not cover some small island countries.[9]

Information of this type can be used by private and public sector decision-makers to quantify the impacts of potential future climate and socio-economic changes on water resources and competition. Our weighted aggregation methodology brings Aqueduct's water stress projections to the country scale while retaining the detail and geospatial sensitivity of the underlying data. These rankings can help decision-makers to prioritize country-level investment and collaboration to advance sustainable water management and climate adaptation. For example:

- Investors can evaluate a portfolio's exposure to future water-related risks.
- Companies can prioritize areas for potential investment and engagement across the value chain.
- Governments can evaluate future exposure to water-related risks relative to other countries.

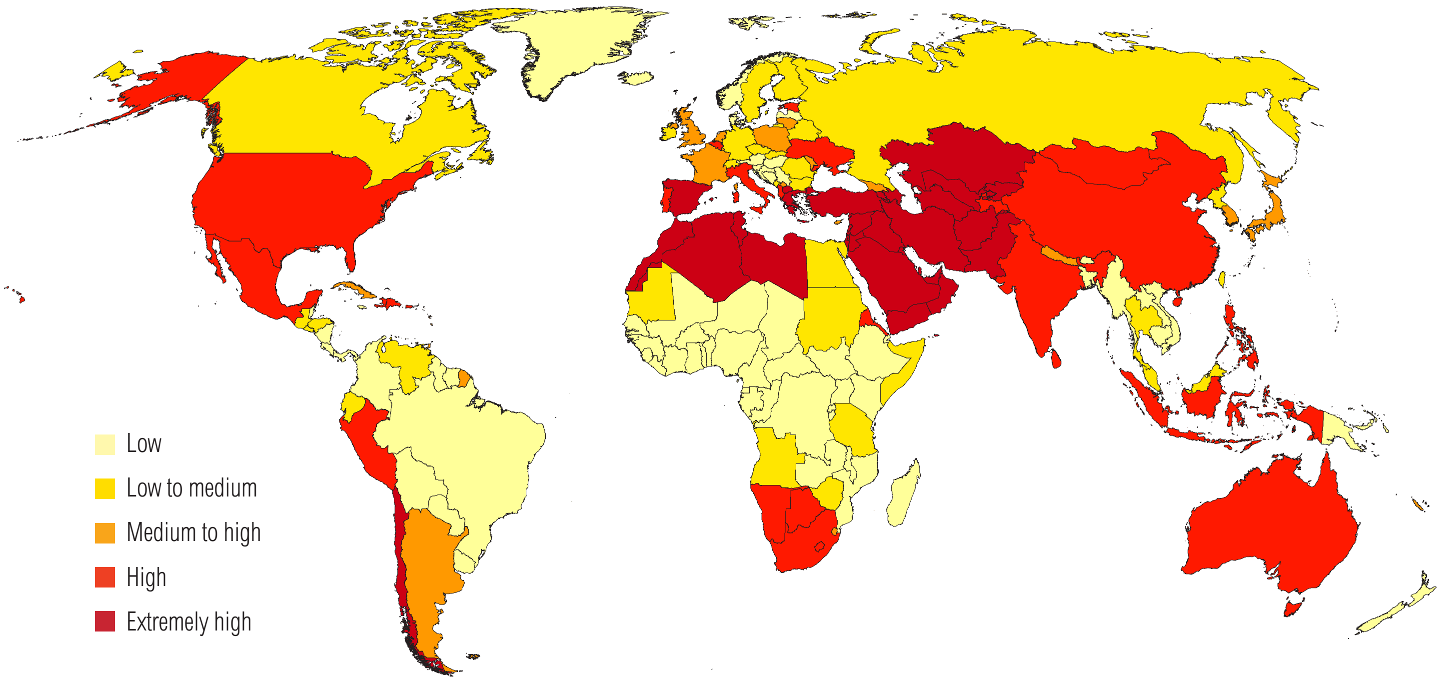
LIMITATIONS

These global projections are best suited to making comparisons among countries for the same year and among scenarios and decades for the same region. More detailed and localized data or scenarios can better estimate

Table 2 | **Data Sources**

DESCRIPTION	DATASET TITLE	SOURCE
SOURCE INDICATORS:		
Optimistic 2020 water stress Optimistic 2030 water stress Optimistic 2040 water stress Business-as-usual 2020 water stress Business-as-usual 2030 water stress Business-as-usual 2040 water stress Pessimistic 2020 water stress Pessimistic 2030 water stress Pessimistic 2040 water stress	Aqueduct Water Stress Projections	Luck et al., 2015
TARGET REGIONS:		
Countries	WRI Countries Admin Boundary Data	Modified from Natural Earth Data. 1:10m Admin 0—Countries
GRIDDED WEIGHTS:		
Optimistic 2020 withdrawals—total and sectoral Optimistic 2030 withdrawals—total and sectoral Optimistic 2040 withdrawals—total and sectoral Business-as-usual 2020 withdrawals—total and sectoral Business-as-usual 2030 withdrawals—total and sectoral Business-as-usual 2040 withdrawals—total and sectoral Pessimistic 2020 withdrawals—total and sectoral Pessimistic 2030 withdrawals—total and sectoral Pessimistic 2040 withdrawals—total and sectoral	Aqueduct Water Stress Projections	Luck et al., 2015

Figure 2 | **Country-Level Water Stress in 2040 under the Business-As-Usual Scenario**



potential outcomes for specific regions and expose large sub-national variations that are subsumed under countrywide water stress values. Even with weighted aggregation, important spatial differences are "averaged away." For example, many countries like Brazil, China, and the United States have very significant regional variations in water demand and supply that may be over- or under-represented when aggregated to the national level. The country indicators face persistent limitations in attempting to simplify complex information, such as spatial and temporal variations, into a single number. They also do not account for the governance and investment structure of the water sector in different countries. For example, Singapore has the maximum score of 5.0 in all projected years and scenarios, but is known for managing water exceptionally well in order to ensure a stable supply.

It is important to note the inherent uncertainty in estimating any future conditions, particularly those associated with climate change, future population and economic trends, and water demand. The future scenarios are defined based on their overall global effects, not their effects on specific countries. Therefore, there could be cases where a country is less stressed in the "pessimistic" scenario than in the "optimistic" one. These future projections should not be seen as predictions, but rather as potential outcomes under specific, pre-defined climate and socio-economic change conditions.

Additionally, care should be taken when examining the change rates of a country's projected stress levels between one year and another, because the risk score thresholds are not linear.[10] For example, a score jump from 3.9 to 4.5 indicates a much more significant increase in the withdrawal-supply ratio than a score increase from 1.9 to 2.5. It would be more accurate to look at rates of change in the withdrawal-supply ratio at a sub-catchment level, which eliminates the impact of aggregation.

While the method has its limitations, the aggregated country projections provide a consistent means for making comparisons between countries and, over time, taking into account upstream-downstream interactions and geographic relationships between human activities and water resources. Full descriptions of the uses and limitations of the Aqueduct indicators and projections can be found in the Aqueduct Global Maps 2.1[11] and Aqueduct Water Stress Projections.[12]

WRI aims to continually improve the data and methodology and welcomes any feedback and suggestions on how to advance the development of country indicators.

APPENDIX

Table A1 | **Aqueduct Projected Country Water Stress Ranking for 2040 under Business-as-Usual Scenario**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
1	Bahrain	5.00	5.00	5.00	5.00
1	Kuwait	5.00	5.00	5.00	5.00
1	Qatar	5.00	5.00	5.00	5.00
1	San Marino	5.00	5.00	5.00	5.00
1	Singapore	5.00	5.00	5.00	No data
1	United Arab Emirates	5.00	5.00	5.00	5.00
1	Palestine	5.00	5.00	5.00	5.00
8	Israel	5.00	5.00	5.00	5.00
9	Saudi Arabia	4.99	5.00	5.00	4.99
10	Oman	4.97	4.97	4.97	4.97
11	Lebanon	4.97	4.97	4.97	4.97
12	Kyrgyzstan	4.93	4.93	4.92	4.93
13	Iran	4.91	4.97	4.97	4.90
14	Jordan	4.86	4.87	4.86	4.86
15	Libya	4.77	4.60	4.60	4.80
16	Yemen	4.74	4.66	4.63	4.75
17	Macedonia	4.70	4.69	4.59	4.79
18	Azerbaijan	4.69	4.59	4.58	4.74
19	Morocco	4.68	4.65	4.63	4.69
20	Kazakhstan	4.66	4.50	4.51	4.76
21	Iraq	4.66	4.58	4.56	4.73
22	Armenia	4.60	4.57	4.62	4.58
23	Pakistan	4.48	4.27	4.23	4.50
24	Chile	4.45	4.73	4.69	4.41
25	Syria	4.44	4.76	4.71	4.37
26	Turkmenistan	4.30	4.32	4.25	4.30
27	Turkey	4.27	4.59	4.53	4.13
28	Greece	4.23	4.19	4.18	4.23
29	Uzbekistan	4.19	4.47	4.45	4.12
30	Algeria	4.17	4.32	4.29	4.03
31	Afghanistan	4.12	3.37	3.62	4.19
32	Spain	4.07	3.64	3.64	4.22
33	Tunisia	4.06	4.41	4.38	4.00
34	Mexico	3.99	3.46	3.40	4.12
35	Dominican Republic	3.94	3.77	3.76	4.09
36	Estonia	3.91	3.92	3.80	1.50
37	Mongolia	3.85	4.05	4.04	3.48

Table A1 | **Aqueduct Projected Country Water Stress Ranking for 2040 under Business-as-Usual Scenario (continued)**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
38	Belgium	3.74	3.74	3.75	3.25
39	Italy	3.67	3.58	3.58	3.80
40	India	3.61	3.24	3.18	3.70
41	Andorra	3.57	3.50	3.58	3.62
42	Monaco	3.56	3.56	3.56	3.56
43	Australia	3.55	3.72	3.71	3.52
44	Portugal	3.55	3.35	3.36	3.61
45	Tajikistan	3.44	3.59	3.39	3.42
46	Sri Lanka	3.33	3.23	3.24	3.53
47	United States of America	3.32	2.88	2.86	4.16
48	China	3.30	3.16	3.06	3.44
49	Albania	3.28	3.33	3.37	3.22
50	Haiti	3.27	3.20	3.21	3.34
51	Indonesia	3.26	3.42	3.28	2.99
52	Ukraine	3.25	3.17	3.16	3.77
53	South Africa	3.19	2.98	2.90	3.29
54	Namibia	3.18	4.47	3.56	2.11
55	Peru	3.18	3.11	3.02	3.21
56	Timor-Leste	3.18	3.31	3.33	3.08
57	Philippines	3.01	2.96	2.92	3.26
58	Botswana	3.00	3.41	3.30	0.87
59	Eritrea	3.00	2.90	2.89	3.05
60	Kosovo	2.96	3.03	3.05	2.30
61	Cuba	2.90	2.92	2.90	2.90
62	Moldova	2.85	2.99	2.84	2.56
63	Luxembourg	2.76	2.76	2.76	2.75
64	Georgia	2.75	2.56	2.52	2.94
65	Argentina	2.69	2.49	2.42	2.99
66	Netherlands	2.67	2.67	2.68	2.75
67	Swaziland	2.63	2.17	2.23	2.70
68	South Korea	2.59	2.42	2.42	2.84
69	United Kingdom	2.38	2.38	2.37	2.81
70	Lithuania	2.30	2.30	2.30	2.09
71	France	2.28	2.36	2.35	1.90
72	Japan	2.24	2.15	2.14	2.41
73	Nepal	2.18	2.27	2.12	2.18
74	Poland	2.05	2.05	2.05	2.21
75	Venezuela	1.98	2.55	2.54	1.74

Table A1 | **Aqueduct Projected Country Water Stress Ranking for 2040 under Business-as-Usual Scenario (continued)**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
76	Ecuador	1.88	1.28	1.28	2.04
77	Finland	1.86	1.90	1.80	0.54
78	Lesotho	1.84	1.84	1.84	1.84
79	Bulgaria	1.84	1.81	1.78	2.69
80	Thailand	1.82	1.71	1.59	1.85
81	Czech Republic	1.81	1.81	1.81	1.91
82	Russia	1.79	1.60	1.60	3.02
83	Malaysia	1.78	1.78	1.70	2.00
84	Ireland	1.73	1.93	1.84	1.22
85	Germany	1.70	1.70	1.70	1.67
86	Somalia	1.66	1.59	1.73	1.40
87	Sweden	1.63	1.66	1.64	0.93
88	Sudan	1.56	1.72	1.64	1.55
89	Egypt	1.53	2.07	2.25	1.25
90	North Korea	1.50	1.47	1.48	1.54
91	Romania	1.50	1.57	1.63	1.42
92	Belarus	1.35	1.35	1.36	1.37
93	Switzerland	1.26	1.24	1.28	1.34
94	Canada	1.26	1.13	1.13	3.28
95	Guatemala	1.23	1.13	1.07	1.68
96	Montenegro	1.22	1.14	1.26	1.68
97	Angola	1.21	1.19	0.90	1.44
98	Honduras	1.17	1.14	1.12	1.33
99	Taiwan	1.14	0.96	0.95	1.60
100	Slovakia	1.08	1.12	1.18	0.73
101	Mauritania	1.05	1.71	1.70	0.88
102	El Salvador	1.03	1.01	1.00	1.08
103	Zimbabwe	1.02	1.10	1.05	1.02
104	United Republic of Tanzania	1.00	0.82	0.82	1.24
105	Senegal	0.98	1.41	1.35	0.87
106	Costa Rica	0.97	0.63	0.61	1.50
107	Vietnam	0.96	1.02	0.98	0.95
108	Republic of Serbia	0.93	0.92	0.98	0.60
109	Latvia	0.92	0.93	0.91	0.63
110	Nigeria	0.90	0.86	0.83	1.23
111	Hungary	0.89	0.88	0.89	1.39
112	Madagascar	0.88	0.53	0.52	0.92
113	Brazil	0.88	0.95	0.94	0.82

Table A1 | **Aqueduct Projected Country Water Stress Ranking for 2040 under Business-as-Usual Scenario (continued)**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
114	Gambia	0.85	1.08	0.95	0.06
115	Bolivia	0.79	0.81	0.80	0.76
116	Slovenia	0.78	0.78	0.76	0.82
117	Mozambique	0.72	0.64	0.66	0.80
118	Denmark	0.70	0.91	0.89	0.53
119	Chad	0.67	0.61	0.54	0.97
120	Croatia	0.66	0.68	0.68	0.32
121	Ethiopia	0.66	0.57	0.51	0.79
122	Austria	0.65	0.62	0.64	1.89
123	Kenya	0.64	0.61	0.62	0.68
124	New Zealand	0.61	0.66	0.65	0.57
125	Guyana	0.61	0.30	0.30	0.71
126	Liechtenstein	0.59	0.59	0.59	0.59
127	Uruguay	0.59	0.70	0.70	0.56
128	Bosnia and Herzegovina	0.58	0.61	0.59	0.02
129	Ghana	0.57	0.61	0.56	0.55
130	Norway	0.55	0.58	0.57	0.21
131	Belize	0.41	0.29	0.26	1.10
132	Nicaragua	0.40	0.29	0.27	0.58
133	Papua New Guinea	0.40	0.41	0.32	0.00
134	Burkina Faso	0.39	0.48	0.40	0.20
135	Cambodia	0.38	0.52	0.41	0.37
136	Colombia	0.37	0.22	0.22	0.55
137	Ivory Coast	0.34	0.38	0.34	0.11
138	Mali	0.32	0.12	0.21	0.36
139	Bangladesh	0.32	0.31	0.32	0.32
140	Togo	0.32	0.45	0.33	0.23
141	Burundi	0.30	0.20	0.13	0.58
142	Djibouti	0.28	0.28	0.27	0.36
143	Niger	0.28	0.31	0.39	0.20
144	Suriname	0.22	0.00	0.01	0.33
145	Zambia	0.20	0.27	0.24	0.12
146	Myanmar	0.17	0.20	0.20	0.15
147	Democratic Republic of the Congo	0.15	0.16	0.13	0.18
148	Rwanda	0.10	0.14	0.11	0.01
149	Laos	0.08	0.10	0.11	0.07
150	Malawi	0.08	0.10	0.10	0.04
151	Liberia	0.03	0.03	0.03	0.00

Table A1 | **Aqueduct Projected Country Water Stress Ranking for 2040 under Business-as-Usual Scenario (continued)**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
152	Guinea	0.02	0.01	0.01	0.05
153	Sierra Leone	0.02	0.03	0.02	0.01
154	Uganda	0.01	0.01	0.01	0.01
155	Cameroon	0.01	0.02	0.01	0.01
156	Benin	0.01	0.01	0.01	0.00
157	Brunei	0.01	0.01	0.01	0.01
158	Paraguay	0.00	0.00	0.00	0.01
159	Panama	0.00	0.00	0.00	0.00
160	Guinea Bissau	0.00	0.00	0.00	0.00
161	Bhutan	0.00	0.00	0.00	0.00
161	Central African Republic	0.00	0.00	0.00	0.00
161	Equatorial Guinea	0.00	0.00	0.00	0.00
161	Gabon	0.00	0.00	0.00	0.00
161	Iceland	0.00	0.00	0.00	No data
161	Republic of the Congo	0.00	0.00	0.00	0.00
161	South Sudan	0.00	0.00	0.00	0.00

Table A2 | **Aqueduct Country Water Stress Ranking for 2010 using Updated Aqueduct Global Maps 2.1**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
1	Bahrain	5.00	5.00	5.00	5.00
1	Qatar	5.00	5.00	5.00	5.00
1	San Marino	5.00	5.00	5.00	5.00
1	Singapore	5.00	5.00	5.00	No data
5	United Arab Emirates	5.00	5.00	5.00	5.00
6	Saudi Arabia	5.00	5.00	4.97	5.00
7	Kuwait	4.97	4.90	4.97	4.97
8	Oman	4.95	4.97	4.97	4.95
9	Kyrgyzstan	4.93	4.97	4.94	4.93
10	Iran	4.79	4.47	4.70	4.80
11	Yemen	4.76	4.08	4.71	4.78
12	Libya	4.74	4.65	4.42	4.82
13	Israel	4.73	4.69	4.80	4.70
14	Kazakhstan	4.50	4.30	4.32	4.55
15	Palestine	4.45	4.49	4.39	4.50
16	Jordan	4.30	4.28	4.36	4.27

Table A2 | **Aqueduct Country Water Stress Ranking for 2010 using Updated Aqueduct Global Maps 2.1 (continued)**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
17	Pakistan	4.25	4.06	4.06	4.26
18	Lebanon	4.23	4.26	4.28	4.20
19	Uzbekistan	4.20	4.46	4.45	4.17
20	Mongolia	4.08	4.82	4.23	3.27
21	Azerbaijan	4.01	4.24	4.03	3.92
22	Turkmenistan	4.00	3.85	3.27	4.03
23	Armenia	3.93	4.03	3.90	3.93
24	Syria	3.86	3.81	3.75	3.87
25	Morocco	3.85	3.57	3.54	3.91
26	Afghanistan	3.76	3.70	3.43	3.77
27	Iraq	3.67	3.15	3.50	3.75
28	India	3.62	3.46	3.10	3.67
29	Greece	3.60	3.14	3.29	3.64
30	Taiwan	3.52	3.65	2.93	2.76
31	Spain	3.51	3.34	3.50	3.57
32	Timor-Leste	3.45	2.51	2.97	3.50
33	Dominican Republic	3.44	3.15	3.26	3.52
34	Italy	3.42	3.45	3.64	3.30
35	Monaco	3.41	3.41	3.41	3.41
36	Belgium	3.39	3.38	3.45	3.13
37	Eritrea	3.34	2.38	3.61	3.32
38	Macedonia	3.34	3.27	3.27	3.45
39	Tajikistan	3.34	2.94	3.25	3.37
40	Mexico	3.32	2.66	2.70	3.51
41	Turkey	3.32	3.27	3.27	3.35
42	Tunisia	3.27	3.42	3.34	3.25
43	Australia	3.24	3.03	3.28	3.26
44	Peru	3.20	3.26	2.75	3.24
45	China	3.10	3.08	2.74	3.18
46	Portugal	3.06	3.16	3.23	2.98
47	Andorra	3.05	2.88	3.05	3.13
48	Algeria	3.04	3.41	2.96	2.95
49	United States	3.01	2.57	2.71	3.70
50	South Korea	2.92	3.32	2.99	2.78
51	South Africa	2.90	3.20	2.52	3.06
52	Chile	2.90	3.19	3.31	2.67
53	Indonesia	2.88	2.30	2.59	3.05
54	Ukraine	2.81	2.46	2.64	3.12
55	Luxembourg	2.80	2.79	2.81	2.79

Table A2 | **Aqueduct Country Water Stress Ranking for 2010 using Updated Aqueduct Global Maps 2.1 (continued)**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
56	Philippines	2.78	2.50	2.56	2.83
57	Cuba	2.76	2.65	2.59	2.85
58	Ireland	2.75	0.82	1.61	3.23
59	Sri Lanka	2.68	2.25	1.96	2.77
60	Japan	2.53	2.78	2.74	2.40
61	United Kingdom	2.52	2.33	2.62	2.90
62	Swaziland	2.41	1.79	1.80	2.46
63	Argentina	2.37	1.92	2.19	2.58
64	Germany	2.19	2.24	1.99	2.03
65	Nepal	2.19	2.34	2.29	2.19
66	Haiti	2.19	1.93	2.10	2.23
67	Moldova	2.12	2.26	2.06	1.96
68	Venezuela	2.07	1.80	2.33	1.75
69	Albania	2.07	2.16	2.26	1.90
70	France	1.98	2.09	1.88	1.60
71	North Korea	1.85	2.07	1.68	1.83
72	Georgia	1.82	1.75	1.59	1.96
73	Ecuador	1.79	1.24	1.45	1.86
74	Somalia	1.79	4.26	1.86	1.78
75	Namibia	1.75	3.36	1.71	1.57
76	Bulgaria	1.74	1.52	2.06	2.30
77	Thailand	1.72	1.40	1.41	1.76
78	Netherlands	1.68	1.69	1.57	1.70
79	Kosovo	1.66	1.69	1.64	1.58
80	Poland	1.65	1.67	1.53	1.85
81	Lithuania	1.60	1.60	1.62	1.54
82	Estonia	1.59	1.59	1.71	0.73
83	Czech Republic	1.54	1.59	1.46	1.60
84	Botswana	1.48	1.31	2.19	0.44
85	Russia	1.43	1.12	1.62	2.19
86	Malaysia	1.39	1.37	1.29	1.49
87	United Republic of Tanzania	1.38	0.79	0.38	1.64
88	Romania	1.34	1.32	1.59	1.07
89	Canada	1.21	1.17	0.73	2.71
90	Egypt	1.19	1.44	0.96	1.19
91	Lesotho	1.17	1.17	1.17	1.17
92	Angola	1.13	1.82	0.35	0.92
93	Sweden	1.12	1.28	0.89	0.75
94	Vietnam	1.09	1.30	1.18	1.07

Table A2 | **Aqueduct Country Water Stress Ranking for 2010 using Updated Aqueduct Global Maps 2.1 (continued)**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
95	Belarus	1.08	1.05	1.08	1.19
96	Madagascar	1.01	0.96	0.66	1.02
97	Switzerland	0.99	1.06	1.01	1.24
98	Sudan	0.95	0.76	1.00	0.97
99	Costa Rica	0.93	0.67	0.83	1.05
100	Hungary	0.91	0.84	0.97	1.14
101	Uruguay	0.85	1.02	1.13	0.75
102	Brazil	0.84	0.84	0.99	0.78
103	Djibouti	0.82	1.17	0.92	0.55
104	Ethiopia	0.81	0.80	0.53	0.85
105	New Zealand	0.78	0.54	0.79	0.81
106	Republic of Serbia	0.77	0.74	0.96	0.36
107	Kenya	0.76	0.81	0.47	0.86
108	Guyana	0.71	0.43	0.50	0.72
109	Guatemala	0.69	0.82	0.27	0.76
110	Finland	0.67	0.59	0.94	0.74
111	Bolivia	0.64	0.73	0.47	0.73
112	Zimbabwe	0.56	0.78	0.40	0.56
113	Belize	0.55	0.53	0.53	0.67
114	Gambia	0.54	0.89	0.53	0.01
115	Montenegro	0.51	0.62	0.45	0.61
116	Mozambique	0.49	1.26	0.35	0.45
117	Senegal	0.49	0.96	0.62	0.46
118	Denmark	0.48	0.46	0.65	0.21
119	Mauritania	0.47	3.37	0.89	0.36
120	Cambodia	0.46	0.21	0.42	0.47
121	Latvia	0.43	0.41	0.46	0.43
122	Liechtenstein	0.42	0.42	0.42	No data
123	Austria	0.41	0.39	0.35	1.30
124	Chad	0.37	0.19	0.07	0.69
125	Papua New Guinea	0.34	0.39	0.31	No data
126	Slovakia	0.33	0.27	0.43	0.29
127	Nigeria	0.33	0.10	0.21	0.61
128	Nicaragua	0.33	0.34	0.22	0.37
129	Norway	0.30	0.16	0.52	0.20
130	El Salvador	0.28	0.20	0.24	0.34
131	Mali	0.26	0.18	0.25	0.27
132	Suriname	0.26	0.01	0.01	0.30
133	Liberia	0.24	0.67	0.05	0.00

Table A2 | **Aqueduct Country Water Stress Ranking for 2010 using Updated Aqueduct Global Maps 2.1 (continued)**

RANK	NAME	ALL SECTORS	INDUSTRIAL	DOMESTIC	AGRICULTURAL
134	Bangladesh	0.22	0.20	0.23	0.21
135	Myanmar	0.21	0.49	0.23	0.19
136	Colombia	0.17	0.18	0.17	0.18
137	Ghana	0.16	0.31	0.18	0.08
138	Slovenia	0.15	0.15	0.13	0.17
139	Togo	0.14	0.57	0.17	0.00
140	Bosnia and Herzegovina	0.14	0.16	0.14	0.01
141	Niger	0.12	0.96	0.12	0.07
142	Croatia	0.09	0.10	0.09	0.03
143	Guinea	0.05	0.04	0.02	0.06
144	Ivory Coast	0.02	0.04	0.04	0.00
145	Laos	0.02	0.02	0.02	0.02
146	Honduras	0.02	0.01	0.01	0.02
147	Cameroon	0.01	0.00	0.02	0.00
148	Sierra Leone	0.01	0.03	0.01	0.00
149	Panama	0.00	0.00	0.00	0.01
150	Paraguay	0.00	0.01	0.00	0.00
151	Uganda	0.00	0.00	0.00	0.00
152	Burkina Faso	0.00	0.00	0.00	0.00
153	Benin	0.00	0.00	0.00	0.00
153	Bhutan	0.00	0.00	0.00	0.00
153	Brunei	0.00	0.00	0.00	0.00
153	Burundi	0.00	0.00	0.00	0.00
153	Central African Republic	0.00	0.00	0.00	0.00
153	Democratic Republic of the Congo	0.00	0.00	0.00	0.00
153	Equatorial Guinea	0.00	0.00	0.00	No data
153	Gabon	0.00	0.00	0.00	0.00
153	Guinea Bissau	0.00	0.00	0.00	0.00
153	Iceland	0.00	0.00	0.00	No data
153	Malawi	0.00	0.00	0.00	0.00
153	Republic of Congo	0.00	0.00	0.00	0.00
153	Rwanda	0.00	0.00	0.00	0.00
153	South Sudan	0.00	0.00	0.00	0.00
153	Zambia	0.00	0.00	0.00	0.00

ENDNOTES

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ABOUT WRI

World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity and human well-being.

Our Challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach

COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

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We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.