



The future of water

How we should think about our investments
and their use of an increasingly scarce resource

Water reduction is emerging as the next widely debated environmental issue. It impacts many global manufacturing sectors whose production is reliant on water. There is growing concern among the public that large industrial concerns, which use up to 30% of the planet's fresh water, should be more vigilant about their consumption¹. The UN Principles for Responsible Investment (UN PRI), to which we are a signatory, postulates that water is a finite shared resource, as well as a basic human right. Increasing demand, climate change and pollution are putting pressure on global water resources.

This raises 3 important questions:

- What water issues do we face?
- Which industries are most affected?
- What questions on water usage should we be asking the companies in which we invest?

What water issues do we face?

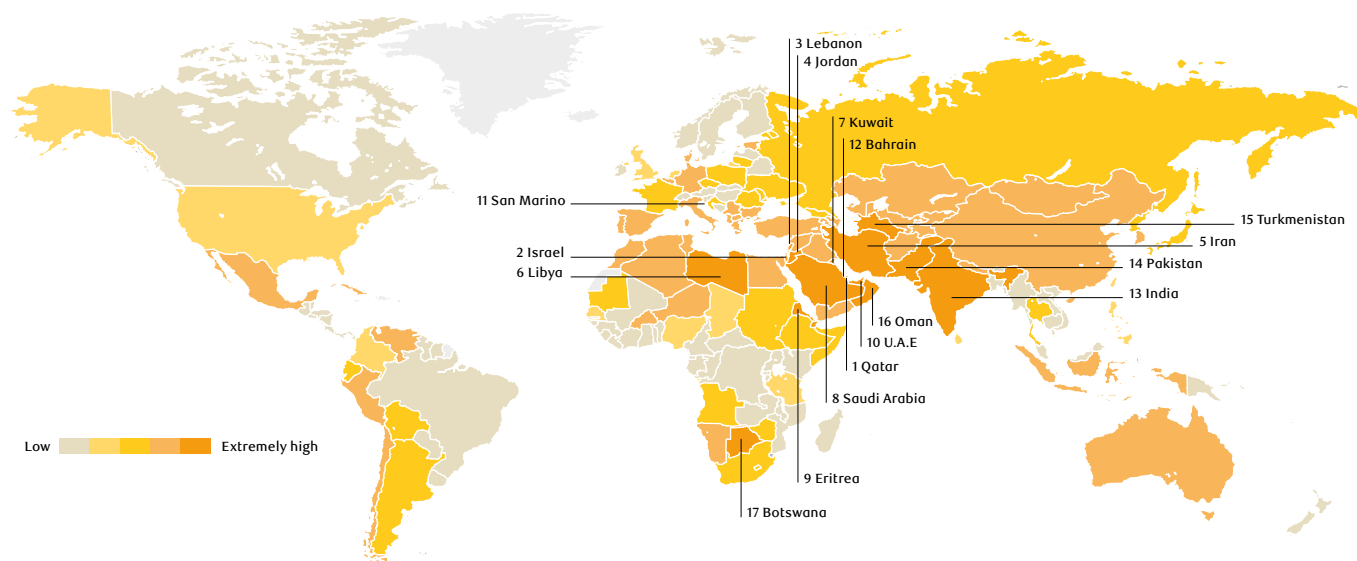
- Water scarcity due to climate change.
- Water pollution driven by agriculture, industry and excessive use of plastic.
- Low water tariffs.
- The geopolitical tensions that arise as a result of water.

Going through each of these issues in turn below, we highlight the urgency of action.

Water scarcity

A country or a region is said to experience “water stress” when annual water supplies drop below 1,700 cubic metres per person per year. At levels from 1,700 down to 1,000 cubic metres per person per year, periodic or limited water shortages can be expected². Exhibit 1 shows the countries most at risk of severe shortages in the next few years.

Exhibit 1: Areas of water stress around the globe



Source: RBC Global Asset Management, World Resources Institute's Aqueduct Water Risk Atlas. Data as at December, 2020. Note: Data on water withdrawal, available water and groundwater are used to calculate baseline water stress.

¹ Our World in Data, Freshwater Use, July 2018.

² Asian Development Bank, “Adapting to Climate Change through IWRM”, April 2016.

Exhibit 2: The Great Pacific Garbage Patch (GPGP)



Source: The Ocean Cleanup Organisation. RBC Global Asset Management. Data as at December, 2020. Note: The GPGP is the largest of the five offshore plastic accumulation zones in the world's oceans. It is located halfway between Hawaii and California.

Countries facing extremely high water stress are using up to 80% of the available surface and ground water supply in an average year. Even small dry shocks, which are poised to increase due to climate change, can have severe effects, according to the World Resources Institute³.

Water pollution

The fashion industry is reported to be one of the most severe water polluters in the world and continues to have a serious impact on the environment⁴. Fast fashion has dominated and reshaped the fashion industry and critics often cite its negative environmental impact; water pollution, toxic chemicals and increasing levels of textile waste are all by-products of the industry.

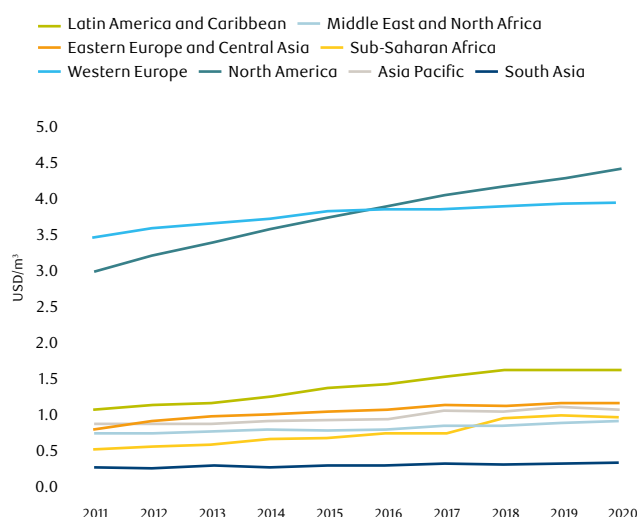
Textile dyeing is the second largest cause of water pollution⁵. In addition, when polyester garments are washed in domestic washing machines, they shed micro-fibres that add to the increasing levels of plastic in the ocean. These micro-fibres are a serious threat to aquatic life because they do not biodegrade and work their way into the food chain.

This has a huge negative impact on marine life. Fisheries that accidentally catch sea turtles report that these turtles can now have up to 74% of their diets composed of ocean plastics⁶.

It is estimated that 1.15 million to 2.41 million tonnes of plastic are entering the ocean each year from rivers⁷.

This plastic does not sink once it enters the sea and remains on the surface as it is transported by converging currents. It finally accumulates in the Great Pacific Garbage Patch (GPGP). Fortunately, many international clothing brands are now trying to improve their supply chains and production processes. A coalition of retail companies, apparel and shoe manufacturers, fashion houses, non-profits, and the U.S. Environmental Protection Agency have launched a new organisation called The Sustainable Apparel Coalition (SAC). The organisation aims to develop sustainability strategies and tools that allow shoppers to see if their clothing items were sustainably produced.

Exhibit 3: Global water tariffs



Source: OECD report: 'Water: the right price can encourage efficiency and investment'. Data as at 9 May, 2020.

³ World Resources Institute, Aqueduct Water Risk Atlas.

⁴ 'True Cost' documentary by Andrew Morgan, October 2015.

⁵ UN Environment Programme, "Putting the brakes on fast fashion", November 2018.

^{6,7} The Ocean Cleanup Organisation.

Low global water tariffs

Households and industry in many OECD countries are increasingly paying an amount that is reflective of the true cost of the water they consume. Three new OECD studies say that putting the right price on water will encourage people to waste less, pollute less, and invest more in water infrastructure⁸.

Tariffs for water and waste-water services vary significantly across regions. In a UN water survey, half of the responding countries indicated that water supply and sanitation tariffs are insufficient to recover 80% of the operation and maintenance costs. Balancing financial, environmental and social objectives in water pricing policies remains a challenge in most OECD countries⁹.

Exhibit 4 shows affordability in 108 cities and 20 countries. The recommended threshold water bill is 4% of middle household income. Higher numbers signal limited ability to deliver affordable water supply and sanitation tariffs. In many countries, the water bill is greater than the 4% threshold. Conversely in the U.S. and in Europe, water pricing systems are obsolete and therefore underpriced. This sends the wrong signals and needs reform, since in these regions governments can raise prices based on consumption levels.

Geopolitical tensions

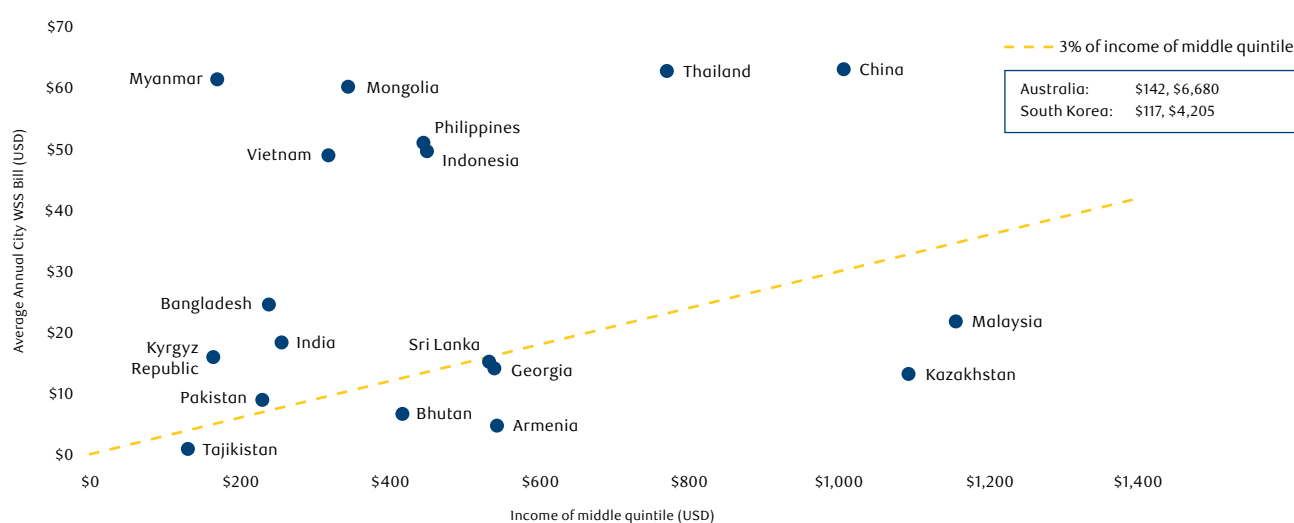
Bodies of water typically help form natural borders of countries and several nations often share access to rivers or lakes. For example, the Nile river runs through nearly a dozen countries alone. Given how conflict-prone humankind is, it is surprising there haven't been more wars of a 'hydro-political' nature.

In the 21st century, fresh water supplies are drying up whilst water demand is expected to rise 55% between 2000 and 2050. In terms of its value as a global resource, water has been described as 'the next oil'¹⁰.

Looking at the world map shows a lot of potential cause for conflict surrounding access to fresh water resources. Egypt and Ethiopia have sparred over development of water from the River Nile for centuries. In Asia, Malaysia's 99-year deal with Singapore, which gives it paid access to fresh water from the Johor River, illustrates that while Singapore is one of the most progressive nations on our planet, without access to sufficient fresh water resources within its boundaries, all industry, trade, commerce and culture would come to a standstill.

India and Pakistan share the waters of the Indus River under the Indus Water Treaty. These countries have repeatedly clashed over the disputed Kashmir territory. In February 2019, following a terrorist attack in Kashmir, India retaliated in part by restricting water flow into Pakistan.

Exhibit 4: Average city water supply and sanitation tariffs as a share of disposable middle-quintile household income



Source: Global Water Security Solutions Centre: 'What does the world pay for water?'. Data as at February, 2019.

⁸ OECD report: 'Water: the right price can encourage efficiency and investment', 9 May 2020.

⁹ United Nations: 'Survey on water and the United Nations', 7 June 2019.

¹⁰ Global Water Forum, 'Water Outlook to 2050', May 2012.

Which industries are most plagued by water issues?

The following are the top three most affected industries today.

Agriculture & farming

Agriculture is the single biggest cause of water pollution globally¹¹. The re-routing of rivers and huge irrigation projects are all required to grow crops and feed livestock. At the same time, the excrement of livestock goes into the rivers, polluting the water supply.

It is estimated that Europe and the U.S. use approximately 45% of all water withdrawals for agriculture but in China it is over 70%, in Africa it is over 80% and in India and South Asia it is over 90%¹².

Projections for these numbers are expected to go down as countries adopt water-saving irrigation techniques. What is clear is that agriculture will need to invest much more in water saving projects as conflicting demands for water grow.

Mining

Water is critical to copper production. Yet 78% of copper produced by the world's 20 largest mines is currently in water-challenged regions. With 33% of 2014 global production, Chile is most affected¹³. The use of fresh water has been the source of disputes between mining companies and local communities worldwide. This has resulted in temporary mine closures, production stoppages and delays in new licences.

Building desalination plants appears to be the mining industry's favoured solution to the issue of water scarcity. Chile is proposing a law requiring all mines using more than 150 litres of water per second to incorporate seawater in their operations. This will see an increase in operating costs which can have a material impact on project economics. Delays in obtaining environmental permits and the huge capital expenditures involved in building desalination plants will reduce the rate of return on new projects.

Semiconductors

In February 2021, Taiwan hit the global headlines with severe water shortages due to drought. This was Taiwan's worst drought in decades. It depleted much of the island's water reserves, putting semiconductor manufacturing at risk. With reservoirs 40% full, government had to ration water to chip facilities. This shows that the global tech industry is not immune to the effects of climate change.

A typical semiconductor manufacturing facility uses 2-4 million gallons (15m litres) of ultra-pure water per day. To put this into context, the average person uses ~100 gallons of water per day¹⁴. This would mean water used at one plant is enough to supply 40,000 people with their daily water needs. A large semiconductor company will have upwards of 10 plants, meaning their total water consumption on a daily basis could be enough to supply over 500,000 people.

To offset this demand for water, Taiwan Semiconductor and other manufacturers have invested in building water recycling plants and replacing the wet process with a dry process. Chip makers also work on extracting more ultra-pure water per litre of municipal water, and optimising procedures to get more chips per drip.



^{11, 12} Food and Agriculture Organisations of the United Nations, "Water pollution from Agriculture: a global review", 2017.

¹³ Statistica, 2020.

¹⁴ Fortune Magazine, 'Taiwan's drought is exposing just how much water chipmakers like TSMC use', 12 June 2021.

Driving change

We believe that better pricing of water tariffs would encourage more companies and people to be less wasteful. Once companies conduct a water audit they will be positioned to invest in technologies that improve irrigation, recycling, conservation and desalination. They would also be ready to invest in the research and development involved with waste water or sewage treatment plants. Furthermore, as investors we need to engage in three important areas:

- i) Companies that are based in water-stressed regions, in regions of geopolitical conflict and in industries that tend to be polluting.

- ii) Regulations that improve the policies related to water scarcity and pollution.

- iii) All companies in which we invest, to ensure they are doing all they can to recycle water and to avoid polluting rivers and oceans.

Exhibit 5 lists some of the questions we ask our companies to give us a higher level of confidence that they are tackling their respective water issues in a proactive and effective manner.

Exhibit 5: Example of the types of questions we ask company management

General questions on water:

1. Is the company in a water stressed region?
2. What is the company's water footprint? This looks at volume, type of water (surface water, groundwater, desalinated water), location and timing.
3. Has the company audited their water use? Hired an independent expert?
4. What efforts are they doing on water consumption/ recycling/ reducing waste & plastic waste (that make their way into our water stream and the GPGP)?
5. What efforts are they making to treat waste-water? How do they treat it? And where does it go?
6. What are their current water tariffs (clean and waste) and how have they trended?
7. What regulations have they encountered?
8. What public backlash has the company encountered?

In specific sectors:

1. Mining - desalination projects or can the company use saline water? And how costly is desalination?
2. Semiconductor - recycling and innovation in pure water use
3. Textile - waste water treatment and where does it go? Recycling?
4. Paper - waste water treatment and where does it go? Recycling?

Source: RBC Global Asset Management. Data as at August, 2021.

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Veronique is a Portfolio Manager on the RBC Emerging Markets Equity team at RBC GAM, specializing in India. Veronique began her investment career in 2000. Prior to joining the firm in 2015, Veronique was at a large independent brokerage and investment group in Asia, where she was responsible for Asian ex-Japan equities for 15 years. During this time, Veronique developed significant expertise in Asian equities, as well as a deep understanding of the region's corporate culture and economic development, particularly during a time of considerable change.

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Publication date: February 2022

GUKM/21/198/JAN24/A



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