Global-Water-Crisis-The-Facts

Technical Report · January 2017

DOI: 10.13140/RG.2.2.14415.02720

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GLOBAL WATER CRISIS:

THE FACTS

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Suggested Citation: Guppy, L., Anderson, K., 2017. Water Crisis Report. United Nations University Institute for Water, Environment and Health, Hamilton, Canada.

Cover image: Pixabay.com

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Download at: http://inweh.unu.edu

ISBN: 978-92-808-6083-2

UNU-INWEH is supported by the Government of Canada through Global Affairs Canada.

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Executive Summary

Water is a foundation of life and livelihoods, and is key to sustainable development. Successful water management will serve as a foundation for the achievement of many ofthe 17 Sustainable Development Goals (SDGs), as well as for SDG 6 - which is to 'Ensure availability and sustainable management of water and sanitation for all'.

Despite this, water is becoming a pressing societal and geopolitical issue – in some regions, it is already of critical national concern. 'Business as usual' will mean the world will miss water-related SDGs by a wide margin; up to 40% of the world's population will be living in seriously water-stressed areas by 2035; and the ability of ecosystems to provide fresh water supplies will become increasingly compromised.

60% of fresh water comes from river basins that cross national borders. Transboundary water agreements need to be robust enough to deal with increasingly uncertain environmental and climatic conditions, and the social and demographic changes that will raise global population to 9.7 billion by 2050 and double the number of people who live in urban areas.

Different conceptualisations of water can and have led to conflict. The perception of water as a human right and a common public and environmental good is often opposed by the view of water as a commodity that needs to be priced to ensure efficient and sustainable use. Not only nations but provinces and communities will need to align water perspectives to allow for peaceful and effective integrated water resource management and sustainable use.

Effective management will mean tackling neglected issues such as water wastage in current systems, which has been estimated to be up to 30%; common institutional dysfunction, unethical practices, poor accountability, and corruption in the water sectors of many countries.

This report highlights looming water crises from 6 inter-related contexts: water scarcity and insecurity, water-related disasters, water, sanitation and health (WASH) crisis, water infrastructure deterioration and destruction, unsustainable development, and ecosystem degradation.

UN agencies, governments and civil societies have made clear that radical new approaches to water are needed to reverse these sobering water trends. Only by facing these crises in an intelligent and cohesive way will water continue to support life, development and biodiversity for our children and our future.

112 million

people were affected by floods 2005-2015

40% gap

between water demand and water available by 2030

1.8 billion

people now use a source of drinking water contaminated by faeces

80%

or more wastewater returns to the environment without adequate treatment

30%

of global water abstraction is lost through leakage

US$114 billion per year

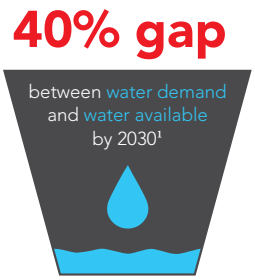
or more than 3 times the current level of capital investment is needed to achieve the Sustainable Development Goal 6 targets on water supply, sanitation and hygiene (6.1 and 6.2). The amount of money needed to meet the other targets of the "water goal" is currently unknown.

12.6 million

deaths

were attributable to the environment globally in 2012

Water scarcity and insecurity



The notion that water is plentiful – it covers 70% of the planet – is false, as only 2.5% of all water is freshwater. This limited resource will need to support a projected population of 9.7 billion in 2050; and by that date, an estimated 3.9 billion – or over 40% of the world's population - will live in severely water-stressed river basins[2].

It is not just population that is pressuring water resources. Excessive use is also evident: the global population tripled in the 20th century, but the use of water increased six-fold[3]. Between now and 2050, water demands are expected to increase by 400% from manufacturing, and by 130% from household use[4].

As water availability decreases, competition for access to this limited resource will increase. 60% of all surface fresh water comes from internationally shared river basins[5] and there are an estimated 592 transboundary aquifers. Continuing cooperation and coordination between nations is crucial to ensuring water is available for human, economic and environmental needs. Although hundreds of international water agreements have been signed over time[6], how countries will cooperatively manage growing resource pressures so that they do not lead to more conflicts over water is not often clear.

Water insecurity can be exacerbated by drought. More people are affected by drought than any other disaster type. In 2016, 411 million people in total were affected by disasters and 94% of those were drought affected[7]. Droughts are also the costliest disasters, with significant impacts on agriculture in particular; droughts cause an average US$6–8 billion worth of losses in agriculture in the USA annually[8]. In China, drought has resulted in an annual grain production loss of more than 27 million tons over the last two decades; and from the 1950s to the beginning of this century, the annual average crop area suffering from drought has expanded from 11.6 million hectares to 25.1 million hectares, an increase of 116%[9].

If water were secured for irrigated agriculture, the potential global welfare gain for reduced risk in 2010 would have been US$94 billion. Findings also show that enhanced water security can help stabilise food crop production and prices. In a water secure scenario, the probability of global wheat production falling below 650 million tons per year is reduced from 83% to 38%[10].

There has been a **55%** drop in globally available fresh water per capita since 1960[11]

By 2030, global demand for water is expected to grow by **50%**[12]

Water scarcity currently affects more than **40%** of the global population[13]

By 2050, an additional **2.3 billion** people can be expected to be living in areas with severe waterstress, especially in North and South Africa and South and Central Asia[14]

Agriculture accounts for **70%** of all water withdrawals globally and for over **90%** in the majority of Least Developed Countries (LDCs)...[15]

and **70%** more food will be needed by 2050[16]

Water scarcity, exacerbated by climate change, could cost some regions up to **6% of their GDP**[17]

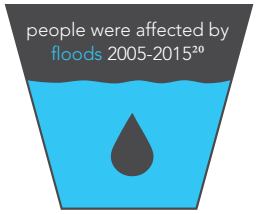
The 5th assessment of the Intergovernmental Panel on Climate Change (IPCC) projects that for each degree of global warming, approximately **7%** of the global population will be exposed to a decrease of renewable water resources of at least **20%**[18]

Worldwide, the total cost of water insecurity to the global economy is estimated at **US$500 billion** annually. Including environmental impacts, this figure may rise to **1%** of global gross domestic product (GDP)[19]

Water-related disasters

112 million

people were affected by floods 2005-2015[20]



It is vital to protect investments in water-related infrastructure from shocks and stresses. In 2009, the World Bank estimated that by 2030, around half the Bank's water sector portfolio – which was then US$8.8 billion committed and US$11.3 billion in pipeline – would be at high to medium risk of exposure to climate change impacts[21].

In addition, hydrologic hazards are leading to significant deaths, displacements and injuries. Up to 90% of all disasters are water-related, and over the last two decades, floods have been the most frequent global natural disaster[22]; in 2016, 50% of all recorded events were related to flooding. The total value of all assets that are at risk from flooding by 2050 is predicted to be US$45 trillion: a rise of over 340% from 2010[23].

Between 1970 and 2010 the world's population increased by 87%, from 3.7 billion to 6.9 billion. During the same period, the annual average population exposed to flood increased by 112% - from 33.3 to 70.4 million per year[24].

By 2050, rising populations in flood-prone lands, climate change, deforestation, loss of wetlands and rising sea levels can be expected to increase the number of people vulnerable to flood disaster to 2 billion[25].

The UN was prompted to release warnings about urban flash floods after hundreds died in Guatemala, the USA and southern France in 2015 – stating that under a changing climate, intense rainfall and urbanisation have made these disasters more common in the last two decades[26].

Water-related ecosystems can mitigate water-related disasters. Every hectare of mangrove and coastal marsh is worth up to US$15,161 a year in disaster-related services[27], and coastal wetlands helped to avoid more than $625 million in damages from Hurricane Sandy in 2012[28]. Coral reefs act as wave barriers, and as an example of their effectiveness in risk reduction, spending US$1 million a year on restoring reefs at the Folkestone Marine Park on the west coast of Barbados could lower annual storm losses there by US$20 million[29].

Despite these risk reduction benefits, water-related ecosystems globally are in decline. In parts of Asia and the Americas, up to half of all coastal mangrove ecosystems have been degraded or destroyed[30].

Water-related disasters account for

70% of all deaths

related to natural disasters[31]

Worldwide flood damage amounted to over

US$50 billion

in 2013 and is increasing[32]

More than

107,000 people

died due to hydrological disasters (floods and landslides) between 2000 and 2016[33]

Several studies estimate that by 2050 between

150 and 200 million people

could be displaced as a consequence of phenomena, such as desertification, sea level rise and increased extreme weather events[34]

Floods and landslides have cost an estimated

US$453,000,000

between 2000 and 2016[35]

Water, sanitation and health (WASH) crisis

1.8 billion

people now use a source of drinking water contaminated by faeces[36]

Although progress has been made in supplying drinking water to more people year on year, 663 million people still lack 'improved' drinking water sources in 2015[37] - and for many people, this 'improved' water is not always safe, reliable, affordable or accessible with equity. For example, around 45 million people in Bangladesh drink water that contains arsenic concentrations greater than WHO standards allow[38].

Sanitation and hygiene have made less progress, with 2.4 billion people lacking improved sanitation facilities[39]. Equity in sanitation and hygiene access is of particular concern. Seven out of ten people without improved sanitation facilities, and nine out of ten people still practicing open defecation, live in rural areas; and a lack of these services often disproportionately affect women and girls, who can not only suffer health repercussions but personal danger when services are not available and not secure. Diarrheal diseases, long associated with poor water and sanitation, account for 1 in 9 child deaths worldwide, making diarrhea the third leading cause of death among children under the age of 5[40]. Poor water, sanitation and hygiene are major contributors to neglected tropical diseases like schistosomiasis, trachoma and intestinal worms, which affect more than 1.5 billion people every year[41].

It is not only households that lack adequate services: in low and middle income countries (LMICs), workplaces, schools and health facilities also lack WASH. In a 2015 survey of LMICs, 38% of health facilities did not have an improved water source, 35% did not have soap and water for handwashing and 19% did not have improved sanitation[42]. The lack of universal WASH in schools costs an estimated 1863 million days of school attendance globally[43].

The WASH crisis does not only affect low income countries. In Canada, there are approximately five thousand homes in First Nations communities that lack basic water and sewage services[44]. Compared to other Canadians, First Nations' homes are ninety times more likely to be without running water[45].

If radical change is not affected, universal water, sanitation and hygiene – as described in SDG targets 6.1 and 6.2 - will not be reached. A World Bank report[46] found that capital investments must increase by approximately 3 times to achieve the water supply, sanitation, and hygiene (WASH) targets globally. Another study has estimated that WASH efforts will need to exceed current trends by almost four times to achieve SDG 6.1 and 6.2 by 2030[47].

Unsafe water, poor sanitation and hygiene cause approximately

3.5 million

deaths worldwide; the latter estimate represents 25 per cent of the deaths of children younger than 14[48]

2.4 billion people

- more than one third of the global population – do not use improved sanitation facilities[49]

One in ten people

has no choice but to defecate in the open[50]

Globally, approximately

US$260 billion

is lost each year to the effects of poor sanitation and unsafe water on many aspects of the economy, but most significantly on healthcare[51]

In India, the time spent looking for a toilet or finding somewhere to go in the open costs the economy over

US$10 billion

every year in lost productivity – 20% of GDP[52]

1,000 children

die each day due to preventable water and sanitation-related diseases[53]

Water infrastructure deterioration and destruction

80%

or more wastewater returns to the environment without adequate treatment[54]

30%

of global water abstraction is lost through leakage[55]

Under the Millennium Development Goals, many populations counted as being 'served' by water supply actually were allocated to systems that had failed. Although there may be as many as 60,000 new handpumps being constructed in Africa every year[56], a 2007 study found 36% of hand pumps across 21 countries in sub-Saharan Africa were not functional[57]. This represents a loss of between US$1.2 and 1.5 billion in investments.

The total cost to water utilities worldwide caused by 'non-revenue water' – a combination of physical and commercial losses - has been conservatively estimated at US$141 billion per year. In developing countries, approximately 45 million cubic meters per day are lost through water infrastructure leakage — enough to serve nearly 200 million people[58]. This problem will only get worse if water infrastructure is not maintained properly, even for high income countries; for example, the capital investment needed to maintain aging water infrastructure in the USA will reach an estimated US$195 billion in 2040, but if current funding trends continue, needs will be underfunded by US$144 billion[59].

Until the SDGs began in 2015, there was far less international focus on infrastructure and processes for wastewater treatment, water recycling, and water efficiency, with significant negative impacts in many areas. For example, poorly treated wastewater is used for agriculture in many low income countries, but children (8-12 years) in areas using wastewater have been shown to have a 75% prevalence rate for gastroenteritis, compared to 13% in areas using freshwater, bringing a 73% higher health cost per child in areas using wastewater[60].

The failure of water systems is often considered a governance issue. In the water sector, the fragmentation of actors and of accountabilities hinders and undermines transparency and economic efficiency and opens doors for corruption. Institutional dysfunction, unethical practices, opaque decision-making, poor accountability, and corruption are reportedly common, but difficult to quantify[61].

Water infrastructure that is damaged deliberately can also have tremendous local impacts. For example, one air strike in December 2016 in Syria cut water supplies for 3.5 million people and, while some pumping was restored relatively quickly, 1.4 million had continued reduced supply[62]. Since 2011, water and water infrastructure have been used as a military target in Syria, Ukraine, India, Israel, Yemen, Libya, Afghanistan, Somalia, the Democratic Republic of Congo, South Sudan, Sudan and Iraq[63].

In low-income countries, only

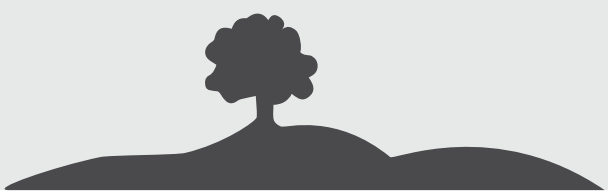
8% of industrial and municipal wastewater

undergoes treatment of any kind[64]

In lower-middle-income countries, only

28%

of wastewater is treated[65]



Globally, it has been estimated that between

5 and 20 million hectares

of land are irrigated with untreated wastewater[66]

Unsustainable development

US$114 billion per year

Or more than 3 times the current level of capital investment is needed to achieve the Sustainable Development Goals on water supply, sanitation and hygiene (WASH). the amount of money needed to meet the other targets of the "water goal" is currently

Unknown[67]

While the effectiveness of water management varies dramatically between countries, a rapid scale-up in effort and resources will be needed for most countries to achieve Sustainable Development Goal 6 and to support other water-related or water-impacted SDGs. A 2016 study wrote that "the longer governments take to act, the harder it will be to deliver on their promises by 2030", and that overall, every 3 years of inaction will mean that the amount of effort needed to succeed will increase exponentially[68].

Beyond SDG 6 – the 'water goal'- water is fundamental to life and livelihoods. The success of SDG 6 will underpin progress in many other goals, including those for human health, universal education and urban progress. Water security is fundamental to poverty alleviation, and water resource management impacts almost all aspects of economic activity, including food production and security, industry, energy production, and transport[69].

However, these human activities often degrade water resources. 2 million tons of human waste are disposed of in water courses every day[70]; 15–18 billion m^3 of freshwater resources are contaminated by fossil fuel production every year[71]; and the food sector contributes 40 and 54% to the production of organic water pollutants in high-income and low- income countries respectively [72]. Severe pathogenic pollution affects around one-third of all rivers, severe organic pollution around one-seventh of all rivers, and severe and moderate salinity pollution around one-tenth of all river stretches in Latin America, Africa and Asia[73].

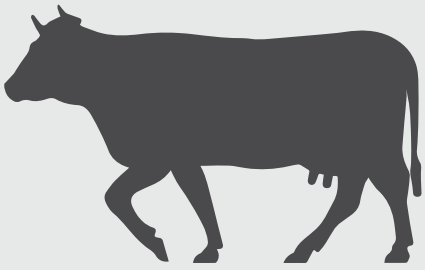
To move beyond simply 'ticking off' sustainability indicators to true sustainability in the water sector, Member States must consider the full cost of water and the services it provides.

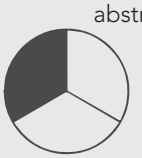
A 2°C rise in global average temperature could mean additional water-related costs between

US$13.7 billion and $19.2 billion

per year from 2020 to 2050, mostly through water supply and flood management[74]

Wealthier diets cost water:
Producing 1 kg of rice requires around **3,500 L of water**, while 1 kg of beef costs **15,000 L**[75]





Regionally, the global limit of ecological sustainability of water available for abstraction is reported to have been exceeded for about

one-third

of the human population. This will rise to about half of the human population by 2030[76]

Of the world's 263 transboundary basins, more than

60% lack

any type of cooperative management framework[77]

Wastewater-related emissions of methane and nitrous oxide could rise by **50% and 25%**, respectively, between 1990 and 2020[78]

Ecosystem degradation

12.6 million

deaths were attributable to the environment globally in 2012[79]

All freshwater ultimately depends on the continued, healthy functioning of ecosystems. Recognising the water cycle as a biophysical process is essential to achieving sustainable water management[80] and securing the ecosystem services that humans rely on.

The water- related services provided by tropical forests include the regulation of water flows, waste treatment and water purification and erosion prevention; these collectively account for a value of up to US$7,236 per hectare per year – more than 44% of the total value of forests, exceeding the values of carbon storage, food, timber, and recreation and tourism services combined[81]. Despite this, between 1997 and 2011, US$4.3 to US$20.2 trillion per year worth of ecosystem services were lost due to land use change.

Freshwater ecosystems themselves provide more than US$75 billion in goods and ecosystem services for people annually; they also sustain a disproportionately large number of species, including a quarter of all known vertebrates[82]. However, wetlands are being increasingly threatened by a host of problems. Since 1900, 64% of the world's wetlands have disappeared[83]. This degradation has been valued at US$20 trillion in lost ecosystem services annually[84]. According to some estimates the populations of freshwater species declined by 76 % between 1970 and 2010[85]; Nearly one-third of the world's amphibians are at risk of extinction and in some regions, more than 50% of native freshwater fish species are at risk of extinction[86].

Wetlands are also carbon sinks. Peatlands –lands with peat at the surface- cover only 3% of the Earth's land surface, but store nearly double the carbon than all the world's forests combined, if they are kept wet. An overall loss of 15% of peatlands has been reported, which translates to a contribution of 5% of all global anthropogenic carbon dioxide emissions[87]. Almost half (45%) of the peatlands in the Nordic and Baltic States have been drained and emit almost 80 megatons of carbon dioxide annually – which is 25% of the total carbon dioxide emissions of these countries[88].

It is estimated that the number of people living in environments with high water quality risks due to excessive biochemical oxygen demand (BOD) will affect

one fifth

of the global population in 2050, while people facing risks from excessive nitrogen and phosphorous will increase to

one third

of the global population over the same period[89]

Eutrophication of surface water and coastal zones is expected to increase almost everywhere until 2030. Globally, the number of lakes with harmful algal blooms will increase by at least

20% until 2050[90]

Inefficient use of water for crop production has caused salinization of

20%

of the global irrigated land area[91]

There has been a

30%

decline in biodiversity health since 1970[92]

Between **US$4.3 and US$20.2** trillion per year worth of ecosystem services were lost between 1997 and 2011 due to land use change[93]

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