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Institution of Civil Engineers

THE STATE OF THE NATION BRIEFING

SOUTH WEST WATER

There is a common misconception that the UK has an abundance of water, but the reality is that we have less rainfall per person than in some parts of Africa. This report highlights that the UK needs to manage water more effectively.

INTRODUCTION

Improvements to water resource and infrastructure management are needed to ensure the secure and sustainable management of water resources in the future. The UK government, water companies, the Environment Agency and Ofwat need to work together on a strategic, long-term roadmap for the management of water. The report notes the challenges of water resource management and the imbalance between demand and supply, which have been made more acute in 2012 with the onset of drought across the UK and the challenges of managing the risks in the future. The interdependencies of water, energy, food and the environment are now clear and it is time for professionals and government policy makers to establish strategic plans that recognise this fact.

THE STATE OF THE NATION
WATER 2012

THE STATE OF THE NATION: SOUTH WEST'S RECOMMENDATIONS

1:

DEMAND MANAGEMENT: FURTHER REDUCTIONS IN THE LEAKAGE FROM WATER PIPES THROUGH REPAIRS AND REPLACEMENT PIPE WORK. IMPLEMENT CHANGES TO REDUCE THE IMPACT OF WATER ABSTRACTION ON THE ENVIRONMENT. FOR EXAMPLE, THE ENVIRONMENT AGENCY'S RESTORING SUSTAINABLE ABSTRACTION PROGRAMME AND ENCOURAGING LOCALISED CAPTURE AND STORAGE METHODS FOR WATER INTENSIVE INDUSTRIES. THIS INCLUDES THE DEVELOPMENT OF SMALL RESERVOIRS FOR AGRICULTURAL USE AND LARGE RESERVOIRS WHERE APPROPRIATE.

2:

WATER COMPANY INTERCONNECTIVITY: COMPANIES SHARING WATER ON A LOCALISED SCALE. BETTER AND MORE EXTENSIVELY LINKED-UP PIPE WORK AND THE SHARING OF WATER RESOURCES. THIS WOULD ENABLE COMPANIES TO MAKE MORE EFFECTIVE USE OF WATER RESOURCES, PARTICULARLY DURING WATER STRESSED TIMES[1].

3:

RAISING AWARENESS OF THE VALUE OF WATER: ATTITUDES TOWARDS WATER NEED TO BE CHANGED THROUGH EDUCATION SO THAT PEOPLE UNDERSTAND ITS VALUE. UNIVERSAL METERING SHOULD BE ROLLED OUT, COMPLEMENTED BY DISCRETIONARY AND SOCIAL TARIFFS. MORE INCENTIVES NEED TO BE INTRODUCED TO ENCOURAGE WATER INTENSIVE INDUSTRIES TO STORE AND USE WATER MORE EFFICIENTLY.

> Until the start of April 2012, we have had the driest 18 month period for almost 100 years, raising concerns over the impact on agriculture and wildlife for the forthcoming summer period. Fortunately, high levels of rainfall over April and May have helped replenish water resources. The recent rainfall patterns have shown how reliant we are on this precious resource and how important it is to use water wisely.
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> **ADAM COOKSON, ENVIRONMENT AGENCY**

1. THE SOUTH WEST CHALLENGE

After two unusually dry winters during 2010/2011 and 2011/2012, rivers and groundwater levels across the South West were exceptionally low. Reservoir levels were in a normal range due to the way public water supply systems are managed and operated under such conditions. The prospects, however, of further dry weather and a third dry winter could start to see significant impacts on agriculture and the environment as well as the security of public water supplies. The South West needs to implement an improved and better integrated network of water infrastructure. This includes leakage management, smart metering and valuing water.

Defra predicts that by the summer of 2050 temperatures will have increased, resulting in lower summer rainfall. Encouraging households to decrease their water usage is essential[2]. There needs to be a change in behaviour brought about by demonstrating the value of water. Defra has set an aspirational target water usage of 125litres a day, but ICE believes more needs to be done and water usage should be reduced by up to a third[3].

Metering should also be implemented throughout the UK and the problem of water leakage has to be tackled. Replacing pipe work is a costly and extremely slow process, so there is a desperate need for more joined-up thinking and innovation into water resource management and usage. Feasibility studies into the effective and affordable technologies for the recycling of water are required. Also incremental reductions in leakage over the long term will prepare us for the uncertainties of climate change and population growth.

FIGURE 1: A SUGGESTED BREAKDOWN OF 100 LITRES OF WATER A DAY PER PERSON IN AN AVERAGE HOUSEHOLD – REDUCTION OF A THIRD FROM THE CURRENT AVERAGE OF 150L/DAY.

1. Future Water, The Government's Water Strategy for England. February 2008. http://archive.defra.gov.uk/environment/quality/water/strategy/pdf/future-water.pdf

2. http://ukclimateprojections.defra.gov.uk/21723 **3.** From the current average of 150l/h/d Defra

2. DEMAND MANAGEMENT

METERING

One solution of dealing with increased water consumption is by implementing universal metering in homes. In the South West, approximately 50-60% of households are metered because of high water bills due to a large extent to beach cleaning costs. One solution to encourage more households onto a meter is to introduce smart meters, which shows householder users where their water use is and allows them to monitor their usage. It also helps to identify leaks. Metering can save between 10-15% on water bills[4]. Discretionary and social tariffs, as well as further public awareness of water use, should complement universal metering.

NATURE OF THE SOUTH WEST

Peak demands in the summer and the tourism, industry put a lot of pressure on water infrastructure. A healthy, attractive water environment can be great for tourism, but large numbers of holidaymakers can put substantial stress on that environment. This is not only due to an increase in individual water usage, but an increase in usage in the hospitality sector (laundry, cleaning etc) and the wet leisure industry. Sewage treatment that the water companies are investing in has also driven water charges up in the South West, making it among the highest in the country. This has been due to European Directives to clean up bathing waters, which is worth a lot to the South West economy. The high cost has been recognised by the Government thanks to long running pressure from local MPs. The economic benefit of a thriving tourism industry does offset some of the cost of water charges.

WATER USAGE

At the moment, anyone wanting to abstract more than 20 cubic metres per day needs a licence from the Environment Agency, but there are no incentives in place to limit the amount of water they use. At present, abstractors pay for a licenced quantity and not the actual amount they take. In households per capita usage is steady, but where per capita usage is increasing incentives to lower the volume of water being used should be introduced. Another option is to encourage manufacturing industries to use non-potable water instead of treated potable water. It is possible that the treatment of water could be tailored to suit a particular industry (for example, different levels of cleanliness depending on the use). The abstraction licencing regime should be better regulated so as to ensure that water resources are allocated equitably and sustainably.

RESTORING SUSTAINABLE ABSTRACTION (RSA)

An Environment Agency initiative, this project identifies major conservation sites which are being affected by abstraction or related issues. Roughly 15 sites are being looked at in the South West, with particular regard to reducing the impact of abstraction on the region's rivers. There is one Habitats Directive Site, which is Hampshire Avon Special Area of Conservation (SAC), and there are 15 Locally Designated Sites that are going through the RSA Programme to resolve damage. Damage could be as a result of a number of causes but is predominantly due to abstraction.

TAW MARSH

Taw Marsh is important for wildlife and relies on the supply of water to sustain itself. The marsh is home to plants which flourish in boggy conditions. The River Taw crosses the marsh and is home to distinctive brown trout. Today Taw Marsh is a healthy wetland habitat, but in the late 1950s and early 1960s South West Water constructed boreholes and wells to supply water to homes and businesses in the area. Over time abstraction reduced groundwater levels in the marsh and in the river, leading to environmental damage. Studies carried out in the early 1990s showed that the habitat had now become less suitable for the native brown trout population. In 1993, the Environment Agency worked with South West Water to stop abstraction from the area and take it from the River Exe (as an interim solution). One of the conditions of the new abstraction licence was that during the term of the licence (from 1997 to 2000) they could not take water from Taw Marsh. South West Water built a new reservoir at Roadford, northwest of Dartmoor, in the 90s. Its pipelines could supply the area once served by the marsh boreholes. Manhole covers and a radon treatment works remain on the site to this day. The impact of removing them, having to use heavy machinery in the process, would be more detrimental to the site than leaving them there. So South West Water secured the site and left it. A recent site survey found a healthy habitat, which can now provide a more secure home for the native wildlife that depends on the boggy conditions.

4. UKWIR Report 05/CU/02/1 'Critical Review of Relevant Research Concerning the Effects of Charging and Collection Methods on Water Demand, Different Customer Groups and Debt' revealed households with meters use on average between 10% and 15% less water than households without meters. Meters raise awareness of water usage and provide an incentive to save water. http://www.environment-agency.gov.uk/homeandleisure/beinggreen/119027.aspx **Image reference:** Graham Hester **Image reference (opposite):** Searching for leaks: South West Water employee Mel Hogan uses specialist equipment to detect cracks in the pipe work. http://www.energysavingtrust.org.uk/In-your-home/water

3. INFRASTRUCTURE AND INVESTMENT

DEVELOPING INFRASTRUCTURE AND INVESTMENT

New build houses should be water efficient – it should be easy to use water wisely. This includes water-sensitive urban design, when designing a housing estate or another kind of development[5].

Leaking pipes are another major infrastructure problem. South West Water (SWW) uses 358 million litres (or mega litres) of water a day and they have a leakage target of 84 million litres a day, which is set by Ofwat and includes any water lost from customers' own pipes. SWW are planning to continue to meet their leakage target over the next 25 years. Wessex Water, Bristol Water and SembCorp Bournemouth Water are all planning to reduce leaks below their current target over the next 25 years[6].

WATER COMPANY INTERCONNECTIVITY

Climate change and population growth (the population of England will rise by 10 million by 2035)[7] across the South West region mean the sustainable management of water resources is critical. Water companies need to be incentivised to share water with each other if it is required.

LONG-TERM PLANNING

Population increase, climate change and environmental legislation mean there is a pressing need for water companies, Environment Agency and Ofwat to focus on improvements to water infrastructure and storage over the next 25 years. Ongoing investment in infrastructure is required. This should not only be focussed on large infrastructure assets but should include investment in ongoing operation and maintenance. The use of technology, such as sophisticated sensor networks, promises savings in cost, energy and water, now and in the future.

CHEDDAR RESERVOIR

Bristol Water plan to build a new reservoir adjacent to Cheddar Reservoir by 2022. This is in response to the impact of an estimated increase in demand for water, incremental population growth and the effects of climate change in the South West. These effects can be mitigated through managing water resources, demand management and leakage reduction. Building new reservoirs costs a lot of money and could result in an over capacity, so appropriate plans to expand existing reservoirs are considered.

"As part of our resources planning we looked at a number of options including supply, leakage options and water efficiency and monitoring. So far, we have reduced our leakage by 10%. We have employed more people to find leaks faster, we have implemented pressure reduction and we are fixing the leakiest areas first. Despite these changes, the reservoir was still required because of the impact of climate change and the increase in population."
Mike King, Bristol Water's Regulatory Director

SMALL SCALE AGRICULTURAL RESERVOIRS

Farmers in the region are being encouraged by the Environment Agency to store water used for agricultural purposes on their own land. Agricultural reservoirs can be shared by groups of farmers and used to irrigate crops and avoid the uncertainties of summer abstraction licence restrictions (in many parts of the country water is only available for abstraction during times of high flow). It is also worth noting that abstraction in the winter months (from November to March) is one tenth of the cost of summer abstractions. Agricultural reservoirs will also help the agricultural industry become more resilient to climate change in the future.

5. CIRIA - Guidance on water cycle management for new developments (WaND) (C690). **6.** Figures and information provided by South West Water's communication team and correct as of 09/05/2012 and the Water Companies Water Resource Management Plans.
7. ONS projected figures from October 2011 http://www.ons.gov.uk/ons/rel/npp/national-population-projections/2010-based-projections/stb-2010-based-npp-principal-and-key-variants.html#tab-2010-based-principal-population-projections

> It's really important to value our water resources. It provides clean drinking water in our homes, water for businesses and agriculture, but it's also important that we leave enough in the environment for wildlife, fisheries, amenity and recreation. Water requires a lot of energy to clean and move around too, so using less also reduces carbon emissions.
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> **ADAM COOKSON, ENVIRONMENT AGENCY**

4. RAISING AWARENESS OF THE VALUE OF WATER

WATER COMPANIES

Householders should be encouraged to achieve a daily water usage limit. In other words, there needs to be a change in mindset from water as an endless supply to thinking of water as a valuable resource. Supplying a service that can reduce demand and still be profitable is important. Ofwat is key to offering economic incentives to water companies and bringing about industry change.

ADVICE AND EDUCATION

Work is being done to encourage housing developers in Torbay to include water butts in developments. Even at a local level this would improve the environment and sewage treatment. If more water is stored then less will go through the system, therefore reducing the amount of waste water going through sewage treatment. From an early age people need to be taught how to use this valuable resource more considerately. If people are aware of the impact of excess water usage on the environment, they may be prompted to use less. However, customers are paying an increased price for water in order to achieve higher environmental standards. Discretionary tariffs will provide households with an understanding of the nature of their water use and social tariffs will ensure that those unable to afford water will be assisted with the financial burden.

REDUCING USAGE

Carbon reduction, climate change and population growth have a big impact on water usage and subsequently the environment. Water has a massive carbon impact, with household users responsible for a large proportion of C02 emissions[8]. Reducing usage – through water-saving toilets, turning the tap off when brushing teeth and using water-saving shower heads – can save over half a tonne of C02 emissions caused by household energy per household per year. Water usage needs to be looked at alongside electricity and gas, as a metered service. Reducing our usage of all three utilities needs to be looked at in parallel. One option is the Purple Pipe scheme. A similar idea has already been rolled out in China and Arizona, where two supply pipes run into households. The purple pipe carries recycled or grey water for car washing and gardens, flushing toilets etc. Trials are underway for retrofitting grey water, but cost, health and storage issues need to be addressed.

SMART DORCHESTER

Wessex Water Smart Meter Community Project will be rolled out in 1,000 households, local businesses and schools throughout 2012. The scheme, which is being launched in Dorchester, aims to engage people in the community in saving water. Customers who volunteer will have a smart meter. By having a meter, consumers understand the value of water and the smart meter allows them to see where the majority of their water usage is, what it costs them and how their use compares to others. Under this scheme, households, businesses and schools will receive community-based rewards when they save water – this may include vouchers for schools.

> We're placing more and more demands on the amount of water we have. Climate change and an ever growing population means the way we currently use water is damaging our natural environment and is not sustainable. To protect the UK's water supplies for the future, there are simple steps that we can all take now to reduce the amount of water being wasted, to protect our precious water resources for the future.
>
> **DEFRA**

THE STATE OF THE NATION: ICE'S MAIN RECOMMENDATIONS

The UK has a looming and significant challenge to its water security. As a matter of urgency ICE recommends that directive leadership is established to deliver a strategic, coherent and integrated water resource management roadmap to water security. ICE recommends that:

1:

GOVERNMENT SHOULD ESTABLISH A UK WATER SECURITY TASK FORCE AND ROADMAP TO DELIVER WATER SECURITY BY 2025.

- A UK Water Security Task Force, providing directive leadership, should be established by the UK governments and in collaboration with regulators and all water users should publish four national water resource management road maps and an integrated UK water security strategy no later than spring 2014
- The roadmaps should centre on water resource availability and the supply/demand balance over an extended time horizon and set out a clear plan for delivering the knowledge, governance, technologies and interventions required to provide water security for all

2:

THE IMPORTANCE OF WATER TO SOCIETY IS MORE EFFECTIVELY EMPHASISED AND WATER CONSERVATION MORE ACTIVELY PROMOTED TO DRIVE REDUCED WATER USE.

- UK governments should drive ambitious changes to reduce domestic per capita consumption by 30%.[9] Reductions across agriculture and industry should be promoted to reflect our need to conserve water
- UK governments, regulators and water companies must implement universal metering, complemented by social and discretionary tariffs, as well as demand management information, so that all water users pay for the water they use depending on the nature of that use and when they use it, whilst at the same time protecting the poor and the vulnerable
- Industry, UK governments, regulators, NGOs and Learned Societies must work together to raise the importance of water as a vital and valued natural resource to society through dedicated campaigning

3:

NEW SUSTAINABLE AND COST EFFECTIVE SUPPLY SCHEMES ARE DEVELOPED TO MAXIMISE THE USE OF WATER RESOURCES IN OUR RIVER BASINS AND WHERE APPROPRIATE AT WIDER SCALES.

- Regulators and users should work to maximise the use of available renewable water resources within catchments to ensure that water is utilised for the benefit of the public, agriculture, industry and the environment
- UK governments and regulators must remove the regulatory barriers and disincentives that prevent collaboration and limit transfers between adjacent water companies and river basins
- UK governments and regulators must remove the regulatory barriers and disincentives that hinder collaboration in investment and development for new regional water resources, particularly the water storage that will be important in addressing the temporal and spatial variations in the availability of water resources
- Water companies, in collaboration with other water abstractors, should develop new major supply schemes that have multiple uses, such as hydropower, flood control, water for agriculture, and public water supply

8. According to the Environment Agency, a typical household uses about 150 litres of water per person per day. Around 90% of household and water company emissions can be attributed to water in the home. This includes energy for heating water. The remaining 10% of emissions comes from abstracting, treating and supplying water, and subsequent wastewater treatment. http://www.environment-agency.gov.uk/business/topics/water/109835.aspx

9. From the current average of 150l/h/d

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View the full report online at
ice.org.uk/stateofthenation

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- Laura Dale, Coast Communications
- Charlotte Snooks, ICE SW
- Jo Mallard, ICE SW
- Trish Johnson, ICE SW

CONTACT

ICE South West
Unit 309
Tamar Science Park
1 Davy Road
Derriford
Plymouth, PL6 8BX

t +44 (0)1752 766239
e ice.southwest@ice.org.uk
ice.org.uk/southwest

For more information on the State of the Nation Water, please contact ICE Public Affairs:

t +44 (0)20 7665 2152
e stateofthenation@ice.org.uk
ice.org.uk/stateofthenation