

INVESTMENT PERSPECTIVES

Ripple effects: Investment risks & opportunities in water

Water affects nearly every aspect of our economies and lives, so managing water risks and protecting water resources are essential.

While water risks are likely to intensify in the future, significant opportunities exist for investors to engage with and address these risks.

Allspring is focused on advancing our understanding of water risks and opportunities and their implications for investments.

Introduction

There's no substitute for water. It's fundamental to sustaining life and critical for healthy ecosystems and socioeconomic development. In addition to supporting life on an elemental level, humans rely on water for hygiene, agriculture, electricity generation, and transportation. However, there's also a delicate balance with water: Too little or too much threatens lives and livelihoods.

Roughly 74% of all natural disasters between 2001 and 2018 were water related. In fact, in 2015, the United Nations (UN) Office for Disaster Risk Reduction estimated that economic losses from weather-related disasters range between \$50 billion and \$300 billion annually (all currency amounts throughout are in U.S. dollars unless noted otherwise).¹ Climate change is likely to increase these losses over time: By 2050, the number of people who will be vulnerable to flood disaster is estimated to be 2 billion—a significant increase from the estimated 15 million in 2030.² Further, the Global Water Institute (GWI) estimates that 700 million people worldwide could be displaced by intense water scarcity by 2030.¹

On the heels of these challenges are significant opportunities for investing and making a positive impact. Notably, one of the UN's 17 Sustainable Development Goals is dedicated to ensuring access to water and sanitation



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1. "Water and Disasters," United Nations Water, unwater.org

2. <https://www.wri.org/news/release-new-data-shows-millions-people-trillions-property-risk-flooding-infrastructure>

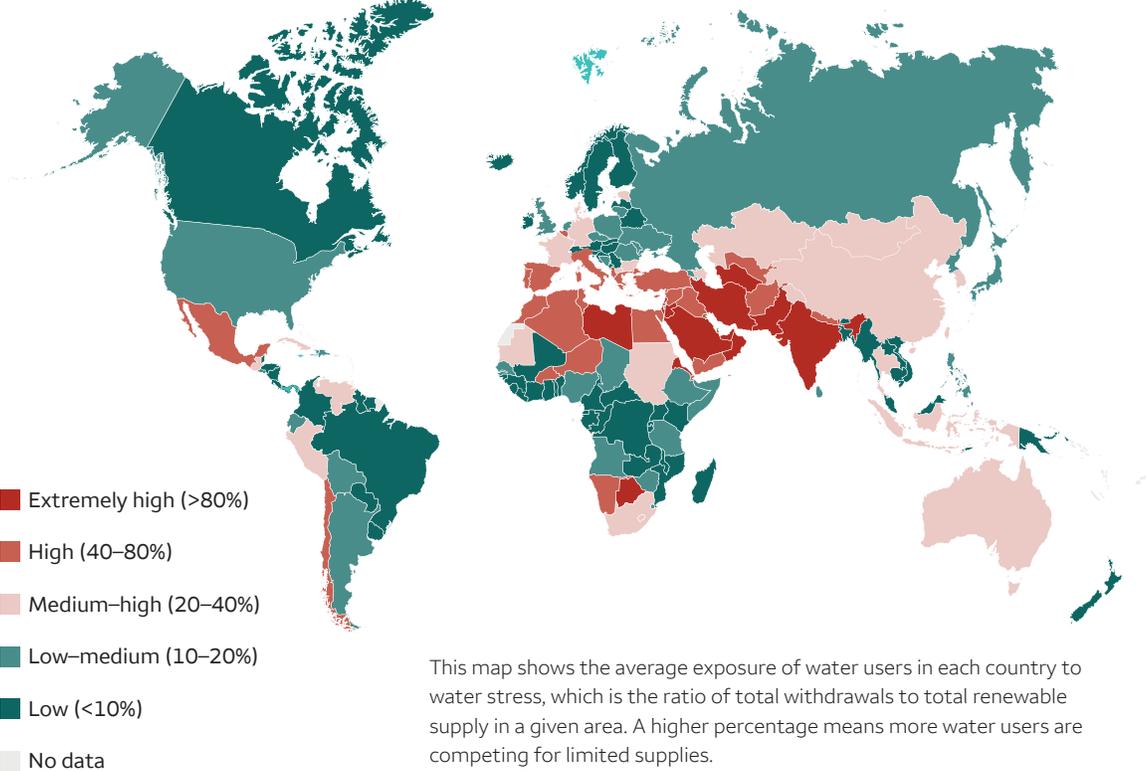
for all. The World Bank estimates that an annual investment of \$114 billion in new infrastructure is required to meet this goal.³ This estimate doesn't include maintenance and improvement of existing aging infrastructure or investments to mitigate water risks.

Assessing water risks and opportunities is an increasingly integral part of investment decision-making. This paper introduces a series of upcoming papers exploring water and investments: how water risks manifest across different asset classes and sectors, what Allspring is doing to address these risks in the investment process, and where there may be areas of opportunity—for investing and for safeguarding the world's water resources.

Water stress and other physical impacts

Water stress is measured by comparing local renewable water supply with water demand. Higher water stress indicates greater competition for a limited supply. According to the World Resources Institute (WRI), 17 countries—mostly in Asia and Africa—face extremely high levels of water stress. This assessment indicates that over 80% of the water available for agriculture, domestic, and industrial uses is withdrawn annually.

Figure 1. Water stress by country



Sources: Allspring and WRI's Aqueduct tool

3. <https://water.org/financingsdg6/>

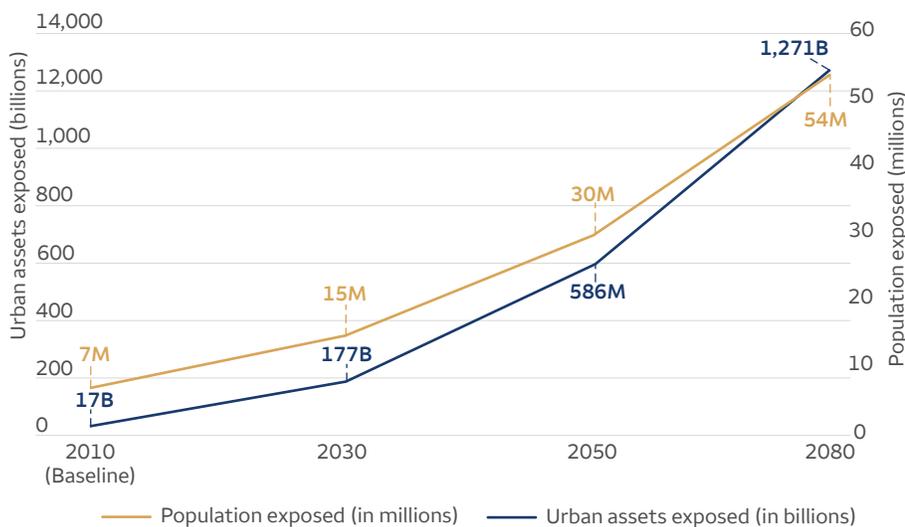
As we outline the main types of water risks below, note that all of them are likely to be exacerbated in the future. Rising sea levels and ocean acidification are directly tied to increasing carbon in the atmosphere and the resulting temperature warming. The supply of fresh water provided by precipitation and annual snow pack melting is affected by climate change, and water demand is increasing with population growth and higher levels of consumption.

Oceans

Increasing sea levels

Two factors related to global warming are the primary causes of sea level rise: the added water from melting ice sheets and glaciers and the expansion of seawater as it warms. Sea levels have been rising at an increasing rate: In 2014, the average global sea level was 2.6 inches higher than in 1993. But in some areas, the sea level has been rising much more than the annual average of one-eighth of an inch.⁴ In addition to putting coastal properties at risk, rising sea levels can drive saltwater into fresh-water aquifers. Should this occur, water would need to be treated in order to be used for irrigation and consumption.

Figure 2. Expected annual costs of coastal flooding



Source: WRI⁵

Ocean acidification

Sea level rise is the most commonly discussed ocean-related climate change effect, but a lesser known issue—ocean acidification—also has significant consequences. The increasing amount of carbon dioxide in our atmosphere is lowering the pH level of seawater, making it more acidic. Over the past 200 years, the average pH of the world’s salt water has decreased 0.1 units, which translates to a 30% increase in acidity.

Increasing acidification of our oceans will significantly disrupt marine ecosystems. For example, acidic seawater is detrimental to shells: It makes it harder for coral to build their shells, which is problematic as coral reefs protect coastlines around the globe. The human costs from shrinking coral reefs include the loss of livelihood for many in the fishing and tourism industries, increased land erosion, and loss of a major food source.

4. <https://oceanservice.noaa.gov/facts/sealevel.html>

5. <https://www.wri.org/blog/2020/04/aqueduct-floods-investment-green-gray-infrastructure>

Water supply

Below are a few examples of the different physical forces that influence the supply of water available.

Rainfall changes

Changes in precipitation are a consequence of climate change. As average temperatures rise, overall precipitation levels are expected to increase. However, increased precipitation will not necessarily increase the amount of water available for drinking, irrigation, and industry. That's because higher temperatures lead to greater water evaporation and greater demand for water.⁶ In addition, flooding and runoffs cause water quality to deteriorate.

Although precipitation is expected to increase on average, certain areas—like locations close to the equator—will become drier. These changing weather patterns—droughts and deluge, warming temperatures—will have significant impacts on food production and availability.

Declining snow packs and glaciers

With warmer temperatures, snow packs and glaciers are melting more quickly, and changes in precipitation aren't making up for their loss. While snow packs traditionally have provided a steady source of fresh water for many regions, their diminishing availability is shifting this reliance. Faster snow pack melts also are leading to flash floods. In addition, ice melting at the North and South Poles is contributing to rising sea levels and negatively affecting ecosystems and wildlife in colder regions.

Water demand

Water availability is directly tied to food security, access to potable water, and loss of livelihood.

For these and other reasons, international treaties for water use are in place around the world. Between 1820 and 2007, almost 450 agreements on international waters were signed. Water sharing has continued to be a source of conflict and can destabilize river basins that cross political boundaries.

The world's 263 transboundary lake and river basins cover nearly half of Earth's land surface. While most basins are shared between two countries, the number of countries sharing basins is higher in many spots, adding to the complexity of sharing fairly. Globally, 13 basins are shared by 5 to 8 riparian nations while 5 basins—the Congo, Niger, Nile, Rhine, and Zambezi—are shared by 9 to 11 countries. In fact, the Danube River travels within the territory of 18 nations.⁷ The UN estimates that more than 1.7 billion people live in river basins where depletion exceeds natural recharge. Should this trend continue, it's predicted that two-thirds of the world's population will be living in water-stressed countries by 2025.⁸

6. <https://www.epa.gov/climate-indicators/climate-change-indicators-us-and-global-precipitation>

7. https://www.un.org/waterforlifedecade/transboundary_waters.shtml

8. https://www.un.org/waterforlifedecade/water_and_sustainable_development.shtml

9. "World Humanitarian Data and Trends 2018," United Nations Office for the Coordination of Humanitarian Affairs

Water is integral to many industries and sectors. While some—like agriculture—are top of mind, water risk is present in many others, either through direct operations or in the supply chain.

Water-reliant sectors



Chemicals



Metals and mining



Building materials



Restaurants and lodging



Consumer products



Food and beverage



Oil and gas



Real estate investment trusts



Information technology



Power generation

Adding to interregional water tensions, climate change-related events—higher temperatures, changes in precipitation, and flooding—will likely cause migration and could increase civil unrest. In fact, numerous recent global conflicts have had water crises at their center. According to the UN, water has played a major role in conflicts in at least 45 countries, particularly in the Middle East and North Africa.⁹

Water-related risks for investors

Water risks for investors can be classified into three primary types: physical, social, and regulatory.

- **Physical risks** include natural hazards like riverine flooding and storms, sea level rise, and water quality/supply issues.
- **Social risks** comprise access, distribution, and equity. The water-sharing agreements between countries, noted previously, are one example. Both the allocation of and pricing of water are interlinked with human rights.
- **Regulatory risks** include prominent issues such as water rights, waste and effluent management, enforcement of regulations, and water infrastructure.

These three types of risks are not mutually exclusive and often affect one another. Physical risks, like water scarcity, can lead to social risks, such as community opposition and regulatory actions against corporate operations.

Figure 3. Sample water risks by type

Physical	Social	Regulatory
<ul style="list-style-type: none"> • Natural disasters: floods, storms • Climate change physical risks: sea level rise, changes in/more dramatic precipitation, melting snow packs • Competition for water • Water contamination • Safety of drinking water 	<ul style="list-style-type: none"> • Rate setting and affordability • Social issues in distribution • Water-sharing between regions or countries • Environmental justice 	<ul style="list-style-type: none"> • Water rights and water availability • Clean water and water infrastructure development • Water responsibility issues (i.e., inadequate environmental policy or lack of enforcement)

Source: Adapted from WRI framework

Evidence of risks

- In February 2021, a piece of a Himalayan glacier fell into the Rishi Ganga River, triggering a huge flash flood in Uttarakhand (a state in northern India), destroying a hydroelectric dam and causing loss of human life. Experts assume that higher temperatures caused the glacial burst but that the construction of the dam and associated work, such as blasting, tree felling, and tunneling, added to the proportion of the impact.¹⁰

10. “Hydropower Dams Face Backlash After Himalayan Flood Tragedy,” Rajesh Kumar Singh, *Bloomberg Green*, February 11, 2021.

- Following the deadly 2015 collapse of a Vale S.A.–BHP dam in Mariana, Brazil, Vale more than doubled investment in its dams to \$60 million in 2018.¹¹ However, in 2019, another Vale tailings dam collapsed, killing 270 people near Brumadinho, Brazil. Waste management is a complicated aspect of a company’s operations. Investment in enhanced waste management doesn’t deliver the same type of direct return for a company that investment in other areas does. This disconnect can create lapses in waste management and can lead to significant acute incidents—like the Vale tailings dam collapse or chronic issues such as the contamination of local water or land resources by effluent.
- Parts of Amtrak’s Northeast Corridor are likely to be inundated for all or significant parts of the year in the coming decades. One such area is located in Delaware, where a multiyear Booz Allen Hamilton Inc. climate study estimated that it would cost \$24 million per mile of track to build removable flood barriers. This expense is in addition to the \$40 billion in critical but largely unfunded basic repairs the company already faces.¹²
- Indonesia has started the \$33 billion process of moving its capital city from rapidly sinking Jakarta to East Kalimantan. Although rising sea level may not be the primary reason for the move, Jakarta is sinking up to 6.7 inches per year and is especially vulnerable to sea level rise. The move isn’t without complications as the new site is on the island of Borneo, which has been dealing with ongoing deforestation. Environmentalists are concerned that an influx of new residents could exacerbate this issue.¹³

Examples of opportunities

Where there’s risk, there’s also opportunity. Significant opportunities exist for investors to engage with and address various water risks.

- The returns on investment in water and sanitation are high. The World Health Organization estimates a return of about \$4.30 per dollar invested through increased productivity and reduced health costs.
- A review of Latin American green bonds, whose proceeds are specifically earmarked for environmental projects, indicates several corporate, sovereign, and subnational issuances for clean water and sanitation, waste water treatment, water efficiency, and storage projects.
- Xylem Inc., a U.S. water solutions company founded in 2011, offers a portfolio of products and systems to meet the demands and challenges of treating water and wastewater. There are other similar players in the water services industry.
- The ocean economy is valued at roughly \$1.5 trillion per year and offers increasing opportunities for investment.¹⁴ The world’s first sovereign blue bond was issued by the Republic of Seychelles in 2018 and raised

11. “Brazil’s Vale Vowed ‘Never Again.’ Then Another Dam Collapsed,” Samantha Pearson, Luciana Magalhaes, Patricia Kowsmann, *The Wall Street Journal*, December 31, 2019.

12. “Rising Waters Are Drowning Amtrak’s Northeast Corridor,” Christopher Flavelle and Jeremy C.F. Lin, *Bloomberg Businessweek*, December 20, 2018.

13. “Indonesia Is Spending \$33 Billion to Move Its Capital From a Sinking City to an Island Where Forests Have Been Burning,” Aria Bendix, *businessinsider.com*, August 27, 2019.

14. <https://thecommonwealth.org/events/world-ocean-day-2021-blue-reset-building-resilient-and-equitable-ocean-based-economies-post>

\$15 million to support sustainable marine and fishing projects.¹⁵ The World Bank raised \$10 million to address plastic pollution in the oceans, and The Nature Conservancy® plans to mobilize \$1.6 billion of funding for ocean conservation.¹⁶

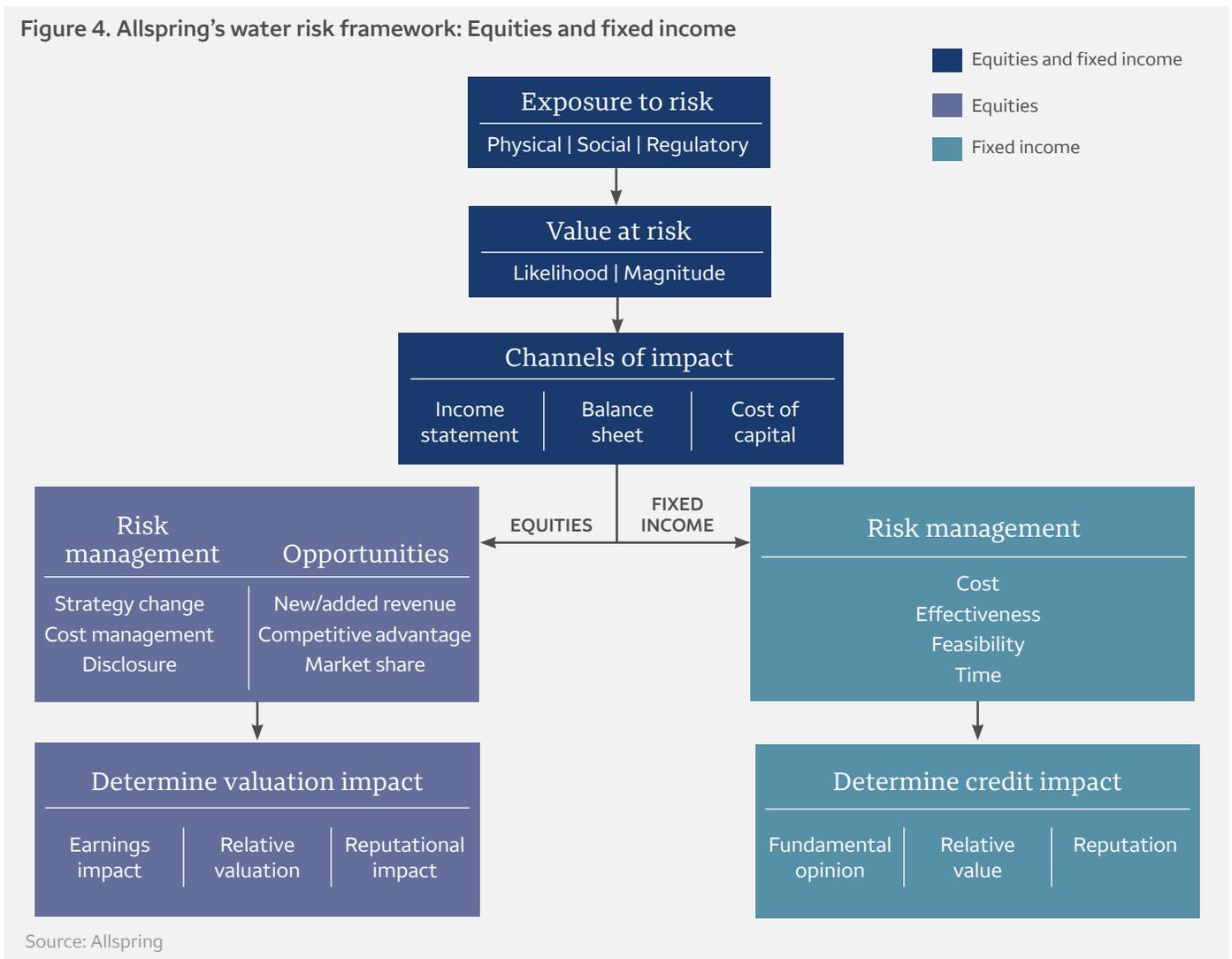
- Nordic Investment Bank launched a Swedish krona (SEK) 2 billion Nordic-Baltic Blue Bond for wastewater treatment and water-related climate change adaptation.¹⁶

What we're doing

Allspring has created a Water Working Group, which researches and analyzes risks and opportunities related to water. It's a cross-functional team that leads top-down, system-level analyses and works directly with analysts to identify bottom-up, issuer-level implications.

We're assessing the physical, social, and regulatory risks at the issuer, industry, and sector levels. Using our water risk framework, we identify key impacts at the issuer level and seek to understand portfolio implications.

Figure 4. Allspring's water risk framework: Equities and fixed income



15. <https://www.worldbank.org/en/news/press-release/2018/10/29/seychelles-launches-worlds-first-sovereign-blue-bond>

16. <https://www.weforum.org/agenda/2019/06/world-oceans-day-blue-bonds-can-help-guarantee-the-oceans-wealth/>

As illustrated in Figure 4, material water risks and opportunities are evaluated and flow through the investment decision process for both equities and fixed income. What’s the exposure to a given risk, and what’s the potential for that risk to derail the business model? Can an entity change course and eliminate the risk, or is it an essential component of the underlying business model? Similarly for opportunities, how can an entity adapt to and harness the opportunity? The answers to these questions ultimately drive the potential valuation or credit impact.

Investors have several options for integrating water themes into investments, ranging from avoiding material risks to being intentional about creating positive change. Allspring investment professionals consider material water risks along with climate and ESG risks as part of their investment research and decision-making processes. Individual teams also may engage companies on water themes, and this is a strategic focus of our stewardship and engagement efforts.

Figure 5. Incorporating water into our investments

Strategy	Description
Integration	Consider material water risks as part of regular investment decisions, including a risk and return assessment
Engagement	Invest with the intention to improve water outcomes through targeted engagement and follow-up; high potential for impact
Screening/exclusions	Apply one or more of the following to a portfolio: <ul style="list-style-type: none"> · Exclude issuers that have a negative impact on water—for example, industries that are inherently water-intensive or produce effluents. · Screen out issuers with unmanaged water risks. · Select issuers and/or issues that have a positive impact on water—for example, issuers whose bond proceeds are used for water investments or issuers who are improving water efficiency. · Consider opportunistic investments—for example, innovative issuers that provide solutions to water issues.

Source: Allspring

Conclusion

While various aspects of water risks have long been part of the investment research and our decision-making process, growing pressures and a changing climate require us to consider these risks in a systematic and consistent manner.

This introductory paper will be followed by case studies from our various investment analysts and teams to illustrate how water risks are being considered in our process and where opportunities may be present. An examination of prior impacts of water risks can help inform a prospective view. Even without precise estimates of future risk, we can start to better understand the material impacts and assess resiliency in a changing world.

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