

# Briefing

## Water: our global impact

### Summary

Water is one of our most precious resources, yet we are over consuming and misusing fresh water and polluting our supplies. This briefing sets out some of the global pressures on freshwater supplies, and how the right to water is being eroded and vital natural systems and biodiversity are being harmed. It explores the issues related to the UK and EU import of water through imported products and provides actions for governments, businesses and consumers to help protect freshwater supplies.

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For more than 40 years we've seen that the wellbeing of people and planet go hand in hand – and it's been the inspiration for our campaigns. Together with thousands of people like you we've secured safer food and water, defended wildlife and natural habitats, championed the move to clean energy and acted to keep our climate stable. Be a Friend of the Earth – see things differently.

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## Introduction

This may be the blue planet, but 97.5 per cent of the world’s water is locked in seas and oceans, too salty for human use<sup>i</sup>. Of the 2.5 per cent remaining, most is in the polar ice caps. Humanity depends on the tiny proportion of the planet’s water that is available as fresh water.

We know that without water there is no life – in the biological or societal sense – but for too long this finite and vulnerable resource has been taken for granted. Peter Gleick at the Pacific Institute coined the term ‘peak water’ to highlight the limits to what can be recharged and absorbed by natural processes<sup>ii</sup>. However, unlike the ‘peak oil’ concept, there are no alternatives to water. Yet with wilful ignorance of the limits on water availability and pressures on consumption, extractive industries and urbanisation have driven over-abstraction, waste and pollution.

Agriculture is the greatest burden on water, accounting for 71 per cent of global water withdrawals. Land and water are being privatised at an unprecedented rate for the production of crops, not only for food, but for energy too – both conventional and new energy such as biofuels. People are being pushed off their lands and having their right to water denied to feed the world’s growing consumption of water. The United Nations' projection is that by 2025, 1.8 billion people will be living in regions with severe water scarcity, and that two-thirds of the world's population could be living under water-stressed conditions<sup>iii</sup>.

This briefing presents some of the most pressing freshwater issues facing us globally and how we can act to minimise our global impact and support communities working to protect their supplies and environment.

## **Future threats to freshwater supplies**

### **Climate change**

Human activities are warming the planet and drastically altering the Earth's water cycle. Climate change will produce new water scarcities and droughts, as well as more flooding and water-based emergencies. Higher temperatures will mean the atmosphere can hold increasing amounts of water, leading to more frequent and heavier rainfall in some regions of the world. In other regions, the accelerated melting of inland glaciers will ultimately mean that they disappear, and lakes and rivers such as the all-important Ganges and Yangtze, will lose their water supply<sup>iv</sup>.

Already, arid regions like southern Africa and the Mediterranean are facing reduced rainfall, rising temperatures and evaporation<sup>v</sup>. Global models predict that climate change will cause more severe and widespread droughts in the next 30-90 years in Europe, eastern USA, Southeast Asia and Brazil<sup>vi</sup>. The Horn of Africa has already been the site of devastating droughts, and in 2011 extreme water and food shortages took lives and drove hundreds of thousands of people to flee from the area<sup>vii</sup>.

Salinity is already an issue that is damaging people's health and agricultural lands in areas of freshwater over-abstraction. In the Bay of Bengal, salty seawater is intruding up to 100 km inland from the coast and thousands of people are finding themselves unable to survive in the area during the dry season. Climate change will exacerbate the problem by pushing up sea levels and increasing saline intrusions into freshwater supplies<sup>viii</sup>.

### **Increased demand and overuse**

Direct threats from droughts and floods are not the only cause for concern. Climate change pressures will combine with increasing demand to create new scenarios of water scarcity. The global population is expected to grow by 50 per cent between 2000 and 2050<sup>x</sup> and analyses suggest that food shortages could rise by an additional 20 per cent, particularly in regions like Southeast Asia where water resources are already scarce<sup>x</sup>. We currently use 6,000 km<sup>3</sup> fresh water (all uses), of which 4,200 km<sup>3</sup> is used for agriculture. Rising affluence in some regions will drive more water-intensive diets, which will require an additional 5,200 km<sup>3</sup> of irrigation water per year by 2050<sup>xi</sup>, as well as greater domestic and industrial demands for water and energy.

### **Overuse of groundwater freshwater supplies**

Groundwater is the largest source of unfrozen fresh water in the world and it supplies fresh water drawn for domestic (36 per cent), agricultural (42 per cent) and industrial (27 per cent) demands.

Groundwater is also a buffer against climate extremes, when it becomes a vital source of water and food security for vulnerable communities in rural parts of low-income countries. Groundwater will become increasingly valuable as consumption pressures increase, and the changing climate gives rise to greater extremes and variability in rainfall, soil moisture and surface water<sup>xii</sup>. It will also become increasingly scarce.

Groundwater aquifers are recharged mainly by rainfall or from surface water<sup>xiii</sup>, both of which will be affected by climate change. In the 2050s models predict that under a high greenhouse gas emissions scenario, almost one-fifth of the global population will experience a 10 per cent decrease in refreshment of groundwater supplies<sup>xiv</sup>, and this will be coupled with increasing groundwater abstraction. Yet many parts of the world are already experiencing a groundwater crisis.

Groundwater abstraction accelerated in many parts of the world from the 1970s onwards when intensive and commercial approaches to agriculture were rolled out in what was coined the 'green revolution'<sup>xv</sup>. This use of water resources means that today, India's aquifers are some of the most depleted and contaminated in the world<sup>xvi</sup>. The problem is exacerbated by periods of weak monsoon rainfall, as occurred in 2012, and by droughts, such as that of 2009<sup>xvii</sup>.

In some parts of the world where fresh water is scarce, salt water is desalinated to produce fresh water suitable for human consumption or irrigation. The number of desalination plants is growing worldwide and while desalination can be an important solution<sup>xviii</sup>, there are concerns over the high energy use required, chemical discharges and harm to ocean wildlife<sup>xix</sup>.

## Pollution

An additional threat to global water resources and habitats is through pollution. Farming, industrial leakages, energy production, and domestic use all contribute to polluted supplies. This is a huge area of concern and is noted here only.

## Hidden water: water footprints and virtual water

Water permeates every aspect of our lives. The average person in the UK uses 150 litres of water each day for domestic needs alone, including drinking, cooking, washing and sanitation. This is already far greater than the UN's recommended 20-50 litres as the minimum needed<sup>xx</sup>. But this is just the tip of the iceberg: we indirectly consume a volume far greater than this in the products and services we buy and use – from our daily pint of milk to the cars we drive. Importing water-intensive goods from water-scarce countries increases the pressure on local water resources.

The concept 'virtual water' helps us to understand the increasingly globalised nature of water consumption. Virtual water is the water embedded in globally-traded commodities, including water consumed and polluted<sup>xxi</sup>.

One way of measuring our virtual water is using the 'water footprint'. This idea was developed by the scientist Arjen Hoekstra to highlight the hidden water consumption of

individuals, businesses and communities, taking into account whole supply chains<sup>xxii</sup>. Applying the concept in the UK makes 150 litres look like quite a modest figure in comparison with our average daily water footprint of 4,645 litres<sup>xxiii</sup>.

Of those 4,645 litres consumed daily in the UK, 62 per cent is the water of other nations. Friends of the Earth Europe's Under Pressure report revealed how the increasing worldwide trade in the amount of embedded or virtual water used is steadily rising, as many goods require water for their production<sup>xxiv</sup>.

### Meat's large water footprint

The UK lies at the high end of the global per capita daily water footprint range of 2,000-5,000 litres, in part because of the meat we consume<sup>xxv</sup>. The average UK citizen consumes 18 kg of beef per year, which is twice the global average<sup>xxvi</sup>. Producing 1 kg of intensively-reared beef requires 15,000 litres of water – ten times what it takes for 1 kg of grain<sup>xxvii</sup>.

The footprints of meat products are even greater when nutritional content is included. For example, the water footprint per calorie of industrially-reared beef is 20 times that for cereals<sup>xxviii</sup>. Animal feed is the dominant factor in the amount of water used to produce meat, and relates to both the amount and type of feed consumed by livestock over their lifespan. Producing meat in intensive systems and using cereal feeds like soya, used in intensive chicken and pork production, can consume and pollute more surface and groundwater than in grazing or mixed systems<sup>xxix</sup>. Grain-based animal feeds use 43 times more irrigation water than pasture-based animal feeds<sup>xxx</sup>.

Already nearly one-third of the total footprint of global agriculture is related to the production of animal products, but as animal production systems are becoming increasingly intensified<sup>xxxi</sup> and global meat consumption is expected to keep rising, this is set to increase<sup>xxxii</sup>.

However, detailed modelling shows that in the European Union (EU), cutting down the total amount of meat in diets could reduce the water footprints of the agricultural products people consume and shift the EU from a net virtual water importer to a net exporter<sup>xxxiii</sup>.

### Products

It is not only the food system which consumes water. The production of one cotton t-shirt requires 2,700 litres of water, most of which is contributed by the farming of cotton, an irrigation-intensive crop. Monocultivation of cotton also leads to enormous environmental problems, as has occurred in the area of the Aral Lake in Central Asia. Once the fourth-largest inland lake on Earth; since 1960 it has lost 70 per cent of its water due to irrigation of cotton fields<sup>xxxiv</sup>.

The diversion of the Aral Sea in Kazakhstan and Uzbekistan for the irrigation of export crops is widely considered to be one of the world's worst ecological disasters. The sea's shrinking and contaminations have caused biodiversity loss, lost livelihoods and mass emigration of local people<sup>xxxv</sup>. Across the planet, hydropower dams have sprung up on all of the major rivers of the world<sup>xxxvi</sup>, causing the displacement and re-settlement of millions of people.

On average, every single smartphone requires 1,000 litres of water to produce it, largely from obtaining raw materials and electrical manufacturing. Apple sold around 93 million

smartphones in 2011 – producing these used enough water to fill Wembley Stadium more than 80 times. Friends of the Earth’s Make It Better campaign is calling for companies to take responsibility for how they use water to ensure supplies are protected.

### Water use in energy production

Energy production is hugely water intensive, so water use is predicted to increase with growth in demand. Some of the water used is taken out of natural cycles and contaminated. This includes water for high-pressure hydraulic fracturing of underground rock formations for natural gas and oil – or ‘fracking’. Water is also used in coal-fired power plants, in nuclear power systems, and to grow crops for biofuels.

If today’s policies remain in place, the International Energy Authority (IEA) calculates that water consumed for energy production will more than double from 66 billion cubic metres (bcm) to 135 bcm annually by 2035<sup>xxxvii</sup>. Small-scale use of water in systems such as hydroelectric turbines does allow water to return to natural systems, but large-scale hydro power such as dams can be devastating [see Box: News on Mekong].

In the context of growing concerns over greenhouse gas (GHG) emissions from transport and over peak oil, much investment has gone into developing alternative fuels, especially biofuels produced from crops such as palm oil, soya and sugarcane. Subsidies, loans and policies like the EU’s Renewable Energy Directive have driven the expansion of crops grown for fuel, often in the global South.

Far from being a ‘green’ energy source, biofuels have the potential to increase global GHG emissions rather than reducing them<sup>xxxviii</sup>. They are also often highly water intensive, requiring huge volumes of water for crop irrigation and throughout the production process. The water footprint of biofuels varies between crops and countries but sorghum tends to have the largest water footprint, requiring on average 7,000 litres of water to produce one litre of ethanol; even sugar beet, with the smallest water footprint, consumes 1,200 litres of water per litre of ethanol produced<sup>xxxix</sup>. These water footprints can include water that has been diverted away from local water users, threatening lives and livelihoods in a process known as **water grabbing**. But identifying who is losing out is usually hard. As the Transnational Institute says

*“The issue of water grabs is a particularly slippery one. Unlike land, water flows and moves from one place to another; its availability goes up and down, affected by the seasons, human use, or climate change; it can be visible on the surface and invisible underground. It can be a source of food, or disease and pollution. Rights, access and uses are complex and varied.”<sup>xi</sup>*

#### News on Mekong

The 5,000 km long Mekong River forms a vast river basin estimated to support up to 100 million people as it passes through China, Myanmar, Lao PDR, Thailand, Cambodia and Vietnam. Fishing communities in particular depend heavily on it. Yet water grabbing for hydroelectric power generation is blocking migrating fish from reaching their spawning grounds and holding back nutrient-rich sediment which sustains aquatic ecosystems and inland fisheries. With a total of 50 dams in the Mekong basin, only 46 per cent of the original ecosystem is estimated to remain intact<sup>xli</sup>. With many more water infrastructure projects in the pipeline, the battle over the Mekong River as a source of fish versus a source of electricity is set to intensify<sup>xlii</sup>.

## Water grabs and the New Colonialism

The footprints of the products we consume have another hidden cost. Water grabs occur when water and land are sold or leased to governments and companies without the involvement of local land users or recognition of their customary laws. The rush for land and water across much of the world is being driven by the high international demand for energy, raw materials and crops for food, biofuels and livestock feed. Land and water deals have undermined the livelihoods and food sovereignty of local communities.

### Privatisation

Much water grabbing is facilitated by the push for privatisation of services, whereby publicly and commonly-owned resources are sold to individuals or private organisations<sup>xliii</sup>. As water security declines, the demand for water resources across national borders for nations or industries is rising.

Multi-billion dollar companies eager to profit from the business of using and supplying so-called 'liquid gold' are acquiring the rights to water on a huge scale<sup>xliv</sup>. In a Citigroup report on water investments, their chief economist stated that water will "*become eventually the single most important physical-commodity based asset class, dwarfing oil, copper, agricultural commodities and precious metals*"<sup>xlv</sup>. A former senior advisor on water to the UN General Assembly, Maude Barlow, has warned that private interests are also infiltrating international governance processes. She argues that UN initiatives like the CEO Water Mandate put transnational corporations into positions of influence over global water policy<sup>xlvi</sup>.

### Land for water

Acquisitions of land and water have accelerated in the past decade, linked to recent food price spikes, as well as growing financial speculation on food and increasing demand for biofuel crops. Countries seek to outsource their water consumption and meet the food demands of their citizens by importing virtual water within food<sup>xlvii</sup>. A 2013 report found that the volume of nations' water being grabbed for crop and livestock production would be enough to meet and exceed each country's per capita water requirements for food security<sup>xlviii</sup>.

In Ethiopia, over two million people require food aid, yet millions of hectares of fertile lands are being sold and leased by the government to foreign investors. Saudi Arabia, a country rich in land but poor in water, has decided to reduce domestic cereal production to conserve its scarce water, looking instead to invest in production abroad<sup>xlix</sup>. The Saudi Star Development Company has purchased rights to irrigate a 100,000 hectare (ha) rice plantation in the Gambela region of Ethiopia with water from the Alwero River<sup>l</sup>. Local Anuak people have been forced to relinquish their ancestral lands and are finding their livelihoods decimated as their key source of water for farming, fishing and raising livestock is snatched from them<sup>li</sup>.

### Dodgy deals

Land deals occurring around the globe usually feature a narrative of 'untapped' or abundant water resources<sup>lii</sup>. Such assumptions often mean that water resources are undervalued by

governments keen to attract foreign investment [see Box: Eroded water rights]. A recent analysis commented that current leasing mechanisms in Ethiopia do not take into account the acquisition of water or local water scarcity, and do not sufficiently enforce legislation protecting communities and environments<sup>lii</sup>.

Processes for selling and leasing water are often uncoordinated and take place behind closed doors. Mozambican Water Law is supposed to prioritise rural households' water use for domestic and subsistence needs; however, it does not require rights to use common land to be registered, making them much easier for planners to ignore<sup>liv</sup>. [See Box: Eroded water rights.]

### Eroded water rights

In Mali, 100,000 ha of land is currently cultivated, largely by smallholders, but 600,000 ha have been allocated for large-scale farming in the past decade<sup>lv</sup>. Three ministries in Mali can lease water rights, but they do so on very uneven terms<sup>lvi</sup> and tension is rising as the government attempts to recentralise water management, while foreign investors press for regional control<sup>lvii</sup>. Moreover, acquisitions are often underpriced or granted in exchange for infrastructure commitments. For example, a subsidiary of Libya's sovereign wealth fund was offered a 50 year renewable lease for 100,000 ha of land for free, plus unlimited access to water for a user fee, in exchange for agreeing to construct a 40 km irrigation canal<sup>lviii</sup>. The canal will divert large volumes of water from the Niger River, threatening the irrigation systems of small-scale farmers and already causing the closure of local women's market gardens<sup>lix</sup>.

### Mining

Mining, usually for minerals for export, can have a major impact on local water resources and habitats. The management of water in Chile was privatised under Pinochet's dictatorship in 1981, in a move which ever since has benefitted private interests, particularly those of foreign mining companies. Protestors are today struggling to have repealed a water code which grants the state the right to hand over water use to companies free of charge and indefinitely, without taking into account the water rights of local people<sup>lx</sup>. In Peru, the large mining company Yanacocha, backed by government policies and local authorities, is using its negotiating power and coercive techniques like offering compensation, to overcome resistance by farmers and take control of water away from local farming communities<sup>lxi</sup>.

### Transboundary tensions over grabs

The United Nations has announced 2013 as the International Year of Water Cooperation<sup>lxii</sup>. This comes after a report last year by the InterAction Council, an association of 37 former heads of state and government, identifying water as an "urgent security issue"<sup>lxiii</sup>. While full-blown 'water wars' are unlikely, inter-state conflicts over water are increasing as water basins crossing international boundaries become ever more precious<sup>lxiv</sup>.

The Nile Basin countries are in a precarious situation due to the combined threats of climate change, population pressures, hydropolitical tensions and foreign investment<sup>lxv</sup>. The



populations of Egypt, Sudan, Ethiopia and Uganda are expected to increase by 50 per cent in the next 20 years, while the aridity of the region will worsen as climate change drives warming and accelerated evaporation<sup>lxvi</sup>.

These tensions are complicated further by the explosion of land and water grabbing in the basin. China has already financed eight dams in the region and Ethiopia has leased one million hectares to nearly 900 companies since 2009<sup>lxvii</sup>. Most of this land will need to be irrigated by water diverted from the Nile's watercourse towards the countries downstream<sup>lxviii</sup>. Whether these developments lead to increasingly unilateral behaviour and the diversion of water from countries down-stream, or whether they catalyse international cooperation over water resources is yet to be seen.

### Conclusions: what would wise management of global water look like?

Fresh water is one of our most vital natural resources. Not only is it essential to sustain life itself, it plays a crucial role in economic development and social well-being. This is being recognised in new development frameworks and agreements [see Box: Global agreements – some progress but not enough].

Given the globalisation of trade, ensuring protection of water and water rights for all must be a global goal for institutions, governments and businesses. Individuals also have a role to play both as consumers of goods which have a water footprint but also in demanding fair and sustainable water policies.

#### Global agreements – some progress but not enough

The United Nations announced last year that the Millennium Development Goal (MDG) for drinking water was attained, while the sanitation target will be far from met by 2015, when the MDGs expire<sup>lxix</sup>. The international community is now shifting away from a narrow focus on domestic water uses, to a 'water security' perspective, as championed by the UN earlier in 2013<sup>lxx</sup>. This perspective is being advocated for inclusion as one of the Sustainable Development Goals, which will replace the MDGs, shifting the debate to reflect the necessity of water for sustainable livelihoods, human well-being, socio-economic development, dealing with pollution and disasters such as drought and floods, ecosystem preservation and political stability<sup>lxxi</sup>. No agreement so far adequately covers the issues of water rights, water grabs and the trade in virtual water driven by consumption.

#### Some key areas for action

In the UK, Friends of the Earth works to protect water supplies and enhance freshwater and marine habitats through its network of local activists and its regional and national advocacy work. To safeguard global freshwater protection we advocate the following key areas for action by governments, businesses, international agencies and consumers:

- **Measuring and setting targets to reduce water use.** For Europe as a whole and in individual countries, we need to measure water and other resource use and set targets for reducing it. This should take account of the embedded resources of

products and services, allowing us to better see their interdependent and inseparable nature. In order to achieve this we need the EU to develop and adopt footprint indicators of resource use<sup>lxxii</sup>, and to start using them in policymaking. In this way it will be possible to avoid trade-offs and to set meaningful resource-reduction targets.

- **Strong EU rules on company reporting**, obliging large companies to measure and manage the amount of resources that they use. Our Make It Better campaign is calling for the new rules currently proposed by the European Commission to be strengthened so it is clear that companies must disclose this information about each stage of their supply chain, including right back to the use of water-intensive mines and fields, and that they report on any potential risks these operations pose to people and the environment, such as pollution of fresh drinking water or wildlife loss. This new information will help prevent problems going undetected, make it easier to hold companies to account, and help them identify opportunities for efficiency and invest in improving water management and innovation.
- **Promoting low-impact consumption.** For instance, governments and businesses should promote policies which encourage lower water diets (including reduced meat consumption), and greater durability of clothing and other water-intensive products and services. Our Sustainable Diets campaign<sup>lxxiii</sup> works to promote such policies in Government procurement, marketing, and farm subsidies and investment. Production and consumption of energy including biofuels is highly water demanding and so energy reduction strategies which take account of water use must be developed.
- **Action on climate change** – investment in green energy sources that contribute to climate mitigation but are low in water use, e.g. small-scale community energy projects (small scale hydroelectric for instance, where the water is recycled to the natural environment); and strategies to reduce investment in dirty energy by the Government and others.
- **Making accessible and affordable fresh water a human right.** The European Commission should introduce legislation implementing the right to water and sanitation as recognised by the United Nations, and promoting the provision of water and sanitation as essential public services for all<sup>lxxiv</sup>.
- **Consumer action.** The Government should provide consumers with the tools to understand the water impacts of their consumption and advice on how to reduce it, to protect UK and global freshwater supplies. A quick tool to calculate your personal footprint can be found on the Water Footprint network site at <http://www.waterfootprint.org/?page=files/YourWaterFootprint>. You can also support campaigns related to water such as End Water Poverty <http://www.endwaterpoverty.org/> and the Blueprint for Water <http://www.blueprintforwater.org.uk/>
- **The water utilities** should consider the energy use in producing potable water supplies for non-potable purposes and how to reduce the waste this represents. Building regulations should stimulate water recycling/grey water systems in UK and EU building stock.

Friends of the Earth International<sup>lxxv</sup> is the world's largest grassroots environmental network. It campaigns on today's most urgent environmental and social issues. Water is a major concern for many national groups around the world who are working with partners locally to

protect drinking water supplies and important wildlife areas from unsustainable and inequitable development.

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