

Thirst for change

Water Security & Solutions Indicator 2024

In partnership with Waterwise



The BSI Water Security and Solutions Indicator





The BSI Water Security and Solutions Indicator 2024 is a high-level index exploring use of water at a country scale; with a focus on municipal/public water supplies. It brings together two elements, the first focusing on the challenge (drawing on publicly available data on water availability, water use, water risk and water wastage). The second part looks at solutions, with a specific focus on the infrastructure in place and on public attitudes, as gathered from a poll of 9,000 people in nine countries.

The lower the challenge score, the lower the level of water security risk for that country. The lower the solutions score, the fewest barriers to solutions and progress for that country i.e. the better placed the country is to implement the solutions that can help address the challenge.

Both provide an inter-country comparison for the target countries showcasing, at a high level, where progress is underway to address water insecurity, and where there may be potential for improvement.

Country Australia China India Japan US UK France Germany The Netherlands



Figure 1: The BSI Water Security and Solutions Indicator

Challenge	Solutions	Overall Water Security & Solutions Score
18	21	39
27	23	50
27	25	52
24	24	48
27	26	53
20	22	42
19	18	37
20	21	41
20	20	40

Key for Overall Water Security & Solutions Score*

<30	<38	<46	≤54	>5
Very low	Low	Medium	High	Very

Very low indicates lowest water insecurity and greatest progress towards solutions

*Challenge and Solution component keys are available in the Methodology



Analysis of results

India Overall: 52/85 High

Like China, India has low levels of renewable water available per capita and high levels of utilization. It is particularly vulnerable to water scarcity risks, with high levels of leakage compounding the problem. Levels of personal water use in India are currently low but this means the country is very vulnerable if personal consumption levels increase and the large cities of Chennai; Hydrabad; Kolkata; Delhi; Mumbai and Bangalore are known to face severe water stress.¹

City with highest levels of water stress worldwide as of 2018, by score*, Statista, accessed September 2024

China Overall: 50/85 High

China faces the major twin challenge of having low levels of renewable water available per capita and high levels of utilization. Its water resources are under pressure, as the price of water relative to GDP is low. In China the cities of Chengdu; Tianjin; Xi'an; Beijing and Shanghai are known to face severe water stress². Despite the above challenges the government and public in both China and India appear to be relatively confident that they have the solutions in place, although executives surveyed for the World Economic Forum³ are much more sceptical and the country is further behind in terms of climate change adaptation readiness.

2 City with highest levels of water stress worldwide as of 2018, by score, Statista, accessed September 2024







Australia Overall 39/85 Medium

Somewhat surprisingly, given its natural environment, Australia's Challenge Index 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 utilization. The data indicates that Australians are also confident their country has the necessary infrastructure in place to maintain water security and believe positive action is being taken to reduce water wastage. This may be due in part to the visibility of water saving measures like the mandatory product water label and actions taken in the Millennium drought⁴.



WEF Global Competitiveness Index 4.0, World Economic Forum, accessed August 2024

The Millennium Drought in southeast Australia (2001–2009): Natural and human 4 causes and implications for water resources, ecosystems, economy, and society, Agu, February 2013

US Overall: 53/85 High

Whilst the US has moderate water availability challenges overall it scores poorly due to its very high levels of personal consumption and leakage per capita with municipal water also very cheap relative to GDP. Furthermore, some parts of the US, such as Arizona, California and New Mexico, are in a very challenging position. Of global mega cities Los Angeles is consistently identified as facing severe water stress⁵. There is scepticism from the public that the government has the right water security plan in place or that positive action is being taken to reduce water wastage. The USA also scores relatively poorly when it comes to having sufficient financing in place to deal with its water management challenges.

5 <u>City with highest levels of water stress worldwide as of 2018, by score</u>*, Statista, accessed September 2024

Japan Overall: 48/85 High

Japan appears to be making greater progress on water security than other countries such as China. In 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 score. There appears to be a disconnect between what the country reports back to the UN in terms of having solutions in place and what the public believe is in place. Results from the public survey have Japan scoring very low when asked whether people believe their government has the right water scarcity plan in place and they are also deeply sceptical action is being taken to reduce water wastage - despite Japan having relatively low levels of network leakage.





Europe

Germany, France and the Netherlands are similar to the UK, albeit with differences in the detail. Germany has the lowest level of renewable freshwater per capita but has lower levels of water consumption and leakage and is further ahead when it comes to water reuse. The Netherlands has more water available per person which might partly explain why their water appears to be significantly cheaper relative to GDP than France, Germany and the UK. They also have an exceptionally low level of leakage. Interestingly the public in France, Germany and the Netherlands has a much greater confidence that they have the necessary infrastructure to maintain water security than their counterparts in the UK, although the Dutch appear more reticent about shifting consumer behaviour to save water.

France Overall: 37/85 Low

Germany Overall: 41/85 Medium

The Netherlands Overall: 40/85 Medium



UK Overall: 42/85 Medium

The UK has one of the lowest levels of renewable water resources available per capita and coupled with a relatively low price of water, high levels of personal consumption and of leakage this results in a relatively high overall Index score. Plans to reduce consumption and leakage and to trial pricing tariffs have the potential to drive progress, however it is notable that the public appear to have limited confidence that the UK is taking positive action to reduce water wastage. They are also sceptical that there is a suitable plan for water security in place, or that the country has the necessary infrastructure in place. The UK also scores relatively poorly when it comes to having sufficient financing in place to deal with water management challenges.



Methodology







The **BSI Water Security and Solutions Indicator 2024 comprises two element**s, as follows:

- The **Challenge**: An assessment of publicly available data on water availability, water use; water risk and water wastage to derive an overall Challenge score for each country. This was originally developed in 2023 and has been updated for all countries for 2024.
- The Solutions: An assessment of information on whether the potential water availability solutions are believed to be in place, drawing on data provided to the UN and on a public attitude survey undertaken by BSI, to derive an overall score. This has been developed for nine key markets.

Taken together, the overall scores provide an inter-country comparison showcasing, at a high level, where there may be potential for improvement. The lower the challenge score, the lower the level of water security risk for that country. The lower the solutions score, the fewest barriers to solutions and progress for that country i.e. the better placed the country is to implement the solutions that can address the challenge.



Thirst for change: Accelerating progress to a water secure world

©2024 BSI. All rights reserved.



The Challenge

This component of the indicator has been calculated using publicly available data across seven key contributory factors, pertinent to whether water is being used wisely at a country scale, and focusing on municipal/public water supplies.

For each of these contributory factors a scale of one to five has been developed by Waterwise¹⁴ with one representing the best relative state. The scores are then added together to give an overall score out of 35. The lower the overall score, the lower the level of water security risk for the country. The higher the overall score, the greater the importance of the country taking action to ensure water is being used wisely.

Renewable water resources per capita 1



Definition - maximum theoretical yearly amount of water available for a country at a given moment per person.

Source - UN measure of total renewable water resources¹⁵ and UN population data¹⁶.

Metric - m3 per person per year.

14 For Water scarcity risk we have used the 1 to 5 scale developed by WWF



August 2024





Proportion of freshwater available being 2 abstracted



Definition - ratio of total freshwater withdrawal to total renewable freshwater resources, after taking into account environmental flow requirements.

Source - UN data¹⁷ for 2021.

Metric - %.





Water scarcity risk 3



4 Water use efficiency



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 - WWF water scarcity risk score for 2021¹⁸.

Metric - Score from 1 to 5.

Definition - overall value added from use of municipal water supplies by people and the economy.

Source - UN data¹⁹ for 2021.

Metric - \$ per m³.

WWF Risk Filter Suite, WWF, accessed August 2024 18



Thirst for change: Accelerating progress to a water secure world

UN Water, UN, accessed August 2024 19





5 Price of water



Definition - a measure of the price of water relative to GDP per capita.

Source - International Benchmarking Network data on the price of water²⁰, GDP per capita data from the World Bank²¹ for 2022.

Metric - GDP per capita in \$ / Price of water per m³ in \$.

Tariff Benchmarking (Current USD), IB Net Tariffs, accessed August 2024. 2022 data other 20 than China, India and Japan where 2021 or "All Data" used

GDP per Capita, World Bank, accessed August 2024 21









Definition - personal water use in the home. **Source** - International Water Association data²² from 2019.

Metric - litres per person per day.

6 Personal consumption

Definition - levels of network leakage per person.
Source - International Water Association data²³ from 2019.
Metric - litres per person per day.

22 <u>Quantifying the global non-revenue water problem</u>, R. Liemberger; A. Wyatt, Water Supply, Water Supply, 2019

23 <u>Quantifying the global non-reve</u> Water Supply, 2019





23 Quantifying the global non-revenue water problem, R. Liemberger; A. Wyatt, Water Supply,



The Solutions

This component has been calculated using data from a number of sources assessing 10 key contributory factors pertinent to whether the solutions to the water availability challenge are thought to be in place or in planning. The data is either from publicly available sources or is drawn from a public attitude survey that BSI commissioned in the target countries.

The lower the score, the greater the position the country is thought to be in in terms of progressing solutions to the water availability challenge. The higher the score, the greater the importance the country takes action on solution development and adoption. More detail on how the scoring has been derived for each of the 10 contributory factors is provided below.

Reliability of water supply



Definition – In your country, how reliable is the water supply (lack of interruptions and flow fluctuations)?

Source - World Economic Forum, Executive Opinion Survey²⁴.

Metric - 1 = extremely unreliable; 7 = extremely reliable.

24





Enabling Policy Environment 2



Definition - In an enabling environment, national and subnational policies and laws set out the importance of integrated approaches to water resources management. Plans are developed to operationalize policy and regulatory frameworks.

Source - UN IWRM Portal data²⁵ for 2023.

Metric - % rating.

IWRM Data Portal, UNEP-DHI Centre on Water and Environment, accessed August 2024 25



3 Institutions and Participation



4 Data collection



Definition - Appropriate institutions and stakeholder participation across sectors is seen at all levels to implement plans and enforce regulations.

Source - UN IWRM Portal data²⁶ for 2023.

Metric - % rating.

Definition - Data and information is collected and provided to all relevant stakeholders to allow for informed decision-making, covering aspects such as sustainable use, pollution control, ecosystem management and disaster risk reduction.

Source of data - UN IWRM Portal data²⁷ for 2023.

Metric - % rating.

IWRM Data Portal, UNEP-DHI Centre on Water and Environment, accessed August 2024 26





Thirst for change: Accelerating progress to a water secure world



5 Financing



Definition - Budgets at the national and local level are made available for investments and ongoing infrastructure and management costs.

Source - UN IWRM Portal data²⁸ for 2023.

Metric - % rating.

IWRM Data Portal, UNEP-DHI Centre on Water and Environment, accessed August 2024 28

Climate change readiness 6





Definition - Readiness measures a country's ability to leverage investments and convert them to adaptation actions. ND-GAIN measures overall readiness by considering three components – economic readiness, governance readiness and social readiness.

Source – Notre Dame Global Adaptation Initiative rankings data²⁹ for 2023.

Metric – Index score.

Definition - How confident are you that your government has the right water security plan in place?

Source of data – BSI / Burson public opinion polling 2024.

Metric - % scoring very confident or fairly confident.

ND-GAIN Country Index, University of Notre Dame, accessed August 2024 29



Thirst for change: Accelerating progress to a water secure world



8 **Confidence in water security infrastructure**



Definition - How confident are you in your country having the necessary infrastructure to maintain water security?

Source of data – BSI / Burson public opinion polling 2024.

Metric - % scoring very confident or fairly confident.





Confidence water wastage is being tackled

10 Willingness to change consumer behaviour



Definition - How confident are you that your country is taking positive action to reduce water wastage?

Source of data – BSI / Burson public opinion polling 2024.

Metric - % scoring very confident or fairly confident.

Definition – I would be willing to change my consumer habits to support businesses demonstrating positive action on water efficiency, but only if it comes at no extra cost.

Source of data – BSI / Burson public opinion polling 2024.

Metric - % scoring strongly agree or agree.





Table with full results

				Chall	enge			
Country	Renewable water resources per capita	Proportion of freshwater available being abstracted	Water scarcity risk	Water use efficiency	Price of water	Personal consumption	Leakage	Overall Challenge Score (2024)
Australia	18,938.42	4.60	2.98	393.45	25,038.40	200	30	18
China	2,011.24	41.52	2.6	88.28	37,412.40	125	42	27
India	1,348.39	66.49	3.41	24.84	20,090.73	94	86	27
Japan	3,436.56	36.05	1.6	217.34	44,178.28	224	32	24
US	9,208.26	28.16	2.21	291.53	36,347.42	379	123	27
UK	2,194.97	14.35	1.62	360.16	22,175.60	149	52	20
France	3,105.88	21.60	2.5	351.20	19,285.97	147	34	19
Germany	1,831.59	35.35	2.31	217.52	16,403.36	110	25	20
The Netherlands	5,140.35	16.08	2.26	292.16	30,494.66	126	9	20



Very low indicates lowest water insecurity, very high indicates highest water insecurity



Key for overall challenge score (2024)



						Solutions					
Country	Reliability of Water Supply	Enabling Policy Environment	Institutions and Participation	Data Collection	Financing	Climate Change Readiness	Public Survey – Confidence in the Water Security Plan	Public Survey – Confidence in Water Security Infrastructure	Public Survey – Confidence that Water Wastage is being Tackled	Public Survey – Willingness to Change Consumer Behaviours	Overall Solu Score
Australia	6.47	85	86	81	86	0.691	69	79	71	74	21
China	4.89	84	79	82	78	0.554	76	80	78	78	23
India	4.35	76	76	76	73	0.389	79	81	78	82	25
Japan	6.67	100	96	94	90	0.69	30	38	27	60	24
US	6.16	84	77	78	68	0.656	60	67	59	70	26
UK	6.44	86	85	76	68	0.685	53	63	52	75	22
France	6.45	100	100	100	100	0.653	60	73	59	76	18
Germany	6.1	94	85	87	85	0.692	63	78	65	74	21
The Netherlands	6.9	87	92	87	95	0.687	66	77	60	67	20

Overall solutions score



Very low indicates greatest progress towards solutions, very high indicates greatest barriers towards solutions



_







Figure 5: The BSI Water Security and Solutions Indicator

Country	Challenge	Solutions	Overall Water Security & Solutions Score
Australia	18	21	39
China	27	23	50
India	27	25	52
Japan	24	24	48
US	27	26	53
UK	20	22	42
France	19	18	37
Germany	20	21	41
The Netherlands	20	20	40

Key for Overall Water Security & Solutions Score*

<30	<38	<46	≤54	>54
Very low	Low	Medium	High	Very high

Very low indicates lowest water insecurity and greatest progress towards solutions

* Challenge and Solution component keys are available on pages 25 & 26



Thirst for change: Accelerating progress to a water secure world



BSI Water Security Indicator 2024

Full country list

This provides an update to the Indicator produced in 2023, which rated countries on the water security challenge. In a number of areas updated data became available, including total renewable resources per capita; freshwater withdrawal as a % of available freshwater resources; water use efficiency and water pricing relative to GDP.

This update allows us to start to look at temporal trends. For example, Australia's Challenge score fell by one point as a result of improvements in water use efficiency, whilst the opposite was true for China. Both India and Japan saw their scores worsen slightly based on a lowering of the price of water relative to GDP. The Netherlands' score dropped by two points, impacted by both a reduction in water use efficiency and in the price of water relative to GDP.





Thirst for change: Accelerating progress to a water secure world





The BSI Water Security Indicator 2024 in full

Country	Total renewable resources per capita ³⁰³¹	Total freshwater withdrawal as a % of available freshwater resources ^{32 33}	WWF 2021 Water Scarcity Score ^{34 35}	Water use efficiency (municipal) ^{36 37}	GDP per capita/ Price per m3 ³⁸	Per capita consumption ^{39 40}	Leakage per capita ⁴¹	Overall Water Security Score (2024) And change from 2023 score
Albania	10,880.40	4.78	2.88	31.27	12,849.27	72	185	19 (-1) ⁴²
Australia	18,938.42	4.60	2.98	393.45	25,038.40	200	30	18 (-1) ⁴³
Austria	8,592.73	8.68	1.68	326.30	23,674.86	125	29	17
Belgium	1,568.20	51.88	2.73	478.90	20,213.29	87	29	20 (+2)44
Bulgaria	3,294.61	37.52	2.81	47.47	8,734.03	98	135	24
China	2,011.24	41.52	2.6	88.28	37,412.40	125	42	27 (+1) ^{45 46}
Croatia	27,374.16	1.48	1.62	85.52	9,378.99	125	23	14
Cyprus	623.26	32.12	3.93	175.59	12,373.84	230	61	27
Zzech Republic	1,249.28	20.51	2.14	210.01	12,546.83	83	23	17
Denmark	1,016.43	26.40	1.89	586.48	22,081.45	128	12	19 (+1) ⁴⁷
Estonia	9,522.83	10.82	2.31	266.03	23,737.06	107	93	21
Finland	19,795.28	7.11	1.61	321.27	21,285.33	120	28	15

Key for Overall Water Security Score*



bsi

Thirst for change: Accelerating progress to a water secure world

very low indicates lowest level of water insecurity, very high indicates highest level of water insecurity

—



Country	Total renewable resources per capita ³⁰³¹	Total freshwater withdrawal as a % of available freshwater resources ^{32 33}	WWF 2021 Water Scarcity Score ^{34 35}	Water use efficiency (municipal) ^{36 37}	GDP per capita/ Price per m3 ³⁸	Per capita consumption ^{39 40}	Leakage per capita ⁴¹	Overall Water Security Score (2024) And change from 2023 score
France	3,105.88	21.60	2.5	351.20	19,285.97	147	34	19
Germany	1,831.59	35.35	2.31	217.52	16,403.36	110	25	20
Greece	6,473.27	20.68	3.48	86.62	8,056.86	97	42	20 (-1) ⁴⁸
Hungary	10,739.91	8.07	1.91	134.90	19,989.33	84	52	17
Iceland	445,142.71	0.39	1.65	173.82	40,145.78	120	28	17
India	1,348.39	66.49	3.41	24.84	20,090.73	94	86	27 (+1) ⁴⁹
Ireland	10,222.16	22.21	2.95	249.42	No charge per m3	149	65	23
Italy	3,250.26	29.65	2.95	137.88	27,383.01	120	52	24 (+1) ⁵⁰
Japan	3,436.56	36.05	1.6	217.34	44,178.28	224	32	24 (+1) ⁵¹
Latvia	18,551.76	1.07	1.79	233.99	19,445.99	120	52	16
Lithuania	8,648.08	1.83	1.98	235.90	19,430.08	70	26	14
Luxembourg	5,378.21	3.96	1.79	1,166.86	40,455.02	120	28	17
Malta	96.48	78.28	4.1	304.43	10,341.67	120	52	24 (-1) ⁵²
The Netherlands	5,140.35	16.08	2.26	292.16	30,494.66	126	9	20 (+2) ⁵³

Key for Overall Water Security Score*





Thirst for change: Accelerating progress to a water secure world

very low indicates lowest level of water insecurity, very high indicates highest level of water insecurity



Country	Total renewable resources per capita ³⁰³¹	Total freshwater withdrawal as a % of available freshwater resources ^{32 33}	WWF 2021 Water Scarcity Score ^{34 35}	Water use efficiency (municipal) ^{36 37}	GDP per capita/ Price per m3 ³⁸	Per capita consumption ^{39 40}	Leakage per capita ⁴¹	Overall Water Security Score (2024) And change from 2023 score
North Macedonia	3,110.30	37.97	2.8	29.91	13,182.94	128	255	27 (+3) ⁵⁴
Norway	72,015.92	2.01	1.45	322.10	44,929.42	200	165	20 (-2) ⁵⁵
Poland	1,610.69	32.08	2.02	173.14	13,253.90	119	32	21 (+1) ⁵⁶
Portugal	7,457.36	12.32	3.36	164.33	16,564.37	161	47	22 (+1) ⁵⁷
Romania	11,183.93	7.36	2.15	109.38	13,848.07	91	122	19
Serbia	23,993.77	5.69	1.83	39.37	16,444.28	143	120	21 (+1) ⁵⁸
Slovakia	9,223.54	2.44	2.04	205.23	15,982.56	83	50	16 (-1) ⁵⁹
Slovenia	15,113.35	6.29	1.52	182.42	23,699.45	104	45	17 (-2) ⁶⁰
South Africa	857.35	66.89	3.41	67.95	5,165.27	270	128	30 ⁶¹
Spain	2,341.70	43.25	3.75	192.70	21,348.59	141	61	26 (+5) ⁶²
Sweden	16,592.06	3.58	1.5	548.87	23,510.12	145	126	17 (-2) ⁶³
Switzerland	6,100.52	6.50	2	611.43	33,546.73	142	33	18 (-2) ⁶⁴
Türkiye	2,479.46	43.38	3.35	90.48	62,791.20	95	177	28 (+3) ⁶⁵
UK	2,194.97	14.35	1.62	360.16	22,175.60	149	52	20
US	9,208.26	28.16	2.21	291.53	36,347.42	379	123	27 ⁶⁶

Key for Overall Water Security Score*

<15	<18
Very low	Low



Thirst for change: Accelerating progress to a water secure world

very low indicates lowest level of water insecurity, very high indicates highest level of water insecurity





Endnotes

- 30 Maximum theoretical yearly amount of water available for a country at a given moment per person
- 31 2020
- 32 Ratio of total freshwater withdrawal to total renewable freshwater resources, after taking into account environmental flow requirements.
- 33 2021
- 34 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 Occurence score
- 35 2021
- 36 Overall value added from use of municipal water supplies by people and the economy
- 37 2021
- 38 2023
- 39 Personal water use in the home
- 40 2019
- 41 2019
- 42 Improvement in Total renewable resources per capita (E), Total freshwater withdrawal as a % of available freshwater resources (H) and GDP per capita/Price per m3 (V)
- 43 Improvement in Water use efficiency (municipal) (R)

- 44 Decline in Total freshwater withdrawal as a % of availal freshwater resources (H), Overall water use efficiency (and GDP per capita/Price per m3 (V)
- 45 Decline in Water use efficiency (municipal) (R)
- 46 Cities known to face high water stress <u>source</u> and <u>source</u>: Chengdu; Tianjin; Xi'an; Beijing; Shanghai
- 47 Decline in GDP per capita/Price per m3 (V)
- 48 Improvement in GDP per capita/Price per m3 (V)
- 49 Decline in GDP per capita/Price per m3 (V)
- 50 Decline in Total freshwater withdrawal as a % of availal freshwater resources (H)
- 51 Decline in GDP per capita/Price per m3 (V)
- 52 Improvement in Water use efficiency (municipal) (R)
- 53 Decline in Water use efficiency (municipal) (R) and GDI per capita/Price per m3 (V)
- 54 Decline in Total freshwater withdrawal as a % of availal freshwater resources (H)
- 55 Improvement in Total freshwater withdrawal as a % of available freshwater resources (H)
- 56 Decline in Total freshwater withdrawal as a % of availal freshwater resources (H)
- 57 Decline in Total freshwater withdrawal as a % of availal freshwater resources (H)
- 58 Decline in Total freshwater withdrawal as a % of available freshwater resources (H)



ible (L)	59	Improvement in Total freshwater withdrawal as a % of available freshwater resources (H)
	60	Improvement in Total freshwater withdrawal as a % of available freshwater resources (H)
	61	New entry – a record high score
	62	Decline in Total freshwater withdrawal as a % of available freshwater resources (H), Water use efficiency (municipal) (R) and GDP per capita/Price per m3 (V)
ible	63	Improvement in Total freshwater withdrawal as a % of available freshwater resources (H) and Water use efficiency (municipal) (R)
	64	Improvement in Total freshwater withdrawal as a % of available freshwater resources (H)
P	65	Cities known to face high water stress – <u>source</u> and <u>source:</u> Istanbul
	66	Cities known to face high water stress – <u>source</u> and
ble		source: Los Angeles, New York
f		
ble		
ble		

©2024 BSI. All rights reserved.





Find out more

bsigroup.com/en-GB/insights-and-media/ campaigns/thirst-for-change

BSI Group 389 Chiswick High Road London, W4 4AL United Kingdom +44 345 080 9000 bsigroup.com

