

## Brief No. 8

# WATER WORLDS: THE FUTURE OF WATER SECURITY

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### KEY MESSAGES

- Water stress is increasing. It is not just a matter of too little or too much water but of balancing between multiple uses and users and ensuring the right amount at the right place, right time and right quality. The challenge extends beyond 'blue' water security to green-, grey- and virtual-water management.
- The drivers of water stress are multiple and diverse and interconnected and nonlinear changes increase the potential for sudden and unexpected changes leading to water crisis.
- Policy responses to climate and other concerns have intensified linkages between water and other systems. The Food-Energy-Water Nexus has been referred to as 'a perfect storm' by the UK Chief Scientist. The complexity of connections, the proliferation of feedbacks loops and the diversity of relevant perspectives have made it more challenging, if not impossible, to develop science and policy on the basis of 'predict and control' approaches.
- To avoid increased conflict and water crisis, there is the need to enable more seats at the water table: trade and business, cities, local communities, national governments, regional authorities, and a seat for wildlife, watersheds and other ecosystems.
- Futures-orientated research, such as scenarios, can help inform water security challenges, identify new 'hot spots', avoid conflict and encourage more effective and collaborative leadership. New tools such as water footprint analysis and virtual water accounting are also being deployed by companies, cities and communities to avoid a water crisis.

# 1 THE WATER CHALLENGE

Water stress is increasing in every sector, in all parts of the world, even in those with good access to fresh water. It is predicted that by 2030 the world will need 30 percent more available fresh water and will need to produce 50 percent more food and energy, while mitigating and adapting to climate change.<sup>1</sup> Currently, global per capita availability of freshwater is steadily decreasing and this trend will inevitably continue with population growth and augmenting consumption levels in developing countries.

The world is not “running out of water”, but it is not always available when and where people, ecosystems and companies need it. Climate, normal seasonal variations, droughts and floods can all contribute to

local extreme conditions. It is not just a matter of too much or too little freshwater (blue water), but also a challenge of allocation between different users and users and ensuring the right quality, in the right place, at the right time. Added to this is the fact that water is not distributed evenly over the globe. Fewer than 10 countries possess 60% of the world’s available freshwater supply.<sup>2</sup>

The drivers of water stress and insecurity are multiple, diverse and interconnected. The concept of water stress is relatively simple: it applies to situations where there is not enough water of the right quality, in the right place, at the right time for to meet all needs of agricultural, industrial or domestic users and ecosystems.

Water stress results from the complex interplay of numerous actors and factors across multiple dimensions and scales – local to global. Dealing with increasing water stress and avoiding water security

crises, in turn, carries knock-on effects for other areas. For example South East Water wants to take 20m litres a day from the River Ouse in Sussex to make up for shortages in supply, which will be potentially devastating for local wildlife.<sup>3</sup>

# 2 WATER AS A SOCIAL CONFLICT AND CROSS- CUTTING ISSUE

Water resource allocation and management is a politically contentious and cross-cutting issue. The needs of the poor and the role of markets and pricing are often overlooked when thinking about water. Water pricing in many parts of the world does not reflect the true value of water which can encourage profligate use and waste. At the same time, poor people can pay an extortionate price for water services because the role of business in providing fair, affordable water and sanitation has not been enabled.

Balancing the needs of competing users and users requires businesses, local and municipal authorities, and national government to work together. There is the need for more seats at the strategic water table, representing not just the interests of governments, businesses and communities, but also taking into account the role of watersheds (ecosystems and biodiversity). Bringing together these different interests, uses and users in constructive dialogue that enables

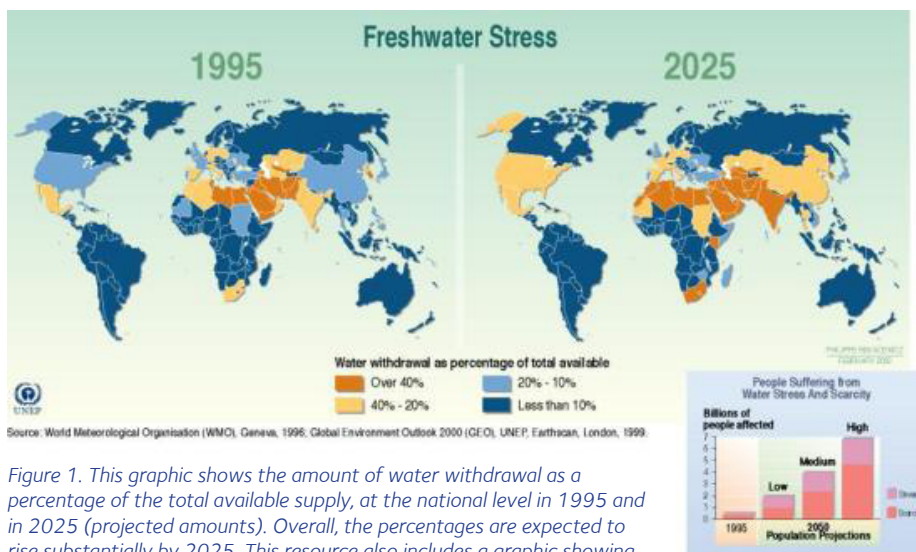


Figure 1. This graphic shows the amount of water withdrawal as a percentage of the total available supply, at the national level in 1995 and in 2025 (projected amounts). Overall, the percentages are expected to rise substantially by 2025. This resource also includes a graphic showing the number of people suffering from water stress and water scarcity worldwide in 1995, compared to projected rates for the year 2050. As the population continues to rise, the number of people affected by water stress and water scarcity is expected to rise sharply.

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fair, affordable and sustainable access and use is not unproblematic. The future can provide a safe space to overcome gridlock and prejudice, enable more constructive exchange and negotiation, forge new common ground and identify more and better solutions.

### 3 NEW CONCEPTS, TOOLS AND APPROACHES

The complex, uncertain and connected nature of the water security challenges has spurred the development of new approaches and analysis methods, such as water footprinting, virtual water accounting and collaborative foresight initiatives.

#### Learning from the future: collaborative futures and scenario planning

Despite historical tensions, there is not a history of water wars. However, in recent years it has become more common to hear media reports about the prospect of water wars between nations, fuelled by the increasing numbers of reports of conflict over water between different users and uses. It is important, but not easy, to consider the longer term future of water. Futures-orientated approaches include methods such as scenario planning, visioning and back casting and integrated assessment modelling. Rather than relying on predictions of the future, scenarios help groups to learn with the

future, encouraging new thinking and providing a safe space to work through values conflict and forge new common ground, as well as a basis for identifying potential hotspots that, left unaddressed, might lead to water crisis. Visioning and back casting offer a way to navigate complex, interconnected challenges such as the 'perfect storm' of the 'food-energy-water' nexus.

The future is not passive, it offers a space for creative learning and collaborative leadership and encourages different questions to be asked:

- What water future(s) do we need to be prepared for?
- What can we learn from the futures of water?
- How can we create a more sustainable future?

Foresight initiatives are being deployed to encourage and sustain more effective collaboration by harnessing the future as a safe space to bring together the many different seats around the water table.

#### Collaborative Futures: Business in the World of Water

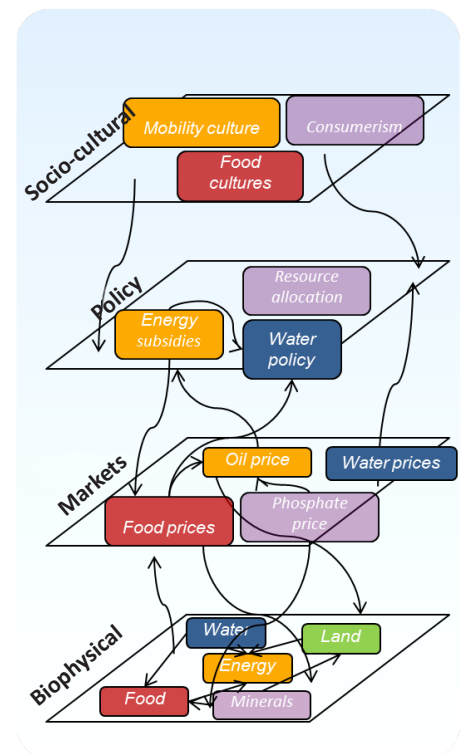
The WBCSD4 publication 'Business in the world of water: WBCSD Water Scenarios to 2025' describes plausible, alternative futures of water, detailing the economic, environmental and social implications of each. By choosing to build scenarios, the WBCSD created a cross-sector platform which enables a more systemic and shared understanding of water-related changes and challenges. Using scenarios to engage with uncertainty and as a means to reveal and respect

different perspectives, this initiative looked beyond today's problems to explore new solutions.

Three scenarios, called 'H, 2 and O' were developed with the involvement of a wider range of stakeholders representing different interests in different world regions.

'Hydro' is the story of hydro efficiency. It highlights the challenges of technological lock ins and avoiding social and cultural legacies which inhibit water reuse and pricing. It highlights economic opportunities in technological innovations relating to water. '2' is the story of rivalry in water security, allowing enough water of sufficient quality for both the haves and have-nots. It notes that business may increasingly risk its license to operate where they are competing with basic human needs or are out of

Figure 2. The food-energy-water nexus



Scenario / key implications	H (Hydro)	2 (Rivers)	O (Ocean)
Water challenge	<b>Efficiency</b> (more drops and more value per drop)	<b>Security</b> (quantity and quality for all)	<b>Interconnectivity</b> (taking account of the whole system)
Business challenge	Innovation	Social licence to operate	Role in water governance

Figure 3. WBCSD Water Scenarios to 2025

touch with political realities. ‘Oceans’ is the story of interconnectivity – accounting for the sustainability of the whole system. In the world of Oceans, businesses realise that they cannot help particular communities survive and prosper at the expense of causing water stress elsewhere.

### Water Footprint Analysis

Water ‘footprinting’ or the analysis of water on a life cycle basis is becoming a significant tool in addressing water security issues. Water footprints have been developed for individual consumer products (e.g. a car) and by individual companies and cities and nations. The water footprint looks at both direct and indirect water use, defined as the total volume of freshwater that is used to produce the goods and services consumed by the individual or community or produced by the business.<sup>6</sup>

### Virtual Water

Some water experts use the term ‘virtual water’ to describe the water that is embedded both in agricultural and manufactured products, as well as the water used in the growing or manufacturing process. When a country exports goods, it is exporting ‘virtual water’. Many businesses have a supply-chain water footprint and/or an end-user footprint that is much larger than the operational water footprint. For

example, think of the water it takes to grow and produce food products, and the water people need for personal washing and laundry.<sup>7</sup>

The global volume of international virtual water flows in relation to trade in agricultural and industrial products averaged 2320 billion m<sup>3</sup> per year during the period 1996–2005 (Mekonnen and Hoekstra, 2011). For water-scarce countries it can sometimes be attractive to import virtual water (through import of water-intensive products), thus relieving the pressure on the domestic water resources. Mexico, for example, imports maize and in doing so it saves 12 billion m<sup>3</sup>/yr of its national water resources. This is the volume of water that it would need domestically if it had to produce the imported maize within the country.<sup>8</sup>

The use of scenario planning, water footprinting and/or virtual water accounting, can help businesses, cities and governments to anticipate water challenges and understand their direct and indirect uses of water. Such tools can also help plan future strategic moves when faced with water security or water scarcity issues. Using futures methods and approaches offers opportunities to engage collaboratively with different uses and users to ensure we can prepare for different possible water futures.

### REFERENCES & NOTES

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