Thirst for change: Securing a water positive future

Water Security Indicator

By Royal Charter

BSI Water Security Indicator

The BSI Water Security Indicator – a tool created in partnership with Waterwise, is a new high-level indicator of the extent to which water is being used at a country scale; with a focus on municipal/public water supplies. It brings together publicly available data on water availability, water use, water risk and water wastage to derive an overall index score for each country. It provides an inter-country comparison showcasing, at a high level, where there may be opportunity for improvement.

The Indicator is designed to provide an inter-country comparison showcasing, at a high level, where there may be potential for improvement. The methodology has been applied to countries in Europe together with Australia, China, India, Japan and the US.

How the Indicator has been calculated

The Indicator has been calculated using publicly available data from a number of sources for seven key contributory factors pertinent to how water is being used, focusing on municipal/public water supplies.

For each of these contributory factors a scale of 1 to 5 has been developed by Waterwise[1], with 1 representing the best relative state, where countries have taken action already to accelerate progress towards a water secure future. The scores across the 7 factors are then added to give an overall Indicator score out of 35. The higher the Indicator score the greater the importance of the country taking action to ensure water security in its municipal or public water supply system. The scores linked to the 7 factors can help shed light on where action to accelerate progress could be focused.

The full Indicator is available at Appendix 3.

More detail on the scoring for each of the contributory factors is provided in Appendix 2.

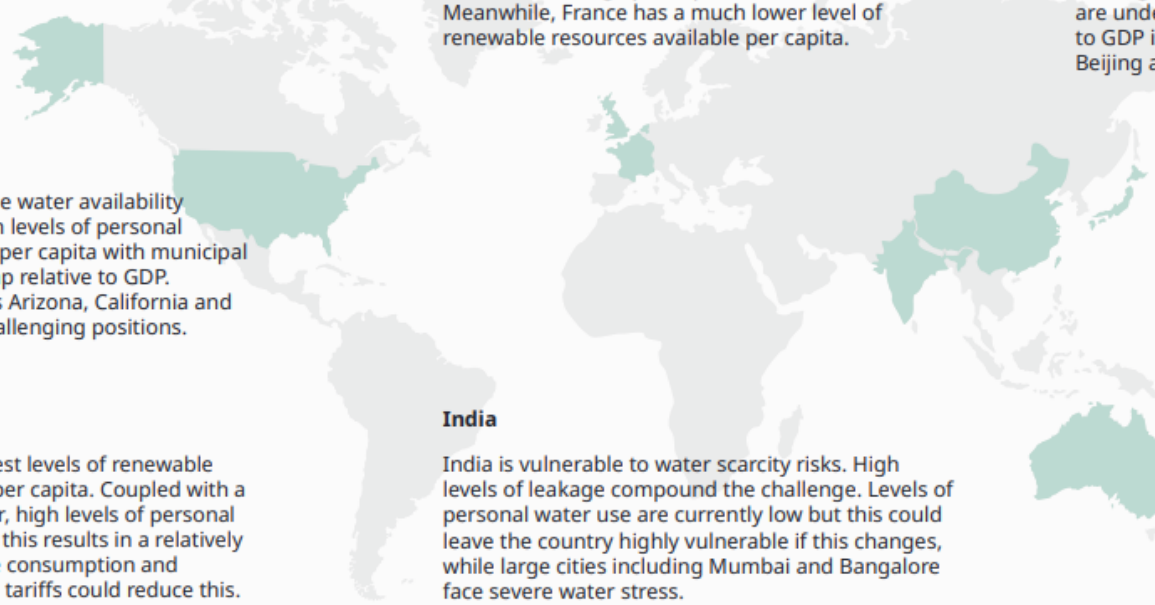
<15	<18	<21	<24	>24
Very low risk	Low risk	Medium risk	High risk	Very high risk

[1] For water scarcity risk we have used the 1 to 5 scale developed by WWF

Source: Thirst for change: Securing a water positive future, BSI & Waterwise, Water Security Indicator

Analysis of results

The varied scores allocated to different countries indicate the positive impact that can be had if countries collaborate to take action to enhance water security.



Europe

Both France and the Netherlands have mid-high range overall scores, although the Netherlands had the lowest leakage per capita across all countries. Meanwhile, France has a much lower level of renewable resources available per capita.

China

China scores highly, facing the twin challenge of low levels of renewable water available per capita and high levels of utilization. Its water resources are under pressure while the price of water relative to GDP is low. The cities of Chengdu, Tianjin, Xi'an, Beijing and Shanghai face severe water stress.

US

Whilst the US has moderate water availability challenges, it has very high levels of personal consumption and leakage per capita with municipal water also being very cheap relative to GDP. Additionally, states such as Arizona, California and New Mexico are in very challenging positions.

Japan

Relatively high levels of renewable water utilization and personal water consumption coupled with the low price of water relative to GDP result in a high Indicator score.

UK

The UK has one of the lowest levels of renewable water resources available per capita. Coupled with a relatively low price of water, high levels of personal consumption and leakage, this results in a relatively high score. Plans to reduce consumption and leakage and to trial pricing tariffs could reduce this.

India

India is vulnerable to water scarcity risks. High levels of leakage compound the challenge. Levels of personal water use are currently low but this could leave the country highly vulnerable if this changes, while large cities including Mumbai and Bangalore face severe water stress.

Australia

Surprisingly, Australia's score is lower than many European countries, including the UK, due largely to high levels of renewable water available per capita and low levels of its utilization.

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How the BSI Water Security Indicator – a tool created in partnership with Waterwise has been calculated

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Renewable water resources per capita

>20,000 <20,000 <10,000 <5,000 <1,000

- **Definition** – maximum theoretical yearly amount of water available for a country at a given moment per person
- **Source of data** – UN measure of total renewable water resources[1] for 2019 and UN population data[2] for 2021
- **Metric** – m^3 per person per year

Proportion of freshwater available being abstracted

<5% <10% <25% <50% >50%

- **Definition** – ratio of total freshwater withdrawal to total renewable freshwater resources, after taking into account environmental flow requirements
- **Source of data** – UN data[3] for 2019
- **Metric** – %

[1, 3] UN Water, UN, accessed July 2023
[2] World Population Prospects 2022, UN Department of Economic and Social affairs, accessed July 2023

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Water scarcity risk

1	2	3	4	5
1.0-1.8 Very low risk	1.8-2.6 Low risk	2.6-3.4 Medium risk	3.4-4.2 High risk	4.2-5.0 Very high risk

- **Definition** – WWF water scarcity risk score is a composite index derived from an aridity index; a water depletion score, baseline water stress score, a blue water scarcity score, an available water remaining score, a drought frequency probability score and a projected change in drought occurrence score
- **Source of data** – WWF water scarcity risk score for 2021[4]
- **Metric** – Score from 1 to 5

Water use efficiency

1	2	3	4	5
>$400	>$300	>$200	>$100	<$100

- **Definition** – overall value added from use of municipal water supplies by people and the economy
- **Source of data** – UN data[5] for 2019
- **Metric** – US$ per m^3

Price of water

1	2	3	4	5
<10,000	<20,000	<30,000	<35,000	>35,000

- **Definition** – a measure of the price of water relative to GDP per capita
- **Source of data** – IBNET data on the price of water[6], GDP per capita data from the World Bank[7] for 2021
- **Metric** – GDP per capita in US$ / price of water per m^3 in US$

4 WWF Risk Filter Suite, WWF, accessed July 2023
5 UN Water, UN, accessed July 2023
6 Tariff Benchmarking (Current USD), IB Net Tariffs, accessed July 2023. All data is 2021 other than China, India, Cyprus, Malta, Greece Luxembourg and Switzerland where "All Data" has been used
7 GDP per Capita, World Bank, accessed July 2023

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Personal consumption

1	2	3	4	5
<75	<100	<125	<150	>150

- **Definition** – personal water use in the home
- **Source of data** – International Water Association data[8] from 2019
- **Metric** – litres per person per day

Leakage

1	2	3	4	5
<5	<50	<75	<100	>100

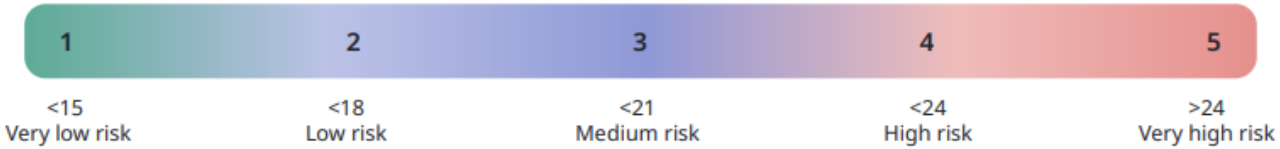
- **Definition** – levels of network leakage per person
- **Source of data** – International Water Association data[9] from 2019
- **Metric** – litres per person per day

[8,9] Quantifying the global non-revenue water problem, R. Liemberger; A. Wyatt, Water Supply, July 2018

Source: Thirst for change: Securing a water positive future, BSI & Waterwise, Water Security Indicator

The BSI Water Security Indicator

	Total renewable water resources per capita	Total freshwater withdrawal as a % of available freshwater resources	WWF 2021 Water Scarcity Score	Water use efficiency (municipal)	GDP per capita/ Price per m^3	Per capita consumption	Leakage per capita	Overall Indicator Score
Albania	10,552.06	6.80	2.88	28.18	6,834.63	72.00	185.00	**20.00**
Australia	19,072.72	4.23	2.98	261.29	20,558.88	200.00	30.00	**19.00**
Austria	8,716.63	9.64	1.68	376.38	23,422.58	125.00	29.00	**17.00**
Belgium	1,580.04	51.58	2.73	477.01	18,434.17	87.00	29.00	**18.00**
Bulgaria	3,070.05	40.08	2.81	43.94	9,474.03	98.00	135.00	**24.00**



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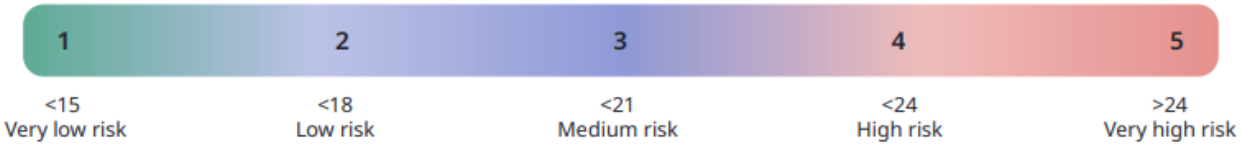
China	1,991.93	43.98	2.60	101.46	36,930.29	125.00	42.00	**26.00**
Croatia	25,864.18	1.49	1.62	76.41	8,002.40	125.00	23.00	**14.00**
Cyprus	628.53	31.57	3.93	157.29	17,336.15	230.00	61.00	**27.00**
Czech Republic	1,249.52	22.90	2.14	200.37	12,247.12	83.00	23.00	**17.00**
Denmark	1,027.22	25.57	1.89	588.61	19,655.43	128.00	12.00	**18.00**
Estonia	9,628.57	10.89	2.31	230.19	22,177.54	107.00	93.00	**21.00**
Finland	19,877.12	7.11	1.61	320.17	20,095.43	120.00	28.00	**15.00**



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The BSI Water Security Indicator continued

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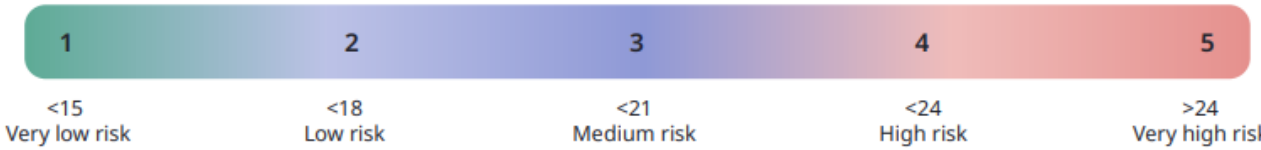
France	3,271.22	23.00	2.50	354.33	17,966.67	147.00	34.00	**19.00**
Germany	1,846.74	33.50	2.31	225.81	16,358.98	110.00	25.00	**20.00**
Greece	6,526.09	20.46	3.48	89.01	17,407.41	97.00	42.00	**21.00**
Hungary	10,687.49	7.71	1.91	132.84	16,872.16	84.00	52.00	**17.00**
Iceland	460,704.61	0.39	1.65	178.52	35,983.04	120.00	28.00	**17.00**
Ireland	10,469.10	21.57	2.95	260.66	No charge per m³	149.00	65.00	**23.00**
India	1,362.20	66.49	3.41	24.84	18,805.00	94.00	86.00	**26.00**



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The BSI Water Security Indicator continued

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Italy	3,222.65	29.75	2.95	138.80	24,935.31	120.00	52.00	**23.00**
Japan	3,441.46	36.05	1.60	218.72	34,484.82	224.00	32.00	**23.00**
Latvia	18,516.16	1.05	1.79	232.66	18,715.22	120.00	52.00	**16.00**
Lithuania	8,734.40	1.83	1.98	223.45	16,945.21	70.00	26.00	**14.00**
Luxembourg	5,511.81	4.09	1.79	1,176.93	43,233.04	120.00	28.00	**17.00**
Malta	96.93	81.00	4.10	266.32	10,147.48	120.00	52.00	**25.00**
Netherlands	5,209.82	17.00	2.26	304.54	27,907.20	126.00	9.00	**18.00**

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North Macedonia	3,036.05	2.05	2.80	21.41	11,157.67	128.00	255.00	**24.00**
Norway	72,885.76	31.10	1.45	317.97	32,538.07	200.00	165.00	**22.00**
Poland	1,576.38	12.32	2.02	163.45	12,857.07	119.00	32.00	**20.00**
Portugal	7,516.02	6.01	3.36	171.47	14,119.25	161.00	47.00	**21.00**
Romania	10,931.73	6.33	2.15	122.36	12,079.84	91.00	122.00	**19.00**
Serbia	22,122.20	2.40	1.83	37.83	13,573.82	143.00	120.00	**20.00**
Slovakia	9,182.55	6.38	2.04	208.73	12,437.15	83.00	50.00	**17.00**

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Slovenia	15,040.11	39.83	1.52	175.22	21,859.25	104.00	45.00	**19.00**
Spain	2,352.42	3.55	3.75	208.50	19,297.12	141.00	61.00	**21.00**
Sweden	16,703.47	6.50	1.50	387.70	20,548.38	145.00	126.00	**19.00**
Switzerland	6,169.99	45.71	2.00	577.16	31,078.24	142.00	33.00	**20.00**
Turkey	2,505.36	38.70	3.35	89.19	16,102.00	95.00	177.00	**25.00**
UK	2,188.54	14.35	1.62	366.48	21,237.58	149.00	52.00	**20.00**
US	5,678.82	28.16	2.21	282.67	36,779.37	379.00	123.00	**27.00**

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<15	<18	<21	<24	>24
Very low risk	Low risk	Medium risk	High risk	Very high risk

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