



Water Security:

Global, regional and local challenges

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Introduction

Within a generation, there could be wholesale migrations of peoples whose lands have become unviable or who have been displaced by resource wars; and there will be widespread loss of life through flood, drought and epidemic. Editorial, The Guardian, 30 November 2009

We are living in a water ‘bubble’ as unsustainable and fragile as that which precipitated the collapse in world financial markets. We are now on the verge of bankruptcy in many places with no way of paying the debt back. World Economic Forum Report (2009)

Around the world, global water problems continue to grow, adversely affecting people, prosperity and national security. This policy brief examines the scope of the problem and identifies a number of important policy considerations for addressing the issues related to this complex matter. While the management of the world’s water resources takes place primarily at the local level, this paper focuses on more complicated issues relating to the international management of trans-boundary water resources, an area of water security that does not currently receive enough attention in the literature. Given the interconnectedness of global water resources management with national security, and the strong role that the UK plays in international development and in ensuring adherence to the international rule of law, the topic is particularly relevant for consideration by policymakers (see Astle *et al* 2007).

It is now clear that military threats are not the only security challenges we face, with poverty, climate change and the recent global financial crisis having provided potential tipping points around the world. The convergence of this range of serious problems across the security triad of water–food–energy has been referred to as the ‘perfect storm’, by John Beddington, the UK Government Chief Scientific Adviser. According to Beddington, the demand for energy and food will increase by 50 per cent by 2030, while the demand for fresh water will increase by 30 per cent (see McGourty 2009).

This concern is broadly shared – for example, the World Economic Forum’s annual meeting in January 2010 planned to look at how existing global governance arrangements might be reformed in a way that better addresses the full spectrum of international challenges, including water–energy–food security issues. The creation of a Global Agenda Council on water security has been applauded by the UN Secretary General Ban Ki-Moon, who has recognised water insecurity as having the potential to exacerbate regional conflicts (Ki-Moon 2008).

This paper begins with an overview of the current global water problem, considering it from social, economic and environmental perspectives, and focusing on the challenging issue of trans-boundary waters. A second section considers the global policy framework in place to address the issue of water insecurity, before a final section evaluates various policy alternatives, including rule of law initiatives that might help to strengthen this framework.

Water in the world: what is happening and where?

The earth is covered in water, but only 3 per cent is fresh water and most of that is unevenly distributed and subject to great variability, affecting social and economic development around the globe. While nation states struggle to cope with domestic issues of water insecurity, the matter is more complex where freshwater resources cross sovereign borders. More than 260 major rivers are shared by two or more states, serving more than 70 per cent of the world's population. For example, the Himalayan glaciers feed the Indus, Ganges, Brahmaputra, Irrawaddy, Mekong, Yangtze and Yellow rivers, and serve large populations in China, India and South East Asia. However, their flows are now diminishing in quality and quantity. A recent report by the National Centre for Atmospheric Research (NCAR) analysing the flows of 925 of the planet's largest rivers found that a number of trans-boundary watercourses, including the Columbia River (Canada, USA), the Ganges (Bangladesh, Nepal, India), the Niger (Benin, Guinea, Mali, Niger, Nigeria) and the Colorado (Mexico, USA), each have diminishing flows, potentially threatening future water and food supplies (Dai *et al* 2009).

The availability of water and water use per capita varies widely around the world. The top five users of water are the United States, Australia, Italy, Japan and Mexico – where the average person tends to use well over 300 litres a day. The countries where water poverty is most pronounced – including Mozambique, Rwanda, Haiti, Ethiopia, and Uganda – have a daily per capita water use of 15 litres or less. In the UK, while Scotland is abundant in water, in some parts of England and Wales per capita water averages are less than in the Mediterranean countries of Italy, Spain and Egypt (UN Food and Agriculture Organisation [FAO] 2005). The water used in food must be taken into account too – one kilo of beef requires more than 15,000 litres of water to produce and a cup of coffee 1,200 litres of water. To complete the picture, a microchip uses 16,000 litres (Water Footprint Network 2010; for a graphical representation of water usage, accessibility and GDP in selected countries, see Circle of Blue 2009).

A recent technical report from the Intergovernmental Panel on Climate Change (IPCC), *Climate Change and Water*, surveys the impact that climate change will have on water resources and presents a series of water models that project serious shortages of water in semi-arid regions of the world such as Australia, southern Africa, Central America, the Caribbean, south-western South America, south-western United States and the Mediterranean, resulting from increased frequencies of droughts and water scarcity over the next 50 to 100 years (Bates *et al* 2008). A quick tour of the world reveals great disparities in the numbers and types of demands on the world's water resources. Africa appears likely to suffer heavily, with the combined effects of water scarcity and poverty leading to increased vulnerability for many people. A 2008 report on Africa by the United Nations Environment Programme (UNEP) warned of severe consequences unless adaptation measures are put in place to deal with threats to freshwater resources due to population growth, food insecurity, urbanisation, industrialisation, pollution of water resources, poor governance and management structures and limited scientific and technical capabilities (UNEP 2008).

The IPCC's chairman, Rajendra K. Pachauri, recently observed that 'at least 500 million people in Asia and 250 million people in China are at risk from declining glacial flows on the Tibetan Plateau' (Schneider and Pope 2008). China's lakes are severely polluted and are rapidly drying up, with some experts claiming that the country loses 20 lakes each year due to over-exploitation. A recent national audit revealed that the US\$13.3 billion spent on addressing this issue over five years has only slightly improved the situation.

Central Asia is also showing signs of water insecurity, with climate change affecting Kazakhstan's glaciers and water availability for the region. Upstream/downstream tensions continue over dam construction and operation in Tajikistan and Kyrgyzstan (including the

Nurek Dam, one of the world's biggest), with Uzbekistan raising concerns about the adverse impact for states downstream on the Amu Darya and Syr Darya rivers. And in response to serious water quality issues, Russia and Kazakhstan have formed a joint commission to protect the Ural River, which is heavily polluted by oil and gas drilling industries in both countries.

In Latin America, any future reductions in rainfall are likely to lead to severe water shortages in arid and semi-arid parts of Argentina, Chile and Brazil, while Bolivia, Colombia, Ecuador and Peru will experience reduced hydropower capacity as a result of glacier shrinkage. Severe water stress already affects eastern Central America, Guatemala (which suffered a food security crisis in the summer of 2009), and parts of El Salvador, Costa Rica, Honduras and Panama.

In Europe, forecasts are for extreme winter precipitation, but with millions of additional people living in water-stressed watersheds in 17 countries in Western Europe, and predictions of reduced hydropower potential across Europe, with a 20–50 per cent decrease expected in the Mediterranean region (Bates *et al* 2008). Australia and New Zealand will continue to suffer adverse impacts from ongoing water security problems, which are predicted to worsen in southern and eastern Australia. There are a number of water-stressed basins around the world already, and this looks to increase in the near future.

Box 1: What constitutes 'water stress'?

The IPPC defines water-stressed basins as those having either a per capita water availability below 1,000m³ per year (based on long-term average runoff) or a ratio of withdrawals to long-term average annual runoff above 0.4. A water volume of 1,000m³ per capita per year is typically more than is required for domestic, industrial and agricultural water uses. Such water-stressed basins are located in northern Africa, the Mediterranean region, the Middle East, the Near East, southern Asia, northern China, Australia, the USA, Mexico, north-eastern Brazil and the west coast of South America. The estimates for the population living in such water-stressed basins range between 1.4 billion and 2.1 billion (see Bates *et al* 2008).

One of the conclusions of the IPPC report *Climate Change and Water* was that changes in water quantity and quality due to climate change will affect food availability, stability, access and use, which in turn will exacerbate food insecurity and lead to the increased vulnerability of poor rural farmers, especially in arid parts of Asia and Africa. Another key finding was that although the management of water resources clearly impacts on many other policy areas, such as energy, health, food and nature conservation, there is little evidence of a genuinely cross-sectoral approach to finding solutions for these complex issues.

Water security: the parameters of the problem

Water security issues arise at two (often interconnected) levels: local and regional/international. At the local level, security of access to the resource is the most pressing problem; at the regional or international level, the primary focus is on military-related threats (a more traditional security approach). Thus, work by the East-West Centre, the Institute for Strategic Studies and the US Corp of Engineers (*inter alia*) are concerned primarily with threats to regional peace and security that might be caused by disputes over water. For example, hotspots such as the Middle East, the Himalayas, and Central Asia represent serious regional security issues and are now being tackled through preventive diplomacy efforts alongside technical solutions. Under this rubric, trans-boundary water cooperation is a high-level objective pursued through confidence-building measures, usually through regional meetings, diplomatic interventions and discussions. A recent example

includes the renewed diplomatic talks between Pakistan and India, where the water issue was raised and linked directly to terrorism and tensions in the region.¹

Over the past decade, the World Bank – with assistance from a broad range of bilateral donors, including DFID – has facilitated a series of meetings on the Nile (involving all 10 basin states). More recently it has also coordinated informal talks in Asia, with a focus on the Himalayan water towers, bringing together relevant countries from Southern Asia (Afghanistan, Bangladesh, Bhutan, China, India, Nepal and Pakistan). Other organisations, such as the East West Institute among others, are taking forward similar initiatives in regional contexts, such as the Middle East and South Asia.

At the security-of-access to the resource level, the local user is the primary focal point, with a range of stakeholders required to be round the table – including farmers, the corporate sector,² and an entire range of domestic government public sectors. At this scale, the challenge is ensuring adequate supplies of good quality water to meet the needs of all users within the nation state. Issues related to national economic policy, including food security and assigning and enforcing priority of use when there is insufficient supply or excessive supply (i.e. floods) to meet demand are matters for domestic government regulation.

There are challenges related to competition for freshwater resources across sectors and around the world. While there may be enough water to meet many needs, there are problems with quality, quantity and distribution. Often it is those who need it the most who suffer the most – water traditionally flows upstream to money. For example, when the city of Barcelona ran short of water in 2008, it purchased shiploads of water from Marseille. Cyprus had tankers of water sent from Greece in the same year. In an international context, the richest states are generally able to buy their way into the resource market (and now international land-grabs are occurring for agricultural production beyond national borders), but grave questions arise in the case of poorer states, leaving local users in these situations at risk. Indeed at the local level, where demand might exceed supply, conflicts-of-use are widespread, and hold the potential to aggravate regional stability through localised hostilities.

Despite the fact that the last war over water occurred some 4,500 years ago³, disputes over international waters are both common and current (see Gleick 2008). While water has never been the sole reason for an international armed confrontation, it has been used on numerous occasions as a military target or tool (Gleick 2006). The potential for water wars might seem low, but conflicts of use over water are alive and well.

The international community has attempted to resolve some of these issues. At the second World Water Forum convened at The Hague in March 2000, the Ministerial Declaration entitled 'Water Security in the Twenty-First Century' listed seven 'main challenges' to achieving water security:

1. Meeting basic needs
2. Securing food supply
3. Protecting ecosystems
4. Sharing water resources
5. Managing risks

1. "Yet Pakistan observers argue that the water issue is a recruitment tool for terrorist groups in their country. The leadership of Lashkar-e-Taiba, which carried out the Mumbai attacks, has warned that "Muslims dying of thirst would drink the blood of India," according to the Hindustan Times' (Circle of Blue 2010).

2. According to Dilley and Hikisch (2009), water is 'essential to almost every product and service our society relies on. By the same token, water is a risk to business. Water insecurity can cause rising material costs, disruptions in the supply chain, increased competition, and regional conflict.'

3. A treaty ended the water war between the ancient Mesopotamian city states of Lagash and Umma (see Postel and Wolf 2001).

6. Valuing water

7. Governing water wisely. (World Water Council 2000)

This declaration was the first inter-governmental, high-level pronouncement on the term 'water security,' and it built on a large number of global water initiatives, beginning with the 1977 Mar Del Plata conference and including, inter alia, the 1992 Dublin Principles, Chapter 18 of Agenda 21, the World Summit on Sustainable Development, the Millennium Development Goals, and the ongoing World Water Forums convened by the World Water Council⁴ (see UN 1977, International Conference on Water and the Environment 1992, UNDESA 1992, UN 2000, and World Water Council 2009).

International interest in this issue has deepened: there are now some 24 UN agencies involved with water-related issues, and in 2003, the UN-Water organisation was established to coordinate UN action on freshwater and sanitation. There are also several non-governmental organisations that engage on water security issues, including the World Economic Forum (see WEF Global Agenda Council on Water Security 2009) and the Global Water Partnership (see Global Water Partnership 2010).

A framework for understanding water security: the three 'As'

A number of definitions of 'water security' have been proffered, including:

- A safe water supply and sanitation, water for food production, hydro-solidarity (see below) between those living upstream and those living downstream in a river basin, and water pollution avoidance so that the water in aquifers and rivers remains useable – that is, not too polluted for use for water supply, industrial production, agricultural use or the protection of biodiversity, wetlands, and aquatic systems in rivers and coastal waters (Falkenmark 2001).
- Adequate protection from water-related disasters and diseases and access to sufficient quantity and quality of water, at affordable cost, to meet the basic food, energy and other requirements essential for leading a healthy and productive life without compromising the sustainability of vital ecosystems (Jansky *et al* 2008).
- The reliable availability of an acceptable quantity and quality of water for health, livelihoods and production, coupled with an acceptable level of water-related risks (see Grey and Sadoff 2005, Wouters 2005 and Global Water Partnership 2000).

A recent work has devised a Legal Analytical Framework that identifies the three core constituent elements of water security (Wouters *et al* 2009):

- (i) *Availability* (controlled supply of quality and safe water)
- (ii) *Access* (enforceable rights to water for a range of stakeholders)
- (iii) *Addressing conflicts-of-use* (where competing uses occur, a mechanism to avoid and/or address disputes is needed).

In addressing the global, regional and local challenges relating to water security, this framework highlights issues that require closer scrutiny when assessing the level of security or insecurity associated with water resources. Thus, whether or not: (i) adequate quantity and quality of water is *available* for use; (ii) individuals and ecosystems have *access* to adequate water, and, (iii) in the event of a conflict-of-use scenario, there exists a robust mechanism for *addressing/avoiding conflicts*, these are matters that must be determined on a case by case basis. At the level of the users, whether they are farmers, industrialists or nation states, each of these elements is crucial and may mean the difference between water security and water insecurity (see Box 2 below).

4. The World Water Council has organised five World Water Forums, the most recently convened in Istanbul. Together these meetings have attracted more than 80,000 delegates, with significant global impact (see World Water Council 2009).

Box 2: The water security analytical framework

	Water security	Water insecurity
Availability	Early warning system on entire river basin system with treaty provisions (e.g. UN Economic Commission for Europe 1992 Helsinki Convention)	No warning system and downstream (e.g. Mozambique during Zambezi river floods)
Access	Constitutional provision for access to water (e.g. South Africa constitution)	No legal right to water and insufficient fresh water to meet all needs
Addressing conflicts-of-use	Functioning dispute avoidance /settlement mechanisms	No dispute avoidance/ settlement mechanisms

Towards greater water security: policy proposals

In this section, a number of policy problems and concomitant proposals to enhance global water security are assessed.

1. The need to deal with rampant uncertainty, emerging tipping points and competition for water

The water security issue is fraught with uncertainty and complexity, with the recent IPPC report on climate change noting significant gaps in information, including a lack of robust forward-planning models, which renders decision-making difficult (Bates *et al* 2008). It was also observed that the management of water resources has an impact on many other areas of policy (such as energy projections, land use, food security and nature conservation) and that the available tools to appraise adaptation and mitigation options across multiple water-dependent sectors remain inadequate (ibid).

There is a clear need for better data and information, which could assist with reducing uncertainty. The Global Agenda Council on Water Security calls for an improved and universally accessible data-set on water, covering a broad range of indicators and information, available to all stakeholders. Some work has been done in this area, with the World Business Council on Sustainable Development producing a Global Water Tool aimed at improving knowledge of local water situations as an important foundation for improved global water management (World Business Council on Sustainable Development 2009).

Additional business intelligence is offered under a 2009 McKinsey & Company report, which predicts that 42 per cent of the global water demand in 2030 will come from four countries (China, India, South Africa and Brazil) and suggests that competing uses will result in a 40 per cent shortage in supply in the same period. Such a scenario threatens already risk-burdened economic strategies by national governments around the world – one Indian finance minister asserted that each of his budgets was a gamble on rain, a situation recurring throughout arid and semi-arid countries around the globe.

2. The big picture: understanding and working with cross-sectoral connections

Water security concerns cut across sectors and are linked intrinsically in dynamic ways to energy, food and the environment. As one analyst notes, ‘a comprehensive view of water security involves taking into account the water needs of all the sectors that consume or harness water, including industry, agriculture, and energy, and domestic water use in both

urban and rural settings' (Grobicki 2009). National governments will have to address this challenge and recognise the need to link up the spectrum of related national policy issues. A recent landmark decision in Chile used an international convention (art. ILO 169) to grant a water flow to indigenous communities, following a 14-year-long battle between the Aymara communities and Agua Mineral Chusmiza, a company seeking the rights to bottle and sell freshwater from a source used historically by Aymara indigenous residents. The decision supporting indigenous communities' rights to reclaim private resource rights (albeit granted by licence by the state) may affect Chile's mining industry, which accounts for more than 50 per cent of all exports.

The IPCC report summarises the policy implications for a range of sectors resulting from water challenges linked with climate change, including:

- Water resource management (more drought and more extreme precipitation)
- Ecosystems (decline in resilience and adaptability)
- Agriculture and forests (increased floods and droughts will adversely impact significantly crop yields and livestock)
- Coastal systems and low-lying areas (sea-level rise and increased salinity will result in decreased freshwater availability)
- Industry (adverse impact on infrastructure, such as urban water supply systems and transport routes), settlement and society (adverse impacts from flooding damage)
- Sanitation and human health (adverse impacts from decreased water quality and availability). (Bates *et al* 2009)

It has been suggested that global trade offers one way of managing water security issues, although the global trade system for agriculture is outdated and in urgent need of reform. Trading 'virtual water' therefore presents its own set of challenges (including trade inequities). There is also a link with energy security needs. The United States and the EU are greatly concerned with improving energy security, and these types of policy decisions must take into account linkages with water, as well as climate and food. Growing urbanisation will drive the need for increased and better infrastructure, and also make greater demands on consumption, most of which is linked to water. As populations become richer, their demands for high-end products – many of which are water-intensive to make and/or use – will increase. This trend is already leading to water insecurity in some regions.

However, despite the complexity of these interconnected problems, there is a clarion call to engage:

Rather than retreating in the face of all these challenges to human security, it is essential that nations, organisations, business and civil society seek new ways to tackle their shared concerns. Opening up intersectoral dialogue and debate around water security will contribute to finding the solutions. (Grobicki 2009)

Governments must take action both on their own and in coordination with others, and indeed the recently concluded Amman Declaration on Regional Cooperation on Water calls on parliamentarians to take the lead, to show courage and build the political will necessary to address these issues at the local, regional and international levels (East West Institute 2009).

3. The vulnerability chain: water flows upstream to money and the UK commitment to poverty alleviation

From the numerous United Nations, NGO, and corporate reports on water, it is evident that the vulnerability chain linking water users is weaker in some parts of the world, and for some particular groups (such as women and farmers), than others (see UNEP 2008).

The UK, through the Department for International Development (DFID), is committed to poverty alleviation overseas and has increased its contribution to the international development water sector, seeking to have a real impact on achieving the UN Millennium Development Goals (MDGs). Given the cross-cutting nature of water and the links, direct and indirect, with each of the MDGs (discussed above), a targeted focus on assisting poorer states with managing their water resources would make a lot of sense and perhaps increase the overall poverty-alleviation impact. DFID appears to have recognised this, stating in a recent report on the sector:

...the World Health Organization (WHO) estimates that for every 50 pence invested in safe water and basic sanitation, the economic returns will range from £1.50 to £17, depending on the region and the technology. This means that while achieving the MDG targets on water and sanitation will require an annual investment of over £5 billion, doing so will deliver economic benefits of around £42 billion a year.
(Department for International Development 2010)

Box 3: Potential contribution (direct and indirect) of the water sector to attain specific Millennium Development Goals

Goal 1: Eradicate extreme poverty and hunger

- Water is a factor in many production activities (e.g. agriculture, animal husbandry, cottage industries)
- Sustainable production of fish, tree crops and other food brought together in common property resources
- Reduced ecosystem degradation improves local-level sustainable development (indirect)
- Reduced urban hunger by means of cheaper food from more reliable water supplies (indirect)

Goal 2: Achieve universal education

- Improved school attendance through improved health and reduced water-carrying burdens, especially for girls (indirect)

Goal 3: Promote gender equity and empower women

- Development of gender-sensitive water management programmes
- Reduce time wasted and health burdens through improved water service, leading to more time for income-earning and more balanced gender roles

Goal 4: Reduce child mortality

- Improved access to drinking water of more adequate quantity and better quality, and improved sanitation, to reduce the main factors of morbidity and mortality in young children

Goal 6: Combat HIV/AIDS, malaria and other diseases

- Improved access to water and sanitation supports HIV/AIDS-affected households and may improve the impact of health care programmes
- Better water management reduces mosquito habitats and the risk of malaria transmission

Goal 7: Ensure environmental sustainability

- Improved water management reduces water consumption and recycles nutrients and organic material
- Actions to ensure access to improved and, possibly, productive ecological sanitation systems for poor households
- Actions to improve water supply and sanitation services for poor communities
- Actions to reduce wastewater discharge and improve environmental health in slum areas
- Develop operation, maintenance, and cost recovery system to ensure sustainability of service delivery (indirect)

Source: Bates *et al* 2008: 131

DFID, working with partners including national governments, states its aim to be a major part of the global effort to 'ensure that water resources are managed in an effective and equitable way that promotes economic growth, improves security and helps countries cope with climate change' (DFID 2010). This objective aligns directly with issues related to water security and a closer examination of how this is achieved on the ground is warranted.

4. Promoting and implementing hydro-solidarity and hydro-diplomacy within and beyond the water box

It has been proposed that the concept of 'hydro-solidarity',⁵ which is founded on the ideas of collective action, interdependence and a community-of-interests approach, can offer a fresh perspective, or even a conceptual and possibly operational platform for implementing the emerging legal notion of water security.

Hydro-solidarity at the international level involves nation states sharing and competing for the same resource in a collaborative manner, and finds its legal foundation in the *River Oder* case decided by the Permanent Court of International Justice (1929), which referred to the community-of-interests in an international watercourse. Collective action, based on cooperative mechanisms (reaching and implementing agreements; establishing and supporting trans-boundary institutional mechanisms; collecting and sharing scientific data and information; engaging with civil society and ensuring public participation), is the prerequisite for achieving regional water security, addressing both the imperative to maintain the integrity of the resource and the need to meet social and economic development objectives (Benvenisti 1996).⁶

The hydro-solidarity paradigm spans the spectrum of actors with an interest in water security and calls for a new understanding of collective action, including the benefits of global cooperation and enhanced water governance, especially within the context of trans-boundary watercourses. Implementing such an approach raises many challenges, and as one scholar has noted, the task facing an (imaginary) 'water tsar', even at just the national level, requires the sage-like ability to, at once, understand fully the big picture and have information, knowledge and resources to act prudently, taking into account everyone's interest (Briscoe 2009).

5. Applying and being seen to apply the rule of law

Geo-politics divides nation states on a number of levels – placing them upstream or downstream (or mid-stream) on shared watercourses; providing some with mountains, some with valleys; some with abundant natural resources (oil) and some with barren deserts; some with great populations and some with small ones. The law of nations constructed as a platform for peace, prosperity and security following the Second World War considers all states to be sovereign equals, with each obliged to act in ways consistent with the UN charter. The war in Iraq and the global financial crisis, to name just two examples, have demonstrated how sovereign states, and especially the most powerful and wealthy nations, have acted unilaterally in ways that challenge the universal rules of international law. Despite these actions, the rule of law continues to underpin (and should be seen to underpin) the architecture of international relations, and offers a compelling framework for cooperation in the field of international trans-boundary watercourses.

International water law offers a broad range of principles, rules, norms and mechanisms that are entirely suited to addressing the water security concerns of most nations, river basins and

5. According to Falkenmark (who introduced this term): 'hydro-solidarity' describes 'an ethical basis for wise water governance and provides a background for balancing between upstream and downstream water use and between human use and ecosystems needs. Philosophically, it is the opposite of 'hydro-egoism,' the all-too-prevalent fragmented and sectoral approach to water management, where the strongest lobbyists tend to win' (Falkenmark *et al* 2003).

6. Briscoe (2009: 14) relates the story of Arthur Cotton, a British military engineer, who built a barrage at the top of India's Krishn Delta, providing secure irrigation supplies that transformed the area, and made him a local hero.

regions. As most of the world's population depends on trans-boundary water resources, ideal solutions will be based on compromise, fairness and rationality. There is a correlation between a state's ability to ensure the water security of its population and the existence of a legal framework guiding the use of its shared water resources. The integral elements of water security – availability, access, and addressing conflicts-of-use – find expression and normative meaning in international water law (treaties and rules of custom).

International law must not be considered the only possible tool for addressing these complex matters – it is not a panacea. Science and policy will also play important roles, because the management of freshwater is largely an issue of allocation and (re)distribution. However, the importance of a transparent, credible, and responsive legal framework cannot be overlooked, since the existence of an agreed legal regime contributes to water security by providing a clear system for addressing specific issues of shared water development and management, based on identifying, considering and determining all relevant factors.

Water law serves three key functions:

- It defines and identifies the legal rights and obligations tied to water use (broadly defined) and provides the prescriptive parameters for resource development and management
- It provides tools for ensuring the continuous integrity of the regime – that is, through monitoring and assessment of compliance and implementation, dispute prevention, and settlement
- It allows for modifications of the existing regime, in order to be able to adapt to changing needs and circumstances. (Wouters 2000)

Based on its firm support for the 'rule of law', the UK should reconsider its stance on the current global ratification campaign of the 1997 UN Watercourses Convention (UN WC), which offers a useful framework for nation states on how to peacefully manage their shared trans-boundary freshwaters. The UN WC was adopted in 1997 by the UN General Assembly with some 104 states voting in support (with 38 states sponsoring the Resolution). While the UN WC has yet to enter into force (for myriad, but no compelling, reasons), the UK should join other national governments (Germany, Sweden, the Netherlands, Finland) that lead the global ratification campaign, in line with the initiative supported through the UN Secretary General's Advisory Board (Hashimoto I, Hashimoto II Reports). With 18 state parties at present⁷, only 17 more are needed for the UN WC to enter into force. State practice certainly supports the UN WC, with numerous regional treaties following its provisions in their agreements (for example, arrangements to manage the Sava River Basin, Incomati and Maputo Basins, Lake Victoria, Zambezi, Mekong), and the International Court of Justice endorsing it in its 1997 Gabčíkovo-Nagymaros case regarding the Danube. Less than half of the world's trans-boundary waters are currently covered by treaties, which poses challenges for effective cooperative management of shared freshwaters. Now would therefore be a good time for the UK to show its leadership on such an important issue.

The UK government, under DFID, has taken some action on this issue, for example by funding a project that looks at international architecture in the global water sector. More can be done, however, especially if a coherent story is to be told around the rule of law and hydro-diplomacy nexus. Leadership from the Cabinet Office (on national security issues), the Foreign and Commonwealth Office (international diplomacy) and the Department of the Environment, Food and Rural Affairs (environmental issues), could consider a joined-up UK Government approach on this issue – what we need is leadership on this point. A forward-looking approach would be based on the rule of law, coupled with national security concerns

7. These states are: Cote d'Ivoire, Finland, Germany, Hungary, Iraq, Jordan, Lebanon, Libya, Luxembourg, Namibia, Netherlands, Norway, Paraguay, Portugal, Qatar, South Africa, Spain, Sweden, Syria, Tunisia, Uzbekistan, Venezuela and Yemen.

and aimed at promoting the higher-level objectives found under the law of nations promoting regional peace and security and precluding unilateral action (for example, the construction of a dam to divert water). Thus, trans-boundary watercourse states should be required (and be seen) to abide by the legal regime that applies to all – in good faith, and consistent with the overall principles of the international law.

6. Contributing to good (water) governance and capacity issues

Good water governance at the local, regional and international levels would help to solve global water problems. In fact, many describe the water crisis as a crisis of governance. However, despite universal recognition of the need for improved governance at the international level, only one third of the world's trans-boundary basins have treaties in place to govern their use, according to a UNEP report (UNEP 2002). The 2001 Declaration of African Ministers highlighted the fact that most of Africa's trans-boundary basins lack any agreements and lack effective institutional arrangements. More than this, however, is the lack of capacity (human and financial) at the *local level* to deal with the extensive range of problems linked with effective water resources management. It is this crisis of governance – the lack of local water capacity – that needs to be addressed urgently.

The UK justifiably prides itself on providing global leadership in education, especially in higher education, and it should be urged to make a stronger contribution in the area of good water governance. The approach should be two-pronged and focus on investing in providing higher-education opportunities in the UK and abroad in the area of water law, policy and science. The aim should be for UK leadership in developing the next generation of local water leaders and enhancing capacity in-country, based fundamentally on the importance of the rule of law. This is a natural extension of the national security concerns currently exercising the UK and other national governments around the globe, and provides unique opportunities for the UK to extend its leadership-mentoring and diplomatic outreach in a critical area – regional peace and security through trans-boundary water security. Indeed, the role of an informed civil society could not be more important than in the way it contributes to the planning on how we use our water more wisely.

The challenge is enormous, but worth every effort – and it is clear that the UK is well-placed to do more. Winston Churchill helped to lay the foundation for the peace of nations in the Atlantic Charter, and the UK must return to such fundamentals. Let us revisit how the rule might be the platform for constructing enhanced global security through addressing the world's water problems.

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