

THE GREAT BRITISH RAIN PARADOX

The UK is renowned for being
wet and rainy, yet we may face
future water shortages



FOREWORD

Sir James Bevan
Chief Executive, Environment Agency



The UK has a reputation for being a wet, rainy nation. This report shows 77% of the British public agree with the statement that “the UK is a wet, rainy country”.

This perception is wrong. Yes we have periods of intense rain. February 2020 was the wettest month on record with Storms Ciara and Dennis causing flooding that brought misery to tens of thousands of people. But climate change is also causing long spells of dry weather that are putting our water resources under increased pressure.

May 2020 has been the driest on record and exceptionally dry weather across the south east between 2017 and 2019 led to some of the lowest groundwater levels we have ever seen. In future we are likely to see even more records being broken and further periods of exceptionally dry weather and drought.

But there is good news. Despite the fact that the UK population is expected to rise from 67 million today to 72.4 million by 2043, if we all take concerted action now we can ensure that there will be enough water to go around for generations to come.

The Environment Agency has recently published a new water resources National Framework¹ setting out how we can work across organisations to increase resilience to drought, increase water supplies sustainably,

move water to where it is needed, and deliver more environmental improvements.

People across the country are also increasingly valuing nature and the environment. The country is currently in the grip of the coronavirus pandemic. Water is playing a fundamental role in the fight against the disease and 83% of people in country state that they appreciate access to clean running water for handwashing.

This report outlines the many steps that people can take to reduce water use without compromising their safety. It is vital that we continue to wash our hands under running water, wash our clothes and surfaces and follow public health guidance in the fight against coronavirus. But there are many other steps that we can all take to reduce the amount of water we consume - from turning off the tap when we brush our teeth to washing the car with a bucket and sponge.

I urge everyone to think what small steps they can take to make a big difference. By taking action now to *Love Water* more, we can ensure clean and plentiful water for generations to come.

¹ Meeting our future water needs: a national framework for water resources. Environment Agency, 16 March 2020. Available at: <https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources> [Accessed June 2020]

Contents

1. The reality of the great British rain paradox	3
2. Where does our household water supply come from?	5
3. The tipping point – without action, demand may outstrip supply	6
4. Britain's water use habits and perceptions revealed	8
5. Water as our first line of defence against COVID-19	11
6. Changing behaviour to save water, clean clever	13

Love Water is a partnership campaign, jointly led by the Environment Agency and Water UK. All partners have shared objectives to drive the behaviour change necessary to ensure that there is clean and plentiful water for people and the environment for generations to come.



1

THE REALITY OF THE GREAT BRITISH RAIN PARADOX

Britain's geography means that cold polar air from the north and warmer air from the tropics push against each other to create unpredictable and changeable weather.² What's more, weather and rainfall patterns across the UK are not even, and can vary widely by region and season.³

Winters in the UK, for the most recent decade (2009–2018), have been on average 5% wetter than 1981–2010 and 12% wetter than 1961–1990.³ Summers in the UK have also been wetter, by 11% and 13% respectively.³

Even with our precedent for rain, climate change is expected to change our weather and rainfall patterns with more extremes. Projections for the UK show an increased chance of warmer, but wetter winters and hotter, drier summers.³ The summer of 2019 saw a record-breaking maximum temperature

of 38.7°C in Cambridge and was overall 0.8°C warmer than the long-term average between 1981–2010.⁴

Despite future summer drying trends, the 2009 and 2018 UK Climate Projections reports (UKCP09 & UKCP18) show probabilities continue to point to more rain in the winter but less rain in the summer^{5,6} (Fig.1), although rainfall could become more intense during the summer months.³ These extremes can have wider consequences such as flooding and more severe droughts.^{5,6}

2. Official blog of the Met Office news team. Why does it always rain on the UK? Available at: <https://blog.metoffice.gov.uk/2012/05/09/why-does-it-always-rain-on-the-uk/>. [Accessed June 2020].

3. Met Office. UK Climate Projections: Headline Findings. September 2019. Available at: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp-headline-findings-v2.pdf>. [Accessed June 2020].

4. Madge, G., 2019. Summer 2019 Climate Statistics: Largely Warm And Wet. Met Office. Available at: <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2019/summer-2019-statistics> [Accessed 20 June 2020].

5. Met Office, 2018. UKCP18 Science Overview Report. Available at: <https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Overview-report.pdf> [Accessed 20 June 2020].

6. Committee on Climate Change, 2017. UK Climate Change Risk Assessment 2017 Synthesis Report: Priorities For The Next Five Years. Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Synthesis-Report-Committee-on-Climate-Change.pdf> [Accessed 20 June 2020].

Fig. 1: Summer and winter changes by the 2070s⁷

Summer Precipitation Change	Winter Precipitation Change	Summer Temperature Change	Winter Temperature Change
FOR A LOCATION IN CENTRAL ENGLAND			
41% drier to 9% wetter	3% drier to 22% wetter	No change to 3.3°C warmer	-0.1°C cooler to 2.4°C warmer
57% drier to 3% wetter	2% drier to 33% wetter	1.1°C warmer to 5.8°C warmer	0.7°C warmer to 4.2°C warmer
FOR A LOCATION IN CENTRAL SCOTLAND			
30% drier to 6% wetter	4% drier to 9% wetter	-0.1°C cooler to 2.8°C warmer	-0.3°C cooler to 2.7°C warmer
40% drier to 8% wetter	3% drier to 12% wetter	0.6°C warmer to 4.8°C warmer	0.6°C warmer to 4.5°C warmer
FOR A LOCATION IN CENTRAL WALES			
39% drier to 3% wetter	2% drier to 19% wetter	No change to 3.3°C warmer	0.1°C warmer to 2.4°C warmer
56% drier to 2% wetter	No change to 29% wetter	0.9°C warmer to 5.9°C warmer	0.7°C warmer to 4.1°C warmer
FOR A LOCATION IN CENTRAL NORTHERN IRELAND			
28% drier to 6% wetter	3% drier to 17% wetter	No change to 2.8°C warmer	0.1°C cooler to 2.2°C warmer
38% drier to 3% wetter	2% drier to 25% wetter	0.8°C warmer to 4.9°C warmer	0.6°C warmer to 3.9°C warmer

Low emission scenario
 High emission scenario

*All results are for the 10th-90th percentage range for the 2060-2079 period relative to 1981-2000

77% of the British public agree with the statement that “the UK is a wet, rainy country”, however the perception of a water-rich nation, immune from future water shortages is in stark contrast with the reality that we are facing.

In our survey of 2,000 adults in the UK, 72% believe we have enough water to meet our needs. Only 14% of people believe it is very likely we will have a water shortage issue on our hands in the next 25 years.⁸

7. Metoffice.gov.uk. UKCP18 Climate Change Over Land. Available at: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-infographic-headline-findings-land.pdf> [Accessed June 2020].

8. Survey of 2,000 British adults conducted in February/May 2020, commissioned by Finish.

2 WHERE DOES OUR HOUSEHOLD WATER SUPPLY COME FROM?

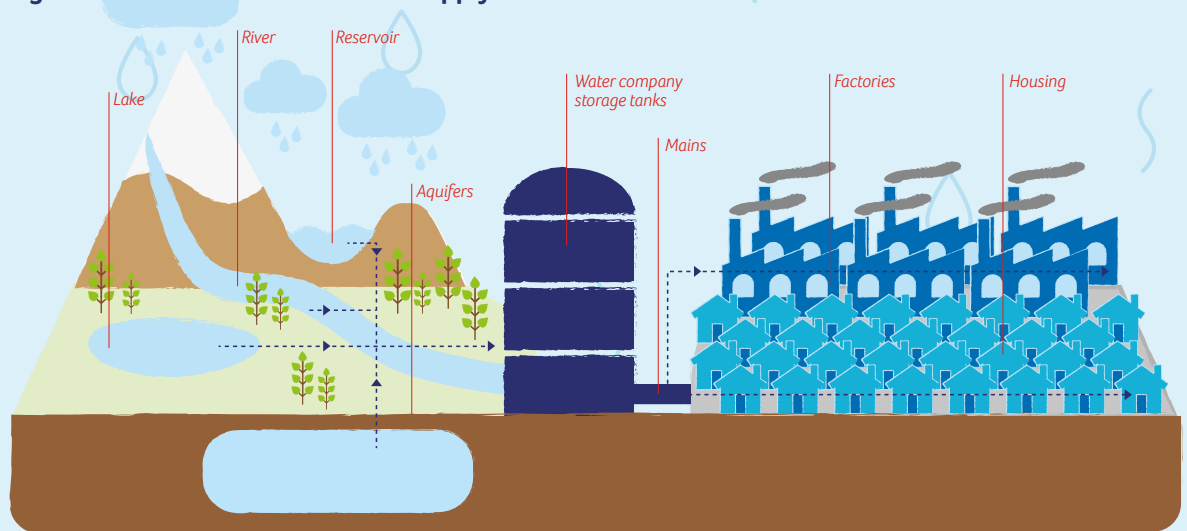
Our water supply comes from several types of natural and man-made sources – rivers, lakes, aquifers, reservoirs and dams – all of which are replenished by rain. (Fig. 2)⁹

Once water has been abstracted (drawn from) these sources, it is treated and coursed through mains and pipes to deliver water to homes and industry.⁹

How much water is abstracted depends on how much is demanded and if we continue using the same amount of water, or more, there is a risk that our supplies could face shortages in the future.⁹

Being water-resilient for the future means working together and becoming more mindful of our demand for water. Alongside the efforts of water companies and government to improve efficiency, we must also look at ways to increase our efficiency by using water more wisely at home.

Fig. 2: The basic elements to water supply and demand⁹



“Being water-resilient means working together and becoming more mindful of our demand for water”

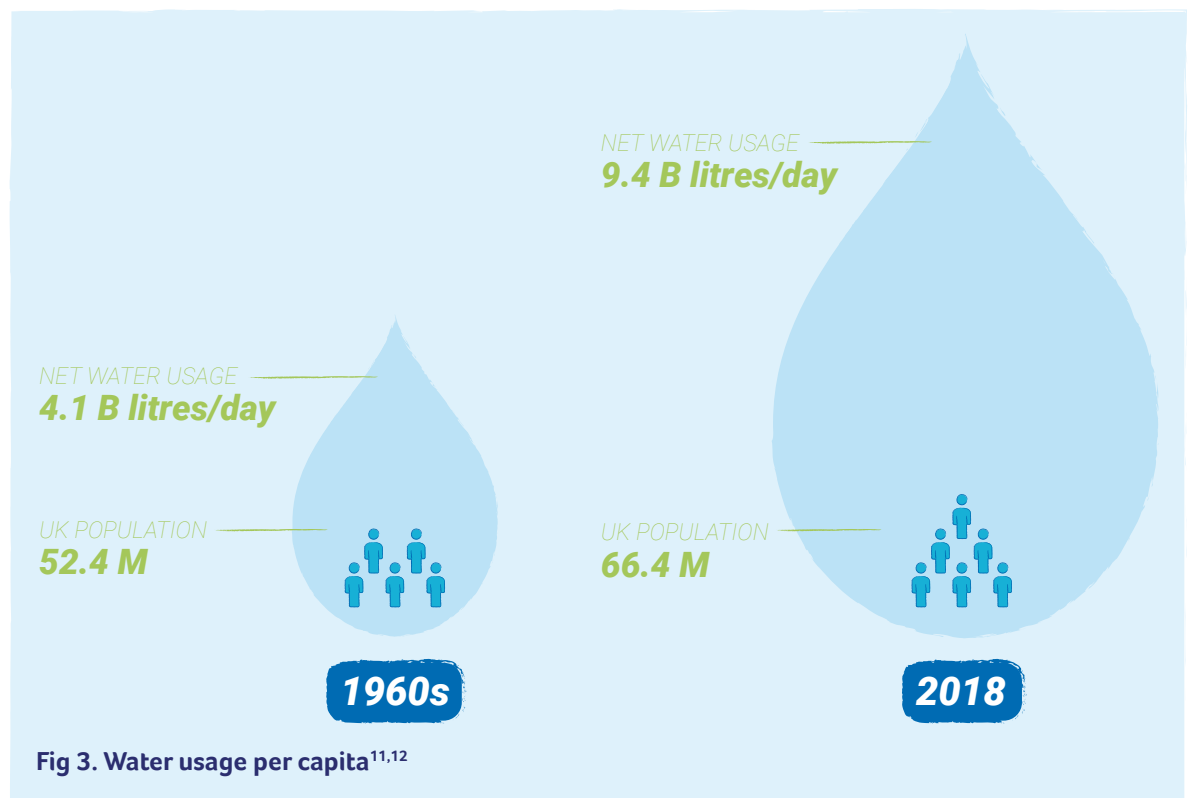
9. Thames Water, The Water Cycle. Available at: <https://www.thameswater.co.uk/sitecore/content/The-Water-Cycle/Accessible/The-water-cycle> [Accessed 20 June 2020].

3

THE TIPPING POINT – WITHOUT ACTION, DEMAND MAY OUTSTRIP SUPPLY

The UK population is expected to rise from 67 million today to 72.4 million by 2043.¹⁰ It is not just our society that is changing, but our water use habits are too. In the 1960's the average person used 85 litres per day, whereas today the figure is 143 litres per day per person.^{11,12}

If we take into consideration the respective populations and per capita water usage from these two timepoints (1960 and 2018) (Fig. 3), it's clear that our water use has grown far more than our population in the last 60 years.



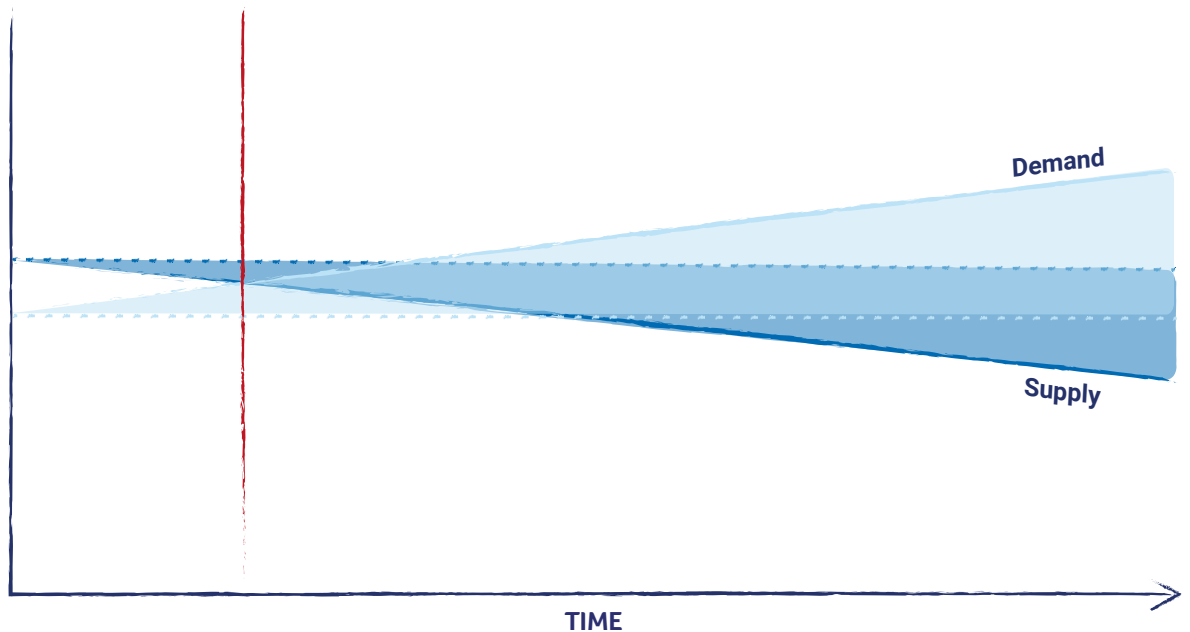
10. Office For National Statistics. (2019). National population projections: 2018-based. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2018based> [Accessed June 2020].

11. Artesia Consulting, 2018. The Long Term Potential For Deep Reductions In Household Water Demand. Available at: <https://www.ofwat.gov.uk/publication/long-term-potential-deep-reductions-household-water-demand-report-artesia-consulting/> [Accessed June 2020].

12. Discoverwater.co.uk. The amount we use. Available at: <https://discoverwater.co.uk/amount-we-use>. [Accessed June 2020].

To avoid future water shortages, demand must not exceed supply (Fig 4.) If no action is taken now, between 2025 and 2050 around 3,435 million extra litres of water per day will be needed for public water supply to address future pressures.¹

Fig 4. The critical moment when water demand outstrips supply



“

In the face of extreme drought and water scarcity, we must tackle both sides of the equation: reduce demand and increase supply.

Sir James Bevan,
Chief Executive of the Environment Agency
Waterwise Conference,
19 March 2019

”

4

BRITAIN'S WATER USE HABITS AND PERCEPTIONS REVEALED

Some insight into Britain's water use habits and perceptions have been revealed in a recent survey of 2,000 British adults. Carried out in February and also May 2020 to capture change in behaviours due to the national lockdown in response to the coronavirus pandemic. Respondents were asked what they think about water, how they perceive it compared to other resources and how they use water at home.

Parts of the UK such as London and the South East are drier than Mumbai, India or Nairobi, Kenya, yet only one in three think it's unlikely that the UK will face water issues in the future.^{8,13}

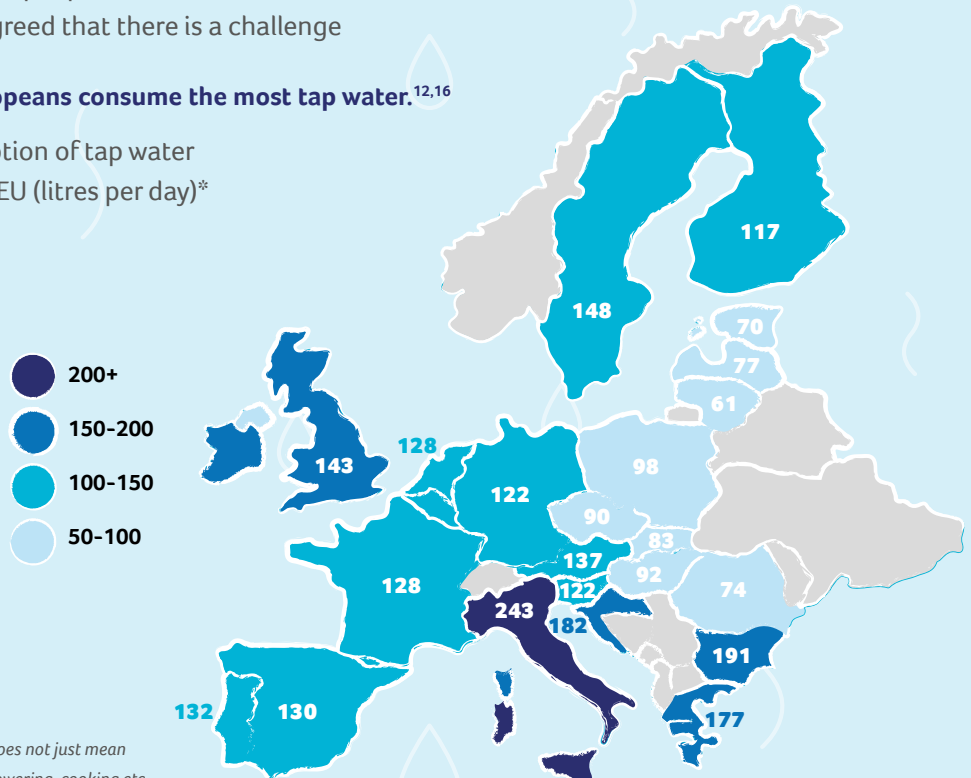
People also incorrectly assume that this is a global challenge rather than a local one. Based on a survey conducted by Cranfield University of more than 1,000 people across the UK, 89% of respondents agreed that there is a challenge

for water resources at a global level. However, 67% agreed that this was a challenge on a national level, and only 43% agreed that this was a challenge at a local level.¹⁴

51% of people believe that British households use the same or less water compared to other European households, when in fact we use more than most.^{8,15,16}

Fig. 5: Where Europeans consume the most tap water.^{12,16}

Average consumption of tap water per person in the EU (litres per day)*



* 2014-15. Consumption does not just mean drinking. Also includes showering, cooking etc.

13. WRI Aqueduct. Water Risk Atlas. Available at: <https://www.wri.org/applications/aqueduct/water-risk-atlas/>. [Accessed June 2020].

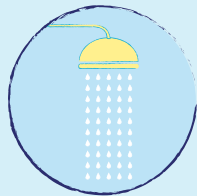
14. Shannon, C. et al. (2020) Social acceptability of circular solutions. Manuscript in preparation.

15. International comparisons of domestic per capita consumption, Environment Agency. Available at: <https://waterwise.org.uk/wp-content/uploads/2019/09/EA-2008-International-Comparisons-of-Domestic-per-Capita-Consumption.pdf> [Accessed June 2020].

16. Statista. Where Europeans Consume The Most Tap Water. Oct 9, 2019. Available at: <https://www.statista.com/chart/19591/average-consumption-of-tap-water-per-person-in-the-eu/> [Accessed June 2020].

HOW DO WE USE WATER AT HOME?

Water is an essential part of any household and many people may not be aware of how much water can be used at home in different areas. Also water use can vary at different times of the year and increase during summer or when people have to stay home more such as during the coronavirus pandemic. So it is important to be mindful of how much we use.¹⁷



SHOWER

The largest water user in the home, although less than baths. Across Britain, we use 840 billion litres of water each year and spend £2.3 billion on heating water for showers.¹⁸



TOILET

The second biggest water user. More than 740 billion litres is flushed down the toilet every year – enough to fill 300,000 Olympic-sized swimming pools.¹⁸



WASHINE MACHINE

97% of households have one¹⁹ and they use around 50 litres of water per wash.¹⁸ The amount of water used by modern machines can vary so look out for water efficiency when buying your next machine.²⁰



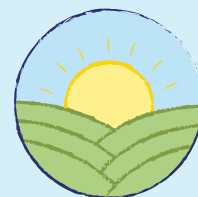
KETTLE

85% of households boil the kettle every day, with three quarters boiling more water than they really need, often wasting water and costing British households £68 million on energy bills a year.¹⁸



DISHWASHER

Close to 50% of people in the UK own a dishwasher¹⁹ and of those that do, only half use the eco setting and a quarter don't fill it to capacity before turning it on.¹⁸ Studies suggest using an automatic dishwasher uses 73% less water than washing dishes by hand, while pre-rinsing dishes wastes 1,232 litres of water a year.^{21,22}



OUTDOORS

Generally water usage increases during the warmer summer months.²³ Outdoor water accounts for less than 10% of household water use and is split between watering the garden and washing the car. There is a reason why hoses and sprinklers are the first items restricted by water companies in times of drought – they use water equivalent to more than 12 baths an hour.¹⁸

17. Thames Water. Coronavirus: How to keep water and energy bills down. Available at: <https://corporate.thameswater.co.uk/media/News-releases/News-Release---Coronavirus-water-efficiency> [Accessed June 2020].

18. Energy Saving Trust. At Home With Water. Available at: <https://energysavingtrust.org.uk/sites/default/files/reports/AtHomewithWater%287%29.pdf> [Accessed June 2020].

19. Office for National Statistics. 19 March 2019. Family spending workbook 4: expenditure by household characteristic. Table A45. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure/datasets/familyspendingworkbook4expenditurebyhouseholdcharacteristic> [Accessed June 2020].

20. In the Wash. How Much Water Does a Washing Machine Use? (UK). Available at: <https://inthewash.co.uk/washing-machines/how-much-water-does-a-washing-machine-use/>. [Accessed June 2020].

21. Berkholz, P, et al (2010). Automatic Dishwashers: Efficient machines or less efficient consumer habits. Available at: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1470-6431.2009.00839.x> [Accessed June 2020].

22. RB data on file.

23. Environment Agency Blog. Summer has started - what does that mean for the water situation in England? - June 2018 Available at: <https://environmentagency.blog.gov.uk/2018/06/29/summer-has-started-what-does-that-mean-for-the-water-situation-in-england/> [Accessed June 2020].

Our survey found that:

SAVING WATER OF LOW CONCERN

Water ranks the lowest of concerns in comparison to the use of, or generation of other resources.

- Generation of plastic waste (39%)
- Consumption of energy (22%)
- Generation of food waste (16%)
- Carbon footprint (11%)
- Use/consumption of fresh water (10%)⁸

WATER DOWN THE DRAIN

Many people conduct high wastage behaviours.

- 42% let the tap run until the water is cold for drinking
- 33% take a shower longer than 8 minutes
- 30% have at least one bath per week, which uses more water than a shower
- 28% leave the tap running while brushing teeth
- 17% pre-rinse dishes before filling the dishwasher
- 3% use a sprinkler system in the garden⁸

Only half (52%) of people correctly identified that dishwashers uses less water than washing dishes by hand.⁸ While only 30% of people in our survey said that they often think about their water use and actively take measures to limit it, 18% said they never think about the water they use.⁸

“18% said they never think about the water they use”

5 WATER AS OUR FIRST LINE OF DEFENCE AGAINST COVID-19

Now more than ever, in the face of the global coronavirus pandemic, we have seen just how vital water is for protecting life. Central to our defence against COVID-19 is the simple act of handwashing with soap and water.²⁴ It must be stressed that it is essential that regular and thorough handwashing is maintained at all times, under all circumstances.

Of course the pandemic has led to an understandable shift in public behaviour, with the impact of lockdown and people spending most of their time at home. With regards to water use during the pandemic, the study found that:



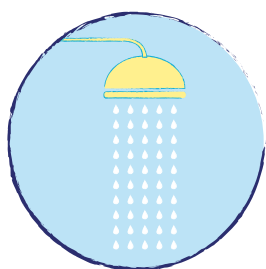
59% cleaning
the house more



48% handwashing dishes
in the sink more



36% using
washing machine more



36% taking more showers



21% taking more baths



19% using the
dishwasher more⁸

24. GOV.UK. Coronavirus (COVID-19), <https://www.gov.uk/coronavirus>. [Accessed June 2020].

WATER IS VITAL FOR PROTECTING LIFE

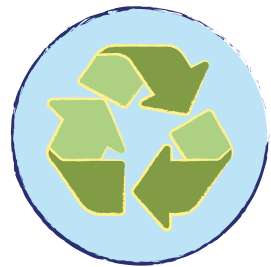
The research also indicates a potential positive after-effect from the outbreak with people viewing the world in a different way. Since the pandemic:



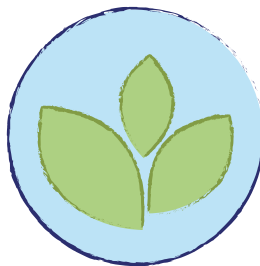
83% appreciate access to clean running water for handwashing



82% appreciate the natural world more



69% are more concerned about the environment & sustainability



76% are more aware of human impact on the environment



67% are now more willing to take action to reduce their impact on the planet⁸

6

CHANGING BEHAVIOUR TO SAVE WATER, CLEAN CLEVER

Saving water starts with small, smart behaviour changes at home:

TURN IT OFF

A running tap wastes more than nine litres of water every minute, so turn off the tap when brushing your teeth²⁵ and don't pre-rinse your dishes before putting them in the dishwasher²⁶

FIX THE DRIP

A dripping tap can waste more than 5,300 litres of water a year, so make sure taps are properly turned off and change washers at the first sign of a drip²⁷

OPT FOR SHORT SHOWERS

If every home took just one minute off their shower every day, it would save £215 million on our collective energy bills every year. If you have to have a bath, try running it just an inch shorter than usual – you can save five litres of water on average²⁶

LEAKY LOOS

Water leaking from the tank into the toilet bowl is one of the most frequent reasons for unexpectedly high domestic water use, wasting up to 400 litres a day²⁸

FILL IT UP

Make sure that dishwashers and washing machines are full before you use them and make sure you use the most efficient water and energy settings^{18,26,27}

DON'T PRE-RINSE

If you have a dishwasher, don't pre-rinse dishes before loading and always use the most efficient water and energy settings.^{18,26} If washing by hand, try not to leave the tap running while you wash.

THINK BEFORE YOU DRINK

When you use the kettle, only boil what you really need and for cool drinks, fill a jug of water and keep it in the fridge to save water and energy²⁶

BE GREAT OUTDOORS

Hoses and sprinklers can use up to 1,000 litres of an hour. Instead, use a watering can in the garden and fit a water butt to collect rainwater off your roof. Wash your car with a bucket of water rather than a hose.^{18,25}

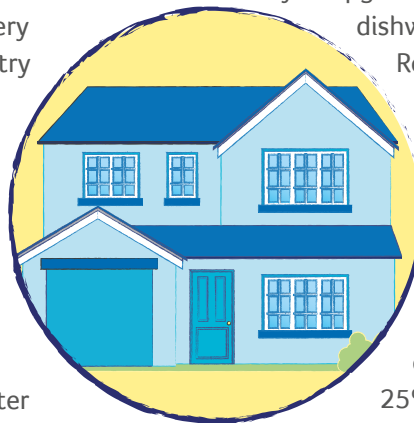
INVEST IN WATER-EFFICIENCY

Make efficient water use a priority when you upgrade your washing machines and dishwashers – look for the Waterwise Recommended Checkmark.²⁷ Dual flush toilets typically use 4–6 litres of water versus the old-style flush systems, which use 13 litres.²⁶ Likewise, invest in an aerated or low flow shower head, which reduces the water flow without compromising pressure. Only 25% of households have them but it could save a typical British household with a high-flow power shower as much as £55 a year on energy bills.¹⁸

FIT A WATER METER

Many people can save money by having a water meter installed and those that do are more likely to make a conscious effort to save water²⁹

By making smarter choices, we can save water and make a meaningful difference. To protect our health, our environment and our future, we ask you to save water and clean clever.



25. Ofwat. Water Saving Tips. Available at: ofwat.gov.uk/households/conservingwater/watersavingtips/ [Accessed June 2020].

26. Waterwise. Save Water. Available at: <https://waterwise.org.uk/save-water/> [Accessed June 2020].

27. Energy Savings Trust. Save Water. Available at: <https://energysavingtrust.org.uk/home-energy-efficiency/saving-water> [Accessed June 2020].

28. South Staffs Water. How can I save water in the bathroom. Available at: <https://www.south-staffs-water.co.uk/help-and-advice/read/how-can-i-save-water-in-the-bathroom-200100000002733> [Accessed June 2020].

29. Water UK. Water Meters. Available at: <https://www.water.org.uk/advice-for-customers/water-meters/>. [Accessed June 2020].

HOW MUCH WATER CAN YOU SAVE IN A DAY?

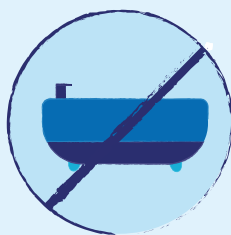
SHOWER

Save 8 litres



Shower 1 minute less (assuming eco showerhead at 8L/min)³⁰

Save 20 litres



Opt for shower vs bath (average 60L for shower vs 80L for bath)^{11,18}

TOILET

Save 15 litres



Switch from full flush toilet to low flush toilet (13 vs 4.8 litres per flush respectively, assuming average 12 flushes /day)¹⁸

Save 400 litres
(per day per household)



Fix a leaking toilet²⁸

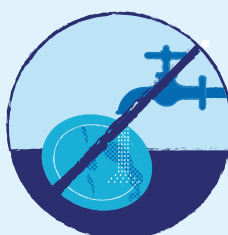
KITCHEN

Save 40 litres



Use dishwasher vs handwashing dishes (9.5L per load vs 49L per load respectively)²¹

Save 5 litres



Don't pre-rinse dishes before loading in dishwasher^{21,22}

Save 35 litres



Switching from a standard tap nozzle to isolating valve nozzle (20L/min vs 2.5L/min, assuming 2.0 minute use)³¹

Save 4 litres



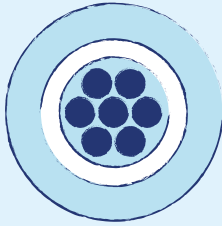
Use dishwasher eco setting vs standard setting (10L per cycle vs 14L per cycle, respectively)¹⁸

30. Save Water Save Money. Water Efficiency Showers and Showerheads. Available at: <https://www.savewatersavemoney.co.uk/water-efficiency-tips-advice/view/82/water-efficiency-showerheads.html> [Accessed June 2020].

31. WWT. Water Consumption report. Available at: <https://waterwise.org.uk/wp-content/uploads/2019/10/WWT-Report-.pdf> [Accessed June 2020].

BATHROOM

Save 2 litres
(per wash)



Use a plug when washing or shaving in the sink²⁸

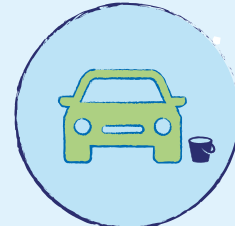
Save 6 litres
(per minute)



Turn off the tap when brushing teeth²⁸

OUTSIDE

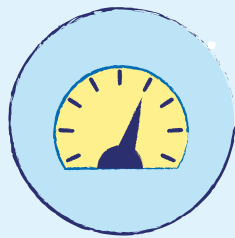
Save 220 litres
(per car)



Wash the car with a bucket vs a hose (30L per wash vs 250L per wash, respectively)¹⁸

WATER METER

Save 97 litres



Install a smart meter (for a family of four using the average 143 litres of water per day)³¹

Save water and clean clever

The Finish vision is about empowering simple behaviour changes to ensure that no water is needlessly wasted, through education on how to save water including the use of dishwashers and avoiding dish pre-rinsing behaviour.

Love Water is a major campaign involving more than 40 environmental groups, charities, water companies and regulators, aimed at getting the British public involved in safeguarding water resources for future generations.

For a full list of Love Water partners & supporters visit
www.water.org.uk/love-water/

