

Third Castle Debate - Environmental aspects, Law and Policy. Water Security 19 April 2011

The Third Debate addressed the long-term issue of the UK's law and policies relating to water security. The Debate was held at the Athenaeum Club in London on April 19th 2011. The event was fully booked beforehand, with 70 people attending on the day.

The speakers were Professor Alan Jenkins, Centre for Water Ecology at Wallingford; Professor William Howarth, Kent Law School, University of Kent; and John Bourne, Deputy Director in the Water Availability and Quality Programme at DEFRA.

Pamela Castle, Chair's Introduction

There are many live issues relating to our water security or access to potable water in the UK arising, for example, from climate change, drought¹, population growth and diffuse pollution.

Key questions which will be considered during the debate include the following:

Can technological developments alone enable us to secure our water supplies?

Is there sufficient awareness in the public and private arenas as to how to use water more efficiently?

Can water companies make the huge investments that are necessary to develop supplies whilst keeping the price of water down?

How will water shortages in other parts of the world impinge on the UK?

Professor Alan Jenkins, Centre for Water Ecology at Wallingford:

The Centre for Water Ecology has 120 scientists working on water related issues. Alan's aim was to explain, in general terms, the natural science relating to water security for a diverse audience which includes ecologists and lay people.

What is water security? It is ensuring that we have a sufficiency of water. This in turn depends on two matters – available water supply, as well as the level of demand for water. If there is very high demand and low availability there can be a water security issue. Indeed, the South East of England has about the same level of water availability per head of population as Tunisia (whilst there is more water in South East England than in Tunisia, there are twice as many people living here (20M) than there are in Tunisia (10M)).

Water quality is an important factor to consider in the context of water security. Poor water quality can render 'available water' unavailable / unusable altogether, or only useable for a few purposes. In the longer term water security is not only about having sufficient water resources to meet demand, but also concerned with being able to cope with extremes. There will always be variability

¹ The Chair mentioned that in the third week of April 2011 there were reports that a number of reservoirs in England were reported as being only half full due to a lack of rainfall.

with our water resources, including occasional droughts. Water security is also about coping with problems caused by having too much water and increasing variability within our water supplies.

There are different types of demand for water. Water is required for basic human needs – drinking, washing. Agriculture needs water. Global demand is huge, albeit that it is not so significant in the UK apart from areas such as East Anglia. Industry needs water, and large users of water include manufacturing plants, and power generation.

These differing demands for water may give rise to competition if there are limited supplies of water. This results in the need to manage carefully the supply of water. All of these elements which make up the human demand for water will be affected by increased population. Increasing population in the South East of the UK is going to be a particular challenge to water security in the future.

In addition, another lesser known factor which influences the demand for water (and which is moving rapidly up the public policy agenda) is the protection of nature. Much work is currently being carried out to calculate the value of the ecosystem to people. The ecosystem provides many benefits including helping to regulate the climate, as well as influencing / regulating floods, and these benefits have not always been considered or appreciated in the past. If too much water is extracted from rivers, then the stability of these important natural systems might be affected.

Moreover many people are now realising that the most visible impact of climate change will be changes in water supply. Population increase is a key driver for water resources in the future. In the UK there is clearly concern about climate change, but Alan would argue that population increase is going to be a big (if not *the* biggest) driver for water security concerns over the next 20 or 20 years.

What are water resources? The only source of water is precipitation – rain and snow-melt. Precipitation is not the only way in which available water resource can be measured. Hydrology explains how water falls on the land and, particularly during the winter, how some of it goes into the ground to replenish the aquifers. Some of the precipitation runs into rivers, and some into lakes. The timing of when the precipitation occurs during the year is a very important factor in determining how the water resource can be made available to meet the above-mentioned demands.

In the North of the UK there is higher rainfall than in the rest of the country and water resources are held in lakes and reservoirs. In the South and East of the country we have a much greater reliance on aquifers (or groundwater) for our water and the recharge for this resource happens in the winter (i.e. before the growing season starts).

Alan used information from the Intergovernmental Panel on Climate Change to show global climate predictions for precipitation in the winter months, and for the summer months. There is a huge amount of uncertainty about climate change impact on precipitation across vast areas of the globe. We can be fairly certain that the UK will have generally wetter and warmer winters, and generally drier and warmer summers as a result of climate change. The downscaling from the global climate model to the UK is not done very well at present. More work is needed so that better informed assessments can be made as to where and how rainfall will come in the future.

Indeed, a key consideration when the extra rainfall comes in the winter is how it comes – will it come as many more storms or as more persistent light drizzle? When it comes in the summer, will it

come as enormous storm events where the water runs off the land very quickly, or as light rain which would be of more use in recharging surface water resources?

That said, over the past few years there have been a number of statements from policy makers which predict that weather extremes will become more prevalent in the future because of climate change and generally warmer weather.

There is, for example, a recent perception that flooding has become more persistent in the UK – e.g. the autumn and winter floods in 2007 near Oxford, and the widespread floods of 2000. However, modelling by climate scientists from Oxford University shows that there is no greater prevalence of flooding when compared with former times. There is no evidence as to either increases in the numbers of floods or the size of floods. Climate change *may* be giving rise to increased variability about flooding but it might take 10 to 20 years to confirm that this is the case.

Are we seeing more droughts? Some droughts are especially memorable: 1976 – these were the driest 16 months ever recorded in the UK, reducing river flows enormously and leading to the appointment of a Government Minister for Drought (a day later, it rained!); 2004-06 – this drought was only experienced in the South and East of the country, and it was the result of 2 very dry winters which failed to recharge aquifers. Water companies were extremely worried about a third dry winter but, luckily, that did not happen.

All we can interpret is that the last 20 years have been hydrologically volatile – lots of floods, and some droughts, but it is hard to see any trends. Wetter winters and dryer summers (as predicted by the climate change modellers) do not necessarily mean that we are going to get more floods or more droughts. Wetter winters might help water resources in the South East, but it depends on how that water comes and increased demand through increased population in the South East. Sustainable water management is going to remain as a considerable challenge because of climate change, and population growth leading to increased demand.

Alan discussed the concept of virtual water because there are many comments about it in the public domain which indicate that it is always a bad thing. Alan disagrees with this viewpoint. The Environment Agency has calculated that only 38% of total water use is actually from UK sources. Hence, 62% of the water use is embedded in the products that we import from around the world. Is it right, for example, for us to be buying green beans which are grown in Ethiopia and Kenya using their water resources? Perhaps not but this is a political question linked to trade and other benefits for the producing country. It cannot however be a problem for the UK, for example, to import beef from parts of South America where there is a sufficiency of water – hence, this would be an example of an ‘acceptable’ form of embedded water. We have to manufacture the products and foodstuffs in the right places around the globe. Given the UK’s use and dependence on embedded water, we cannot simply focus the policy discussion on what is happening in the UK – we need to look at what is happening around the globe.

Professor Bill Howarth, Kent Law School, University of Kent:

From a legal perspective, water security is a relatively novel idea. It concerns the capacity to secure continuing access to drinking water, measuring the resilience of water supplies against threats to continuing access. What sort of threats? Greater demand for water. Lesser supply caused by a range

of factors – seasonal or annual variation; demographic changes; prospect of lesser amounts of precipitation (e.g. due to climate change). The possibility that present supplies may cease to be available in the future: e.g. due to contamination, or the need to reduce abstraction in order to protect our ecological systems / mitigate the adverse effect of abstraction on watercourses.

There are some ideas which are closely related to water security which also need to be considered. The issue of international water security – unsustainable water use in arid countries; the potential for conflict where two or more countries share water resources. The debate is about UK water security, but, as Alan has indicated, we are dependent on other nations for the import of our water, creating a dependence on the continuation of water supply in those countries. We may need to look at reducing this dependency by growing more of our own food. There is also a close inter-relationship between water security and water insecurity – e.g. problems generated by excess of water resources which might be a consequence of climate change. Nationally we have had a change of approach to this in the Flood and Water Management Act 2010 – we have shifted the emphasis from flood defence to flood risk management (and this has important consequences for how flood protection is organised).

The legal response to UK water security has started to be addressed through various means. The Water Industry Act Amendments in the Water Act 2003 imposes an obligation on ‘water undertakers’ (i.e. water supply companies) to produce and maintain water resource management plans. There is considerable detail provided in the Act and accompanying regulations for the content of these plans, including consultation. The object of the exercise is that the draft plans are approved by the Secretary of State / Welsh Minister.

What are these plans about? They are a description of how the water supply companies are going to develop and manage water resources, with the objective of continuing to meet their supply obligations in the immediate and longer term. The plans extend over a 25 year period – and the water companies are setting out in these plans how they will be maintaining water supplies over this period. To do this they need to look at the available supplies, as well as the development of their supplies over this period. If there is a deficit, they need to propose measures that will meet that deficit.

All of this forms part of the legal obligation in the Water Act 2003 to produce the long-term management plan, underpinned by regulations which set out an elaborate procedure which needs to be followed to draw up the plans. It is all set against a policy background in the shape of guidelines from the Environment Agency which gives guidance (or perhaps these should be seen as instructions) as to how the water supply companies should be approaching this planning process, establishing a baseline for water development, and so forth. This is a very complex process – the guidelines are technically formulated, etc., and are seen as a kind of Bible for those engaged in the water management process.

What is to be done then to ensure water security? There are the following options — you either increase your supplies of drinkable water, reduce your demand, or adopt a combination of these approaches (the twin-track approach). This twin track approach can be reduced to the following alternatives: more water metering to reduce demand (there is an estimated 10% reduction in demand following the introduction of metering); or more reservoirs - this raises significant

environmental concerns – e.g. the environmental impact of construction, economic efficiency; and the carbon cost of new infrastructure.

Although, in principle, there are these different options, in practice there is a strong policy emphasis in the UK and across the EU on reducing demand. The Environment Agency's water strategy stresses the need for demand reduction. At the European Union level there is a European Commission communication on water scarcity and droughts which stresses that environmentally reduction of demand is preferable to the development of new infrastructure.

In addition, the Water Act 2003 imposes a new water conservation obligation on Government and other public authorities. There is a duty to conserve water. There is no explicit duty to increase water supplies by infrastructure development, but this could possibly be construed through the general duty on water companies to maintain an economic and efficient water supply system.

What progress has been made in relation water resource management plans? In 2008 water companies were busy producing their draft water management plans, complying with strict consultation requirements with public bodies and ordinary members of the public and responding to consultation. These draft plans went to the Secretary of State in 2009, and in most cases (all but 3, see below) the Secretary of State approved the drafts and authorised them to be published.

There were, however, problems with the draft plans from Thames Water, South East Water and Portsmouth Water Company. All of these water supply companies are located in the water-stressed South East of the country. All of the plans involved proposals for significant infrastructure including new reservoirs. Portsmouth agreed to go back to the drawing board and restart the planning process. There were public enquiries in relation to the draft plans for Thames Water and South East Water, followed by lengthy reports produced by Inspectors which were then agreed by the Secretary of State in final decision letters. In relation to South East Water there were shortcomings in the water management plan relating to forecasts – the justifications for some of the supply options (i.e. a reservoir near Leigh) were not clear. In relation to Thames Water, the Inspector concluded that the draft water management plan prevented a conclusion being reached as to whether the supply of water would be efficient and economical. Likewise, the justification for a proposed new reservoir near Abingdon was not sufficiently compelling.

What is the overall lesson that can be learnt from this? It is about transparency. The water resources management planning process does not prohibit the construction of new infrastructure. Likewise it does not ban new reservoirs. If the water supplier wishes to do this there needs to be a clear and robust justification for it, and they have to show that the need cannot be met by a demand control measures (and that is where Thames and South East Water came unstuck).

The final point is a genuine question – to date we have been concerned with a planning exercise which has been purely procedural. By themselves, water management plans do not save one drop of water. What matters is the implementation of these plans and that is the next stage of the process.

What will happen if a recalcitrant water company fails to implement measures in its water resource management plan? Will the plans be 'policed' by DEFRA pursuant to some regulatory order? What then is the relationship between the review of prices conducted by OFTWAT and water resource management plans – is OFTWAT going to agree to allow the funding to be provided for water

resource management measures? Is there going to be co-ordination between the Environment Agency and the water companies?

Bill will be observing this very closely over the coming years in order to gauge whether the plans are working in practice.

John Bourne, Deputy Director of Water Availability, DEFRA

John started by saying that the term 'water security' is a relatively new one, albeit that he has participated in a previous debate about on this topic. The term seems to have derived from food security which in itself is a complicated subject. A number of inter-related concepts which have a bearing on water security were considered, including: water scarcity, water stress, drought and catchment water management strategies.

Water stress in the UK is fairly extensive in the South and East of the country. Notwithstanding this, the message which often comes back to Government from many lay people is that water security is not an issue. DEFRA disagree. UK water security is not a crisis, but it is certainly an issue. Hence, looking for international comparisons, the South East of England has comparable levels of water stress to Spain and Italy.

Another way to look at water security is to consider 'water availability' – where are the available resources? Shortages of water availability are quite variable / patchy across and between different localities, but in the South East, where most people live, there is limited water availability. This has an impact on business - across a number of water stressed areas in the South East the limited water resources mean that applicants for water abstraction licences are automatically refused.

Statistics show that people are using more and more water to support their affluent lifestyles: we wash our clothes more often, water our gardens more often, wash ourselves more often and so forth. Most people in the UK use between 140 and 150 litres of water per day.

Looking at how we use water in the UK: a significant and increasing proportion is used for public water supply; energy is another major user of water (albeit that cooling water, for instance, is often returned to the rivers to be used again); in water stressed areas abstraction for public use (ordinarily 40% of available water supplies) is a significant consideration; abstraction for agricultural

use, whilst still an issue in water stressed areas (and particularly so in the summer period), is not overall as significant as abstraction for public use.

John posited the following questions as suitable for further discussion: how do we ensure we have enough water for our needs? Do we have enough water to meet peak demand, particularly during the summer months?

Looking forward, John stressed the need to maintain confidence in the water industry. Investment by the water supply companies in our water infrastructure needs to be maintained. It is currently running at approximately £4bn/year for the next 5 years). He also thought that people need to take more care over their use of water – to understand it better, and to value it more carefully. Finally, he thought that metering had benefits and was becoming more widespread.

Questions and Answers:

Q. Chair – what is the Government doing to raise awareness about water use and availability? Would it support an educational / advertising campaign so as to better educate our population?

A. John Bourne – this Government would be unlikely to regard a public advertising campaign as representing value for money. DEFRA is producing a Natural Environment White Paper over the coming months and natural ecosystems will feature in this. This will increase awareness and raise the level of debate.

Q. Katherine Deas, Managing Director, Low Carbon Workplace Ltd – what is the Government doing to roll out water metering across the country?

A. John Bourne - Meters are in place across 40% of the UK, with 70% in the South West, and uptake increasing all the time. Currently, metering can be imposed by water supply companies in water stressed areas. In addition, some of the water management plans indicate that some water supply companies have plans for metering – e.g. Southern Water will be introducing metering across their whole area; and Thames (when their plan is finalised and approved by the Secretary of State) have plans for metering in parts of their area. The use and uptake of metering will be considered further in the White Paper.

A. Bill Howarth – if a water supply company is to be allowed to construct new infrastructure (e.g. a reservoir) it will need to show that it has an aggressive plan to introduce water metering. Customers can request metering as well and then the water supply company has the option to instal.

Q. Robert Smith, Solicitor, GH Canfields LLP Solicitors – Kielder Reservoir in Northumberland was built between 1975 and 1981 to service the industries of the North East. The water has been underused due to changes in the local economy. There was, however, a plan to use the water in other areas in the event of drought. Has this plan been shelved? Further, does this demonstrate a more widespread problem for water security and management - a lack of central planning?

A. John Bourne – should we have a national grid for water? Water is very expensive to move around, and uses a lot of carbon, and it would be more expensive to build a national grid than to deploy alternative solutions. That said, there had been grand plans for Kielder, and it is not impossible for the water there to be used in other areas. Whilst it may not make sense to move water from Kielder to Cornwall, there might be issues more local to Northumberland / the North where more water sharing might provide an answer – i.e. where the water is moved relatively short distances. Government recognises that the current system, perhaps, tends to disincentive economically efficient water trading and sharing across company boundaries, and will be considering how best to address this.

Q. Sir Crispin Tickell – it is a major responsibility of Government to secure supply and hence ensure that water is available. Water desalination has been adopted in SE Australia, as well as across some of the Southern States in the USA where water prospects are very poor. Is desalination part of the plans for water security in the UK, especially given increased volatility caused by climate change?

A. John Bourne – there is a desalination plant in London which opened in 2011. The general view is that desalination can make sense if it is used as a back-up in times of peak demand. It is very energy intensive, but less so if it is only used for back-up supply.

However, the UK is nowhere near the point where large-scale desalination should be used as a major source of water supply. This is because of the cost entailed - there are cheaper solutions at hand. We are unlikely, in the foreseeable future, to be in the position of countries which have great water scarcity and which rely heavily on desalination.

A. Bill Howarth – when it comes to the notion of Government responsibility for water supply, we have to be mindful of the peculiarities of the UK's approach to water supply, given our privatised water system. The idea of Government responsibility connotes the ability to control – and this is not so simple in the UK. Responsibility for water supply does not reside with central or local government in the UK. Furthermore, water supply is a natural phenomena and it is beyond the control of anyone, let alone Government, to make it rain!

A. Alan Jenkins - desalination will become an option in the relatively near future to contribute to the mix of water supplies (i.e. not just as a back-up option).

Q. Mike Streetly, Director, ESI – the customer's willingness to pay is a key factor shaping water resource management and the long-term planning by water supply companies. This is subject to flux – e.g. the water management plans were developed pre recession when perhaps more money was thought likely to be available. When willingness / ability to pay is variable over time, how can we manage to invest steadily in our water resource management?

A. Bill Howarth – this comes back to the role of OFWAT which has responsibility to regulate the water industry by a periodic review of pricing: to allow the water supply companies to achieve a reasonable return on capital, whilst protecting the interests of consumers. In the past this might have involved allowing the water companies to put a break on certain aspects of expenditure. How will OFWAT react to water resource management measures if these have been endorsed by the Minister approving the water companies' water management plans? It is not clear how these two processes will operate in tandem.

A. Alan Jenkins – the demand for water from the environment to protect and maintain ecology needs to be kept in mind. If there is limited supply and heavy demand by agriculture, people and industry, then it has proved possible in the past to 'reduce' demand by taking water required by the environment that has then demonstrated its ability to recover over time. One question though is whether the impact of climate change might affect the environment's ability to recover in such circumstances?

A. John Bourne – balancing the different demands on water resources is difficult. Willingness to pay has a role to play, but it is not the only factor. Willingness to pay varies in respect of economic well-being, but also timing (e.g. after a drought or after a flood, the question of willingness to pay might receive a different answer).

Q. Stephen Sykes – our water security depends on many factors including our own responsibilities and behaviour and how we value the water that we use, but critically upon the robustness of the water management plans. How are these put together, and what sanctions are available if these are breached?

A. John Bourne – this is a relatively new process and hence it is untested. By encouraging or forcing water companies to go into such levels of detail, and to focus on supply and demand, the process of drawing up these plans is driving some behavioural change. This can be seen in the plans – e.g. the metering proposals for Southern Water and Thames Water. The plans will probably not be perfect. The enforcement procedures have not had to be used to date.

A. Bill Howarth – The Secretary of State has powers to issue enforcement orders so the water management plans may be enforced by DEFRA (Section 18 of the Water Industry Act).

Q. Bearing in mind the suite of chemicals which enter our rivers and seas, do we need any additional laws to protect our water environment?

A. Alan Jenkins – at the moment we know less than we ought to about the different chemical compounds which man discharges to water. The impact of these substances on ecology and organisms remains difficult to assess.

A. Bill Howarth – a recent edition of the Water Law Journal (which Bill edits) includes an article about regulating endocrine disruptors under EU legislation. The main point though is that issues of water quality (e.g. pollution) and water supply are inter-dependent. This leads on to the Water Framework Directive which sets objectives for maintaining water quality (Bill expressed reservations as to whether enough is being done to implement it).

Pamela Castle, Chair’s Summary:

The Chair thought that we can be encouraged by the level of expertise available to address the challenge faced through the creation of solutions. OFWAT has a significant role in this though, and this needs more consideration. In addition, there is a need to make the public more aware of the issues so that they can instigate measures to reduce their demand for water.