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Thirst for change

Accelerating progress to a water secure world 2024

In partnership with waterwise

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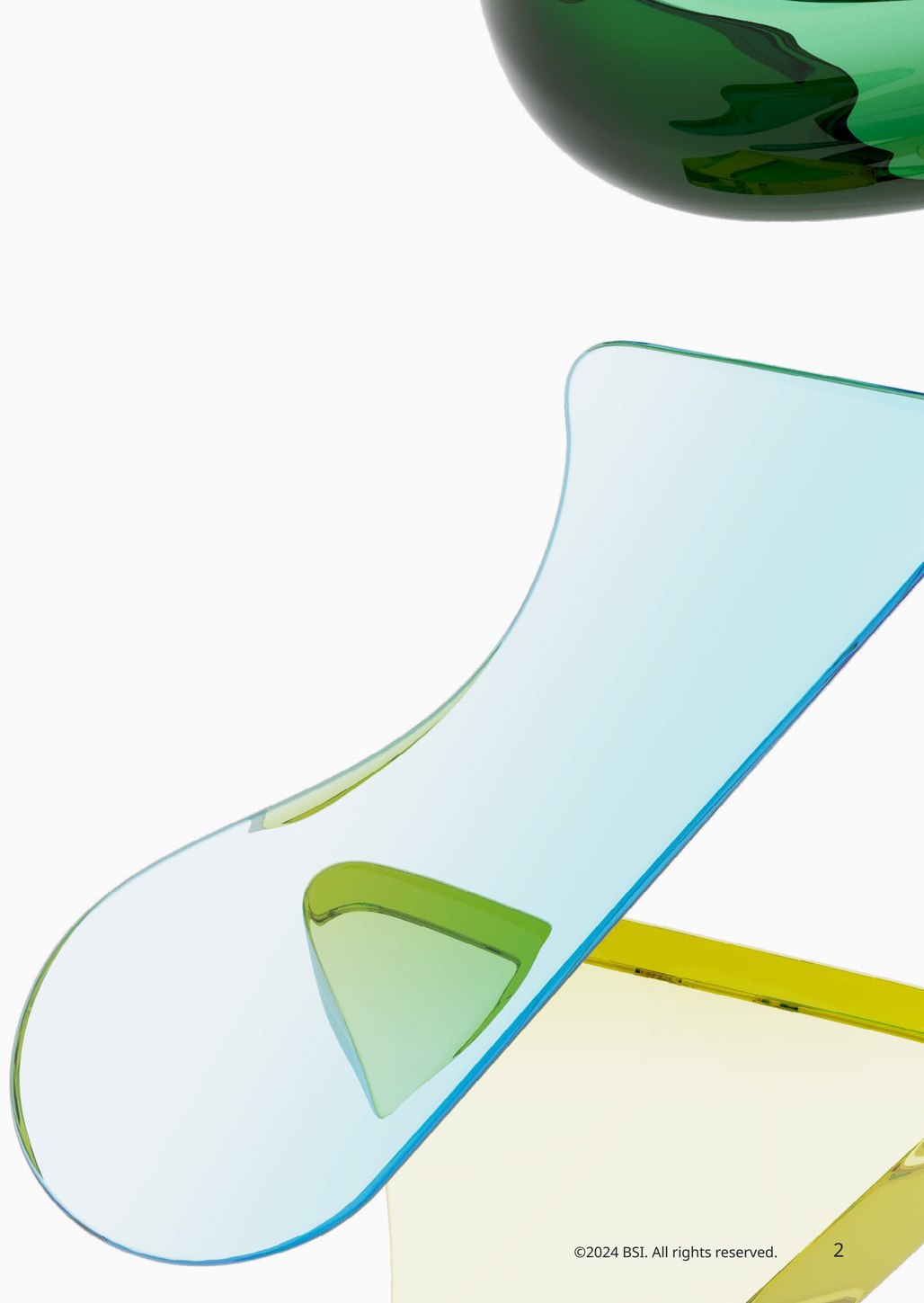


Foreword

Susan Taylor Martin
Chief Executive, BSI

Just over a year ago, BSI partnered with Waterwise to publish the first report in our Thirst for Change series, an in-depth study exploring the critical global issue of water security and examining how individuals, organizations and society could play a role in addressing it. We were proud then to draw attention to this important issue, which is as significant a challenge as climate change, and to highlight what steps we can take to improve the situation.

The stark reality is that in the year since we published the study, this issue has only become more important. Put simply, a combination of population growth, climate change and economic development is driving increasing demand and putting growing pressure on our supply of water. This is more pronounced in some countries, regions or indeed in different sectors, but it is an issue that is relevant to us all.

Water security in its simplest form means society having reliable access to enough freshwater of sufficient quality for survival and for life to continue as it needs to – for example for people to remain healthy, for ecosystems to be preserved, and for society to function sustainably. As part of the research we published last year, Waterwise produced a Water Security Indicator, ranking 40 countries on various metrics related to water sustainability. To understand how the picture has changed, this has now been updated.
But we wanted to go further and explore not only the challenge facing different countries, but the progress being made to respond. The new BSI Water Security and Solutions Indicator 2024 brings together information on both the potential water availability solutions in place and public attitudes to the topic, drawing on data provided to the UN and an opinion poll covering 9,000 people globally.

The results show China, India and the US experiencing a particularly significant water security challenge, reflecting not only the scale of water insecurity in those countries, but slower progress in terms of infrastructure or public engagement with solutions. France and Australia present a more promising picture in this regard. The data should not be taken as a criticism of certain countries, but as a call to action for us all to respond to the water security challenge domestically and as global citizens. This is a global issue, and one for us all to play an active role in addressing.

Ultimately, at BSI we believe it is possible for individuals and organizations to come together to accelerate progress towards a fair society and a sustainable world, one in which the supply of fresh water can keep up with the growing demands. It is heartening to see, for example, that 60% globally think that water security is an important issue. Recognition of the challenge is essential to pave the way for action.

What's clear is there is a huge challenge ahead. Action now, to better manage our use of water, is as vital to people and the planet as tackling the climate crisis. There’s no silver bullet, but there are actions we can and should be taking today. From water efficiency labelling so consumers can make sustainable choices, to innovative farming practices, and better waste water management in pharmaceutical development, there is much we can do as individuals, organizations and society.

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.

Figure 1: 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

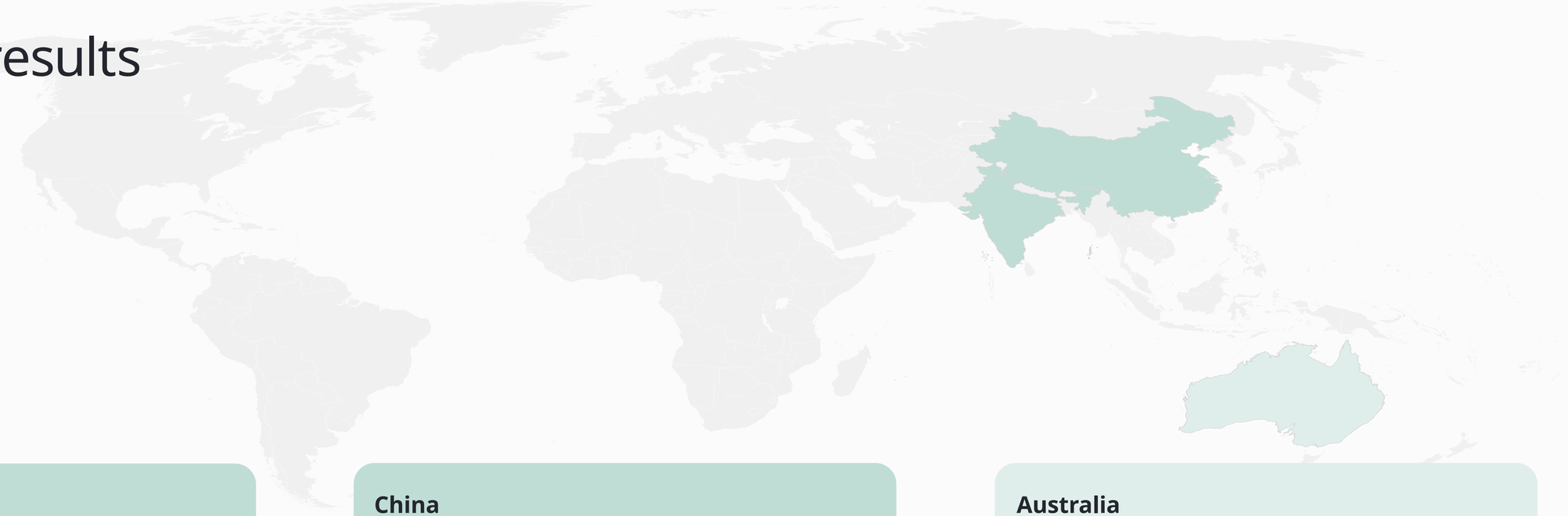
Key for Overall Water Security & Solutions Score*

<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 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]

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 stress[2]. 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 Forum[3] are much more sceptical and the country is further behind in terms of climate change adaptation readiness.

Australia
Overall 39/85 Medium

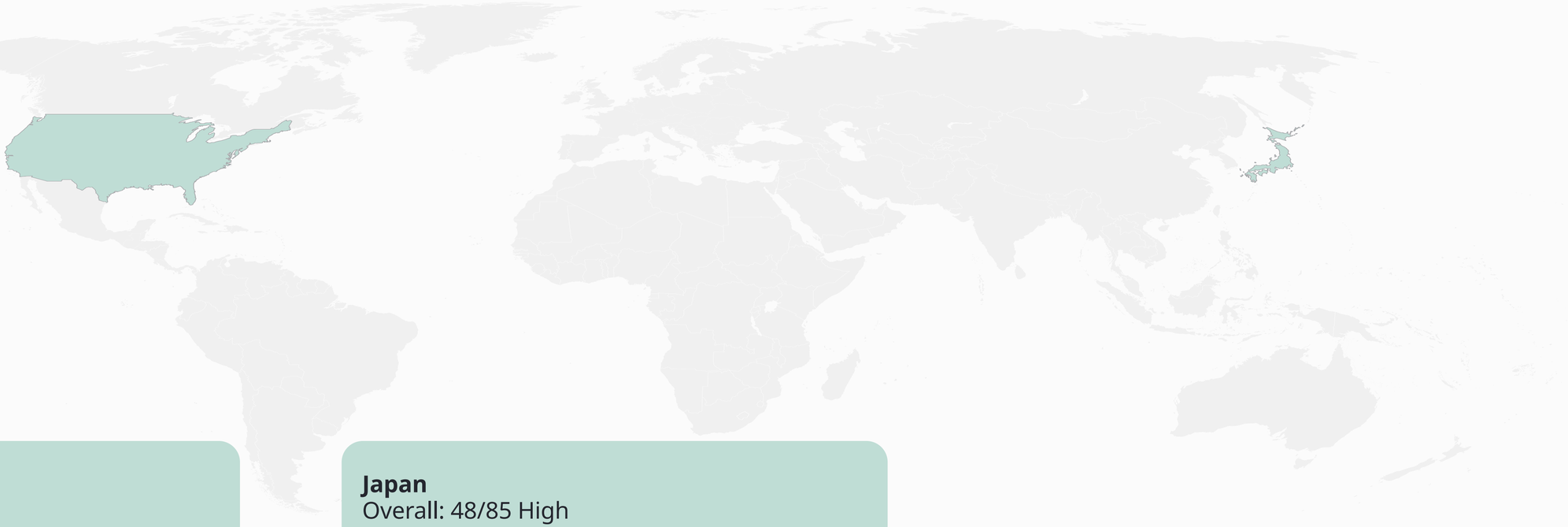
Somewhat surprisingly, given its natural environment, Australia's Challenge Index score is lower than many European countries including the UK, due largely to high levels of renewable water available per capita and low levels of utilization. The data indicates that Australians are also confident their 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 drought[4].

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

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

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

4 The Millennium Drought in southeast Australia (2001–2009): Natural and human 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 stress[5]. 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.

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.

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

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.

Exploring consumer attitudes to water security

What emerges globally is that water security is an underdiscussed topic – 60% think it is an important issue, although this falls to 51% in China and 42% in Japan. But only 15% say that water security is talked about regularly by the media or politicians and just 19% have heard the media talk about water security in the last year.

This is despite the fact that annual water use rose by around 3,500 billion m3 globally between 1900 and 2024 and will worsen with climate change[6]. Put in context, this equates to adding 895m3 of water demand each second or an Olympic sized swimming pool (2500m3) every 2.79 seconds. In the future, global water demand is projected to grow by around 1%, or 400 billion m3, per annum[7]. On this basis, new calculations show that the world could add 1268 m3 of water demand per second, equating to one Olympic sized swimming pool every 2 seconds. Despite this picture, only one third (31%) have a good understanding of their country's current level of water security – a figure that is in itself inflated by the fact that two thirds (55%) in India say this.

More concerningly, while three quarters globally see drought in their country as an issue (76%), under half of those surveyed (45%) recognize addressing water security to be as important as addressing climate change. The implication is that people are not connecting water-related climate events to the water security challenge.

6 https://ourworldindata.org/grapher/global-freshwater-use-over-the-long-run
7 https://www.nature.com/articles/s41545-019-0039-9

Figure 2: Heard the media talk about water security in the last year

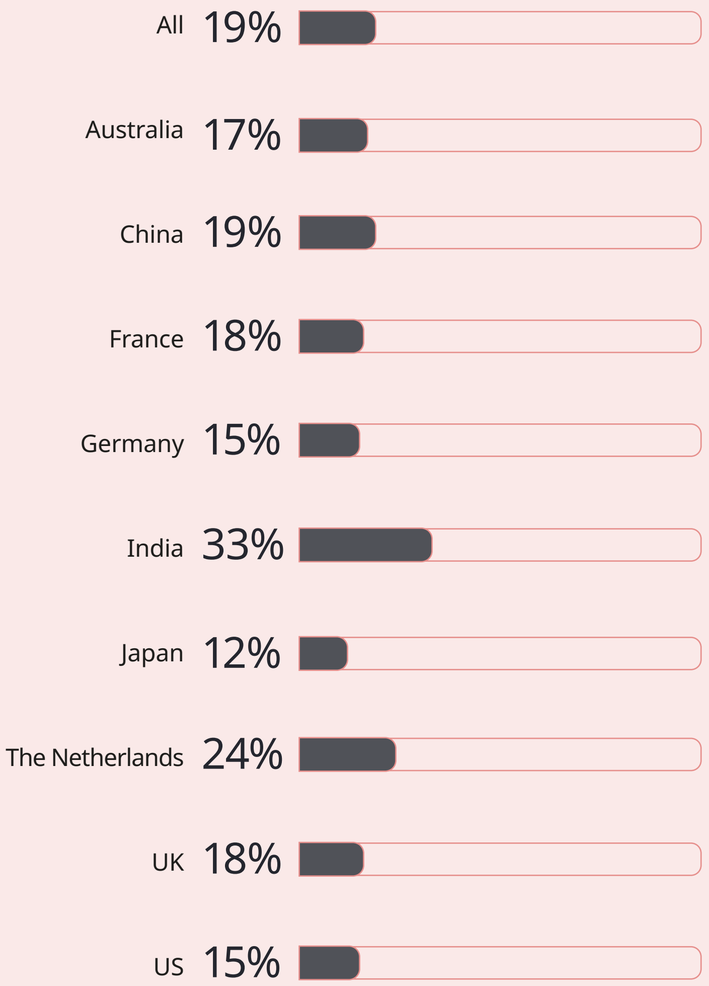
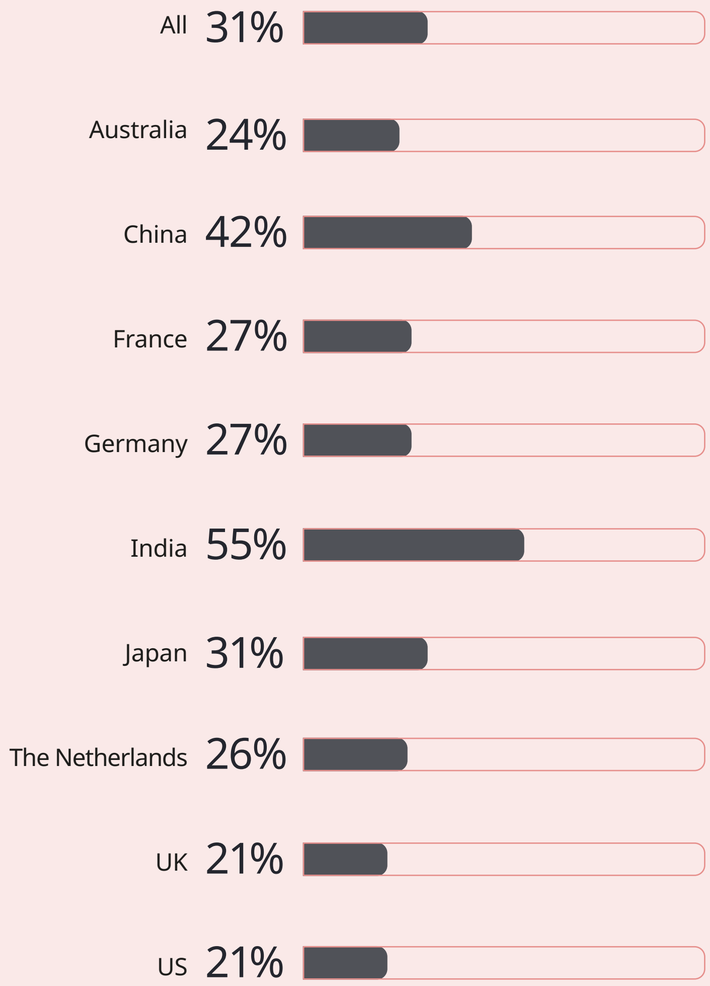


Figure 3: Good understanding of how water secure my country may be in the future



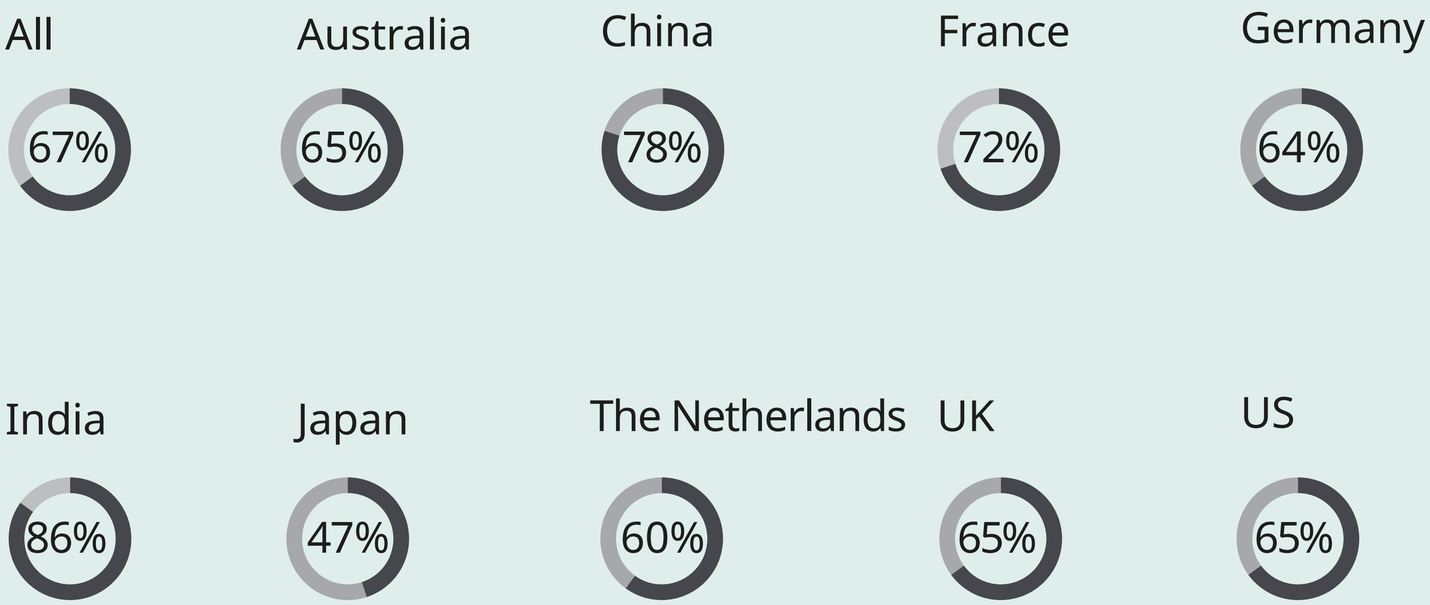
The data is more positive when it comes to concrete steps that can be taken. For example, nearly three quarters globally (73%) want to see water use labelling on products – in other words there is appetite for government, regulators and the international standards system to empower consumers and product manufacturers to make sustainable choices. Similarly, more than two thirds say they would be willing to spend more on brands that are acting on water efficiency (68%) and two thirds (67%) say they would purchase items that use less water intensive materials (e.g. recycled cotton) even if this increased the cost.

While consumers still need engaging around water security, there is clear opportunity to take initial steps to encourage a water secure culture, and support a shift in mindset.

60%

say water security is an important issue

Figure 4: More willing to purchase an item of clothing that has used less water intensive and sustainable materials, even at an extra cost



Next steps

In the 2023 Thirst for Change report, BSI identified a series of recommendations for action to drive progress on water security.

We called for society to:

- Recognize water wastage as a serious challenge
- Ensure it is easy to choose water saving products
- Get smart when it comes to saving water
- Encourage a water saving culture
- Close the loop by making water recycling and reuse the norm where possible
- Collaborate across a wide range of players from organizations, households, government, and regulators to the water industry.

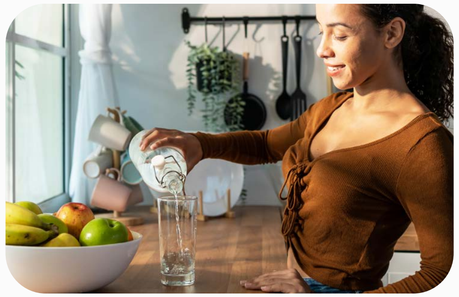
While the Indicator shows subtle changes, broadly speaking these recommendations still apply. Added to this, the following are key areas where progress towards solutions can be made.

Raise awareness of water security

Our research makes clear that the topic is under-discussed. Only 15% of people say they hear water security talked about on a regular basis by politicians or in the news. Media and policymakers, along with businesses and other organizations, have the opportunity to shape an urgent conversation on water security.

Place water within the climate conversation

45% of people agree that addressing water security is as important as addressing climate change. The two impact each other in a feedback loop, by amplifying the impacts of climate change such as extreme weather events like drought and flooding and exacerbating water scarcity. Placing water security as a key topic within the climate change conversation can help to raise awareness, understanding and drive positive change.



Support consumers with sustainable choices

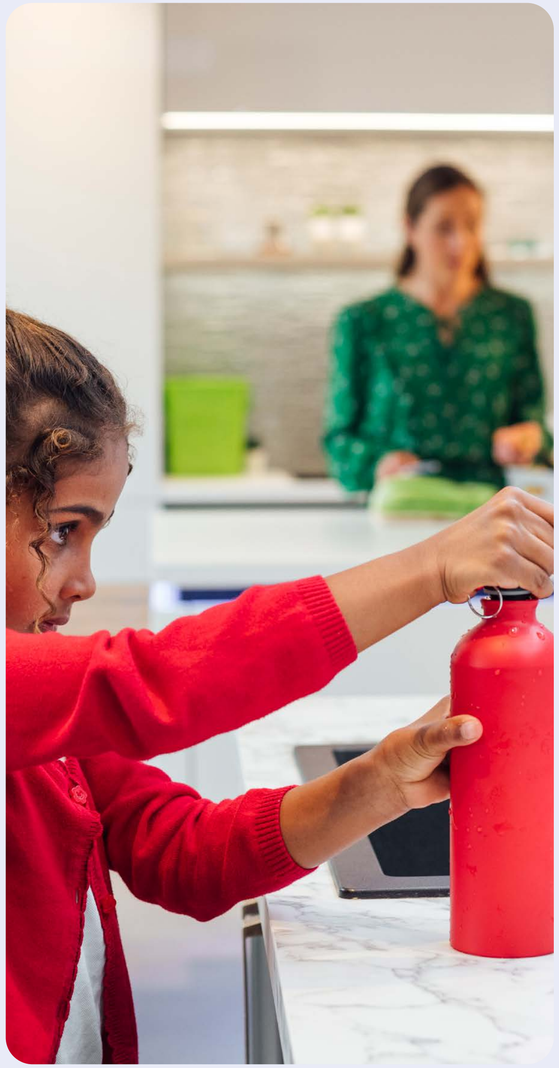
While more than half say it is important for people to take action on water security, individuals cannot do this alone. Now is the moment to engage consumers, helping them to understand the opportunities to drive positive change and empowering them to make sustainable purchasing decisions. We can take inspiration from countries like Australia and Singapore, which have implemented mandatory product water efficiency labelling systems, visible at the point of sale. Such steps can not only put water efficiency at the forefront of consumer consciousness but can also encourage the market to innovate.

Case Studies

Reducing leakage with smart meters in the UK

The East of England is the UK's driest region. Consequently, Anglian Water is implementing a major smart metering program to help spot and resolve leaks and encourage water saving behaviour change. The project forms part of Anglian Water's Water Resources Management Plan and has a budget of over £180 million.

By 2022, the program was estimated to have saved Anglian Water customers £15 million off annual water bills (£251.97 per customer). Since 2020, 100,000 leaks have been resolved at customers' properties. Half a million smart meters have been fitted in customers homes, 1.1 million new upgraded water meters will be installed by 2025. A further 1.2 million will be installed by 2030. According to Anglian Water, they have already begun seeing reductions in the quantity of water abstracted from the environment.



Shaping consumer behaviour via mandatory water labelling in Australia

The Water Efficiency Labelling and Standards (WELS) is a mandatory labelling scheme implemented in Australia in 2005[8] to encourage more efficient domestic water use and reduce potable water consumption by helping consumers choose more water efficient products at the point of sale.
The scheme mandates the registration and water efficiency labelling of certain water-using or water-saving products sold or supplied across Australia including showers, taps, flow controllers, toilets, urinals, clothes and dish washing machines.

In the year to 2018, it was estimated that approximately 112 gigalitres per year (GL/year) of water was saved. By 2036, it is projected this will increase to 231 GL/year being saved. Cumulatively, the WELS scheme is estimated to have saved more than 2,928 GL by 2030[9]. In 2018, the scheme was estimated to have saved $0.78 billion (USD) and is forecasted to save $1.46 billion (USD) by 2030.

8 Water rating label, Australian Government, accessed August 2024
9 2020 Independent Review of the Water Efficiency Labelling and Standards Scheme and Intergovernmental Agreement, Allen + Clarke Consulting, July 2021

Enabling a more sustainable food supply with Hydroponic Agriculture

Globally, 70% of freshwater is used for agriculture[10]. Hydroponics is a farming technique that circulates nutrient-rich water directly to the plant in a closed-loop system. It uses approximately 70 to 95% less water than conventional field farming[11].

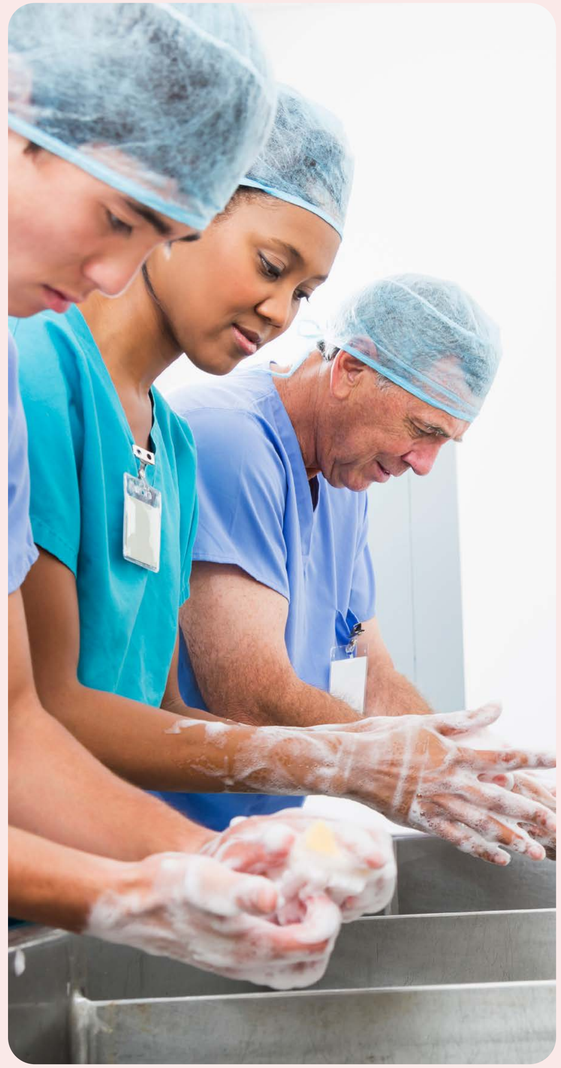
Through the closed-loop system, water can be recycled, preventing wastage, nutrient leaching and run-off. Growing conditions can be controlled precisely and fresh leafy greens, fruit and vegetables can be grown year-round. When used in a vertical farming system, space is maximized, benefiting expanding urban areas. Urban vertical farms are already in operation on rooftops in New York and in disused underground bunkers in London. At Gotham Greens in the US, under four litres of water is used to produce one lettuce, 15 times less than traditional farming. Hydroponics and vertical farming can potentially contribute to food and water security.

10 Chart: Globally, 70% of Freshwater is Used for Agriculture, World Bank, March 2017

11 How Vertical Farming and Hydroponics can Save Space and Water while Producing Fresh and Nutritious Food, Agritech Digest, November 2023

Addressing water security in healthcare with improved Water Treatment Technology

A medical device manufacturer and a healthcare products manufacturer in the US sought both to expand operations and production without increasing water consumption, waste discharge limits or waste disposal costs. One manufacturer also faced a city mandate to reduce industrial water use by 10%. They worked with Evoqua Water Technologies, a water and wastewater treatment system developer, to help design a solution[12]. Technological solutions were developed that either effectively removed contaminants from the wastewater stream for recovery and reuse or maximised water conservation through improved water purification technology, saving 52 million and 16.4 million gallons of water per year, respectively[13].



12 Medical Manufacturer Saves Millions with Water Reuse, Evoqua, accessed August 2024

13 Healthcare Manufacturer Saves Over 16 Million Gallons of Water, Evoqua, accessed August 2024

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.

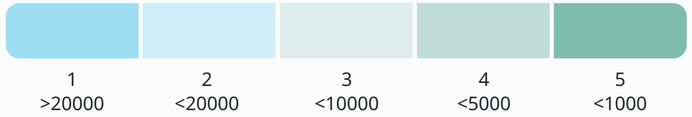
Taken together, the overall scores provide an inter-country comparison showcasing, at a high level, where there may be potential for improvement. The lower the challenge score, the lower the level of water security risk for that country. The lower the solutions score, the fewest barriers to solutions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

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 Waterwise[14] 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.

1 Renewable water resources per capita



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

Source - UN measure of total renewable water resources[15] and UN population data[16].

Metric - m3 per person per year.

2 Proportion of freshwater available being abstracted

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

Source - UN data[17] for 2021.

Metric - %.

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

15 UN Water, UN, accessed August 2024

16 World Population Prospects 2024, UN Department of Economic and Social affairs, accessed August 2024

17 UN Water, UN, accessed August 2024

3 Water scarcity 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 - WWF water scarcity risk score for 2021[18].

Metric - Score from 1 to 5.

4 Water use efficiency

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

Source - UN data[19] for 2021.

Metric - $ per m^3.

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 water[20], GDP per capita data from the World Bank[21] for 2022.

Metric - GDP per capita in $ / Price of water per m^3 in $.

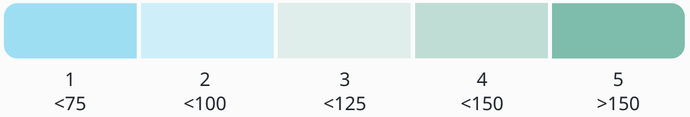
18 WWF Risk Filter Suite, WWF, accessed August 2024

19 UN Water, UN, accessed August 2024

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

21 GDP per Capita, World Bank, accessed August 2024

6 Personal consumption

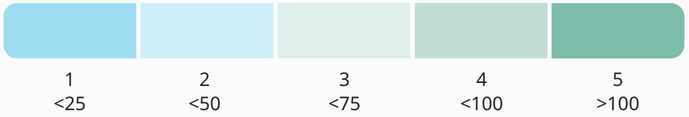


Definition - personal water use in the home.

Source - International Water Association data[22] from 2019.

Metric - litres per person per day.

7 Leakage



Definition - levels of network leakage per person.

Source - International Water Association data[23] from 2019.

Metric - litres per person per day.

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

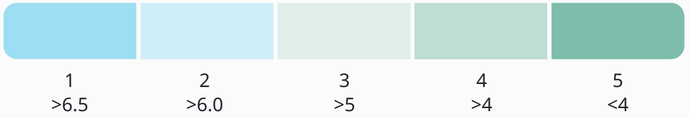
23 Quantifying the global non-revenue water problem, R. Liemberger; A. Wyatt, Water Supply, Water Supply, 2019

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.

1 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 Survey[24].

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

2 Enabling Policy Environment

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 data[25] for 2023.

Metric - % rating.

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

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

3 Institutions and Participation

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

Source - UN IWRM Portal data[26] for 2023.

Metric - % rating.

4 Data collection

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 data[27] for 2023.

Metric - % rating.

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 data[28] for 2023.

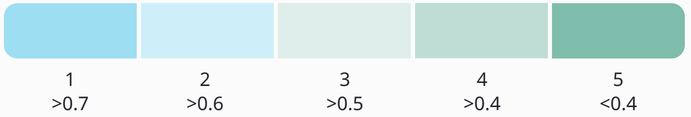
Metric - % rating.

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

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

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

6 Climate change readiness



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 data[29] for 2023.

Metric – Index score.

7 Confidence in government planning

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.

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.

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

9 Confidence water wastage is being tackled

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.

10 Willingness to change consumer behaviour

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

Country	Challenge							
	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

Key for overall challenge score (2024)

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

Country	Solutions										
	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 Solutions 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

<15	<20	<25	<30	>30
Very low	Low	Medium	High	Very high

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

Appendix

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.

The BSI Water Security Indicator 2024 in full

Country	Total renewable resources per capita[30][31]	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
Czech 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*

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

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

Country	Total renewable resources per capita[30][31]	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*

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

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

Country	Total renewable resources per capita[30][31]	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	<21	≤24	>24
Very low	Low	Medium	High	Very high

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

How BSI can partner with clients on water security

BSI has the expertise and resources to help businesses understand and implement sustainable practices and standards:

Environmental management

BSI can help make sure businesses put environmental management at the heart of their operations to help meet regulations, improve efficiency and environmental performance aligned with ISO 14001.

Adaptation to climate change

BSI can assist with the process of anticipating future climatic conditions, and developing strategies to minimize the effects of shocks and stresses of future climatic events. This is called future-proofing. When our organization is vulnerable, we need to adapt, become resilient, and future-proof it. This is a process that will be ongoing. The activity is aligned with BS 8631:2021: Adaptation to climate change – Using adaptation pathways for decision making.

Flood resistance

BSI provides certification to the British Standard BS 851188, and the BSI Kitemark™ for flood resistance, providing reassurance to those vulnerable to flooding – as well as construction companies, insurers, local authorities, and manufacturers of flood-resistant products and systems – that certified flood resistance products are fit for purpose and will provide protection when it’s most needed.

The Kitemark™ for regulation 4 water fittings.

The Regulation 4 Kitemark is a certification program designed for manufacturers of water fittings intended for installation in domestic properties within the UK. This certification demonstrates that the products comply with the UK’s Water Supply (Water Fittings) Regulations and Byelaws, ensuring consistent, high-quality products that prevent contamination and water waste. The scheme covers a broad range of products, including valves, taps, mixers, pipes, and appliances that come into contact with drinking water, such as tanks, cisterns, water meters, washing machines, dishwashers, and steam ovens. Regulation 4 certification applies to non-metallic products, such as rubbers, coatings, cement, resins, and sealants.

Consulting Services

We offer services including groundwater investigation, remediation, and monitoring to determine if water meets applicable quality standards.

We advise on protecting water as a natural resource including around the following topics:

1. Stormwater pollution prevention plans (SWPPs) designed specifically to control pollutants entering the stormwater system which ultimately enters surface and/or groundwater used in drinking water supplies.
2. Remediation of groundwater to remove harmful contaminants including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCS), petroleum products, pesticides and herbicides, and inorganics.
3. Hazardous waste management to ensure proper handling and disposal of hazardous wastes and hazardous materials to prevent unintended and/or unauthorized discharges.
4. Hazardous materials storage and containment systems to prevent releases to the environment.
5. Soil and sediment erosion controls prevent washout of soils which provide natural filtering of water.

Related services include:

- **Climate Risk Adaptation**: BSI helps our clients model out future scenarios to understand where their company assets, business model and/or and value chain may be exposed to a changing climate. These risks include exposure to water-related impacts, such as flood and drought. Upon understanding which physical risks may represent significant impacts, BSI leverages our Connect Climate software platform to gather information from company sites/suppliers to understand their awareness and management systems related to water usage/minimization, flood mitigation/responsiveness, etc., which supports ongoing capacity building of sites/suppliers that are highly vulnerable based on exposure and business practices.
- **ESG Reporting**: The EU CSRD (Corporate Sustainability Reporting Directive) requires reporting of water-related risks, opportunities, and management practices, as defined in the ESRS (European Sustainability Reporting Standards) E2 (Pollution) and E3 (Water and Marine Resources) standards. BSI supports our clients in the gathering of information related to water consumption, treatment, recycling and discharge, along with business activity in water-stressed regions to support corporate reporting.
- **Food Loss & Waste**: Many of our clients have begun to recognize the financial, environmental, and climate-related impacts of Food Loss & Waste; so we have developed the BSI Food Waste & Loss Program. The program enables Food Sector companies to reduce their volume of food waste - and associated GHG emissions and financial losses - at multiple points of their value chain through a combination of best practice guidance, technical expertise, and innovative technology. Since lost/wasted food represents 25% of all water used in agriculture, minimization of food waste results in lower water consumption.

Training

Water efficiency management systems awareness ISO 46001 on-demand eLearning
Learn what water efficiency management is, why it is important and how your organization manages their water efficiency management performance. Consider how you are a vital piece of the jigsaw and what you can do to help your organization.

Water Efficiency Management Systems Requirements ISO 46001 on-demand eLearning
This course outlines the requirements of ISO 46001:2019 water efficiency management systems, aiming to help and enable organizations to assess and account for their water use, and to identify, plan and implement measures to achieve water savings through the systematic management of water.

ISO 14001 Environmental Management training courses

We offer a range of courses to help to embed environmental management best practice, supporting your organization's mission to make a positive impact on the climate, natural resource quality, habitats and communities:

ISO 14001 Awareness
Help your teams understand what ISO 14001 is, why it's important and how they can contribute to effective environmental management.

ISO 14001 Requirements
Learn the history, key terms and definitions of ISO 14001:2015, giving you the knowledge to stimulate sustainable growth.

ISO 14001 Implementation
Develop the knowledge and skill required to implement an ISO 14001:2015 Environmental Management System (EMS).

ISO 14001 Lead implementer
Learn about ISO 14001 requirements, how to implement an EMS and develop the leadership skills required to manage a robust system.

ISO 14001 Internal auditor
Learn the key principles and practices of effective EMS audits in accordance with ISO 14001 and ISO 19011.

ISO 14001 Lead auditor
Demonstrate your commitment to a sustainable model by transforming existing auditor skills to ISO 14001.

CQI and IRCA Certified Lead Auditor Training Course (17903) - ISO 14001:2015
This ISO 14001 lead auditor course helps you develop the skills required to carry out a full environmental management system (EMS) audit.

ISO 14001 Senior Management Briefing
Help business leaders understand how they will be involved, and the commitment required to support effective implementation.

United Nations Sustainable Development Goals (UNSDGs) training

This course will help you understand the purpose and gain awareness of the United Nations' (UN) Sustainable Development Goals (SDGs) for your organization.
As a leader, sustainability or environment manager, or operational member of staff, your commitment, practical understanding and support is crucial to the success of your organization’s adoption and implementation of the UN SDGs. This essentials training course highlights the benefits of an effective commitment to the UN SDGs and introduces you to the key concepts and signposts to the relevant associated standards and current case studies.

Introduction to the Corporate Sustainability Reporting Directive (CSRD)

The Corporate Sustainability Reporting Directive (CSRD) was introduced in 2021 to standardize non-financial reporting impacting a range of organizations. The CSDR is part of the broader ‘European Green Deal’, a set of policy initiatives by the European commission. It incorporates the European Sustainability Reporting Standards (ESRS), a new mandatory set of standards for sustainability reporting.
The CSRD includes water reporting requirements. This course will develop and improve your understanding of the key elements to develop sustainability reports aligned with the ESRS and CSRD, recognize the value of the ESRS as a tool to identify and effectively communicate sustainability issues and best practices, improve your ability to support your organization in meeting its sustainability and ESG commitments and goals, understand how CSRD and ESRS relate to other ESG and sustainability reporting frameworks and requirements.

Standards

BSI in its role as the UK National Standards Body has published the following standards. BSI Knowledge offers access to all water-related standards as well as a wide range of internationally recognized standards in one convenient platform, ensuring that organizations remain compliant and informed, simplify how they manage and access standards, saving both time and money.

Water management and Environmental Management

- Water efficiency labelling programmes. Requirements with guidance for implementation (BS ISO 31600:2022)
- Water efficiency management systems. Requirements with guidance for use (BS ISO 46001:2019)
- Principles for effective and efficient corporate governance of water utilities (BS ISO 24540:2023)
- Activities relating to drinking water and wastewater services. Guidelines for the assessment and for the improvement of the service to users (BS ISO 24510:2007)
- Activities relating to drinking water and wastewater services. Guidelines for the management of wastewater utilities and for the assessment of wastewater services (BS ISO 24511:2007)
- Activities relating to drinking water and wastewater services. Guidelines for the management of drinking water utilities and for the assessment of drinking water services (BS ISO 24512:2007)
- Drinking water, wastewater and storm water systems and services. Adaptation of water services to climate change impacts – Part 2. Stormwater services (BS ISO 24566-2)
- Environmental management systems. Requirements with guidance for use (BS EN ISO 14001:2015)
- Environmental management systems. Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area – Water (BS EN ISO 14002-2:2023)
- Service activities relating to drinking water supply, wastewater and stormwater systems. Vocabulary (BS ISO 24513:2019)
- Guidelines for the management of assets of water supply and wastewater systems – Drinking water distribution networks (BS ISO 24516-1:2016)
- Guidelines for the management of assets of water supply and wastewater systems – Waterworks (BS ISO 24516-2:2019)
- Guidelines for the management of assets of water supply and wastewater systems – Wastewater collection networks (BS ISO 24516-3:2017)
- Guidelines for the management of assets of water supply and wastewater systems – Wastewater treatment plants, sludge treatment facilities, pumping stations, retention and detention facilities (BS ISO 24516-4:2019)

- Activities relating to drinking water and wastewater services. Crisis management of water utilities (BS ISO 24518:2015)
- Service activities relating to drinking water supply, wastewater and stormwater systems. Guideline for a water loss investigation of drinking water distribution networks (BS ISO 24528:2021)
- Principles for effective and efficient corporate governance of water utilities (BS ISO 24540:2023)

Industry

- Water supply. Requirements for systems and components outside buildings (BS EN 805:2000)
- Specifications for installations inside buildings conveying water for human consumption – General BS EN (806-1:2000)
- Specification for identification of pipelines and services (BS 1710:2014)
- Provision and management of temporary water supplies and distribution networks (not including provisions for statutory emergencies). Code of practice (BS 8551:2015)
- Code of practice for the sampling and monitoring of hot and cold water services in buildings (BS 8554:2015)
- Process for designing and implementing Biodiversity Net Gain. Specification BS 8683:2021
- Environmental management. Requirements with guidance for verification and validation of water statements (BS ISO 14017:2022)
- Water quality. Water safety plans. Code of practice (BS 8680:2020)
- Sampling for Legionella bacteria in water systems. Code of practice (BS 7592:2022)
- Water quality – Risk assessments for Legionella control. Code of practice (BS 8580-1:2019)
- Water quality – Risk assessments for Pseudomonas aeruginosa and other waterborne pathogens. Code of practice. (BS 8580-2:2022)
- Water quality. Sampling – Guideline on the validation of the storage time of water samples (PD ISO/TS 5667-25:2022)
- Environmental management. Water footprint. Principles, requirements and guidelines (BS EN ISO 14046:2016)
- Guide to the design, installation, testing and maintenance of services supply water for domestic use within buildings and their curtilages (BS8558:2015)
- Code of practice for the design and installation of drainage fields for use in wastewater treatment (BS6297:2007+A1:2008)
- Code of practice for the preparation, commissioning and maintenance of domestic central heating and cooling water systems (BS 7593:2019)

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 available freshwater resources (H), Overall water use efficiency (L) and GDP per capita/Price per m3 (V)

45 Decline in Water use efficiency (municipal) (R)

46 Cities known to face high water stress – source and source: 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 available 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 GDP per capita/Price per m3 (V)

54 Decline in Total freshwater withdrawal as a % of available 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 available freshwater resources (H)

57 Decline in Total freshwater withdrawal as a % of available freshwater resources (H)

58 Decline in Total freshwater withdrawal as a % of available freshwater resources (H)

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)

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)

65 Cities known to face high water stress – source and source: Istanbul

66 Cities known to face high water stress – source and source: Los Angeles, New York

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