Met Office

Department for Environment Food & Rural Affairs

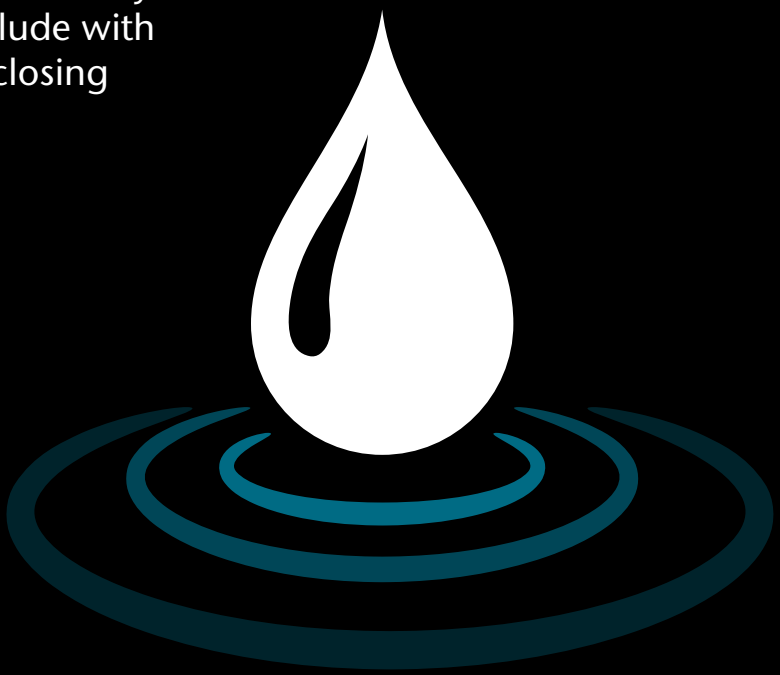
Science Museum

Water in the 21st Century

Roundtable summary

On 28 February 2013, the Met Office, Defra and the Science Museum brought together key stakeholders for a discussion under Chatham House Rules to get key influencers talking about shared issues. The event focussed on the social, economic and environmental challenges posed by too much and too little water.

This document summarises the discussion and recommendations made. It opens with an introduction to the discussion, followed by three main topic headlines that conclude with recommendations, and ends with a closing overview of the main points raised.



Our environment, our future

Sharing ideas to safeguard natural resources

Introduction

The starting point of the group's discussion on Water in the 21st Century is the reality of climate change. Global temperatures have increased by 0.8 °C since the end of the 19th century. Temperatures of England's rivers have risen by 0.6 °C over the past 30 years. The extent of Arctic sea ice reached its lowest recorded level last September.

Rainfall in the UK has always varied because of constantly changing weather patterns. However, preliminary evidence suggests we are getting slightly more rain in total and it may be falling in more intense bursts. We may also have seen a change in the nature of the rain we get, with 'extreme' daily rainfall becoming more frequent.

Between March and June last year, the extremes were stark: the South Tyne River was at its lowest recorded March monthly average, running at just 28% of its long-term average. By June, it was running at 406%. In Wales, the River Dyfi went from 43% in March to 461% of its long-term average in June.

One thing is certain: variability in rainfall can be large and may increase in future. In particular, heavy rainfall events are likely to become more frequent.

To prepare for change now, there are three key challenges: the need to improve water resilience, the need to improve flood resilience, and the need to be more adept at planning for uncertainty.

While the direction of travel as a result of climate change is clear, what the end point is or how fast it will be reached is unknown.

Have the past lessons of drought and flooding taught us enough to manage the effects of extreme changes in rainfall?

Over the last five years, the UK has seen severe extremes of flooding and drought, which has caused many difficulties for businesses and the public at large. The group acknowledged the great work carried out to date – but recognised there are still many improvements to be made.

One of the things to come out of the Pitt Review in 2007 was the need to improve flood-warning systems. On the back of its recommendation, the Met Office and Environment Agency (EA) set up the Flood Forecasting Centre. The quality of the interaction between the two organisations, as well as the level of understanding and co-operation across a broader set of issues, has been hugely positive. Warning systems have dramatically improved and regular engagement with the primary audience – made up of the resilience community and regional flood forecasters in the EA – has seen remarkable feedback.

There is still progress to be made. Currently, warning systems are calibrated on the rivers; they do not take into account surface water flooding, which can often hit first. Also, current warning systems do not predict the time it takes for a river on higher ground to swell and flood communities lower down. Delivering better and quicker warnings in that situation is important. Experiments are already underway to use automatic devices in rivers to deliver direct warnings.

It's clear that flood defence works: over the last 10 months of concentrated rainfall, flood defences built over the last few decades protected 200,000 properties. The government has already set up partnership funding mechanisms, enabling a whole range of flood defence activity. However, maintaining flood defence assets is as important as building new ones, and there is work to be done in creating 'soft' flood defence assets.

There have been marked benefits of close collaboration between agencies and local authorities, with the latter able to improve local flood resilience through a commitment to funding. Flooding is clearly not a single agency issue; the government, local authorities, water companies and environment agencies – supported by the planning agencies – all have a responsibility to take a catchment-wide approach, and use customers and stakeholders to protect critical infrastructure.

The group agreed that more needs to be done to create a true tripartite relationship between assets, communities and partnerships.

Recommendations:

- Consult with Ofwat on its forthcoming price review to take account of the need for water resilience as part of the overall water package.
- Increase links with research bodies and academic institutions to further the understanding of water resilience and develop appropriate innovations to meet the challenges it presents.

What, if any, are the barriers that affect our plans for managing current rainfall patterns – in both the public and private sectors?

The group discussed several key issues in terms of responding to and managing extreme rainfall.

Firstly, the science behind regional and seasonal forecasting is a big challenge, particularly over the medium range. Currently, there are things science cannot – and potentially will never be able to – explain or resolve.

This results in communication difficulties, predominantly because the subject of the water cycle and flooding is so complex. One minute the public are facing a hosepipe ban to address the issue of drought, the next they witness the wettest season on record. Another challenge is that climate science is perceived as rather dull; it is often sensationalised by the media, but it is difficult to build consistent public engagement and understanding. However, flooding and drought are real issues that affect the public, so more should be done to engage with them and make them part of the solution, rather than recipients of the messages.

Water companies, consumer groups and academics all agree there is much work to be done regarding how to change consumer behaviour. It's about finding the right moment of change – to give individuals and communities the incentive to be more aware of water consumption and how to reduce it, especially during times of drought.

While discussing the need for greater research, the key observation made by the group was that there are currently few research partnerships between water companies and universities, predominantly due to historical issues surrounding research council funding. But things seem to be changing. There is a greater understanding of the whole pipeline, from the strategic and innovation end of the spectrum, through to the practical end. The group concluded that strategic partnerships could help leverage funding in the future.

Lastly, a potential barrier to effective water management is population growth. It not only puts a strain on demand and supply, it also creates wider issues in terms of development. Land is being paved over and, in concentrated downpours the drains are filling up quickly due to a reliance on a network installed by the Victorians. Surface water flooding then becomes an issue. While mapping is underway by the EA, there is not as detailed a picture for the impact of surface water in relation to river water – and the subsequent effects it will have on particular catchments. It is very much a work in progress.

Concurrently, water companies have been developing imaginative ways to deal with surface water beyond the traditional assets, such as identifying fields that can be flooded in urban areas. But it's imperative that water companies, developers and planning authorities work together to look at natural landscaping further upstream, to slow the flow into the urban areas.

Recommendations:

- Greater communication between organisations and agencies will help ensure the messages to businesses and the public at large are clear, strong and consistent.
- Communicating honestly is essential – even if the message is 'we don't have the answer'.
- Take the energy sector's lead by signposting domestic appliances and such like, to help inform customers of water consumption.
- The government estimates sustainable water supply at around 130 litres per person per day. Water use is currently at an average of 150 litres per person in the UK, so work is needed to reduce demand.

In terms of future progress for water resilience, does water and policy legislation address the issues effectively? Will they provide appropriate outcomes for the economic, environmental and social needs of the country?

The short answer is, more work is needed. Due to the complexities surrounding water management, legislation can only do so much.

For example, the Flood Management Act provided for sustainable drainage in quite a complex way. If the financial responsibility can be made a bit more straightforward, that will be a big step forward.

A point raised repeatedly throughout the discussion is that the task of providing effective, nation-wide flood or drought resilience requires a multi-agency approach. The EA is responsible for understanding flood risk and flood policy. Meanwhile the councils and local authorities need to look at planning for flood resilience. Key players, including water companies, are then responsible for delivering on those policies. Developing a much more joined-up approach will broaden understanding, share skills effectively and put in place tangible solutions and policies that work.

The public account for only half of total water consumption – the remaining half is used by agriculture and industry. While business metering is working effectively in Scotland where retail competition has opened up, it is only a small part of a broader approach. More needs to be done to develop the technical aspects of water management, looking at the supply side and also water storage.

The group acknowledged that more research is required to address the uncertainty of water demand and effective demand management. While work on supply has been carried out since the 2007 Pitt Review, it has yet to be tested during a prolonged period of hot, dry weather. There's a question mark over whether water provision will be able to withstand increased demand in this scenario.

In terms of abstraction and abstraction reform, there are again many challenges. The current abstraction rules are not fit for purpose in the era of climate change. Many rivers are significantly abstracted, running dry under unacceptable conditions. In terms of abstraction licensing, there needs to be a modern system where everybody is subject to fair, sensible conditions that are transparent and understandable – and are resilient to changes in flow. We also need to consider not just abstraction – but also discharge at times of low flow, as discharge and dilution are potentially a greater issue than abstraction.

Recommendations:

- Learn from innovations in demand management that are in place overseas – such as Australia.
- Incentivise the industry to 'do the right thing' – to drive innovation, sustainability and efficient use of water resources.
- Facilitate small-scale water storage assets, particularly for the agricultural sector.

Final summary

The discussion raised some fascinating subjects and areas that need greater development, in terms of investment, innovation and partnership building.

There are some big-picture, long-term issues. Not only will climate change and climate variability alter the environment in which we have to manage water resources, demographic changes will inevitably present supply issues.

In terms of climate change and surface water, new developments in science are pushing capabilities to the limits, potentially asking science to do things that may never be possible. The big challenge is to make science practical – and give real complex problems a tangible context.

Collaboration is vital, from the government and environmental agencies, right through to the water companies and water consumers. Managing issues on the ground, and water management in general, is clearly a multi-player, multi-agency activity, one that requires a joined-up approach. It's about stitching together the whole framework of response in a more coherent way.

Communication has a crucial role to play in improving our general understanding of water and how it plays into our lives. Trying to prepare businesses and the public to deal with flooding while preparing for drought is a particularly interesting challenge.

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