



Position Paper Water Scarcity

1 Introduction

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Pensioenfonds Zorg en Welzijn (PFZW) is the pension fund of, for and by the Dutch healthcare and welfare sector. At PFZW, employees and employers jointly aim to ensure a good collective pension in a liveable world. Our primary task is to provide our beneficiaries with the best possible pension. Hence, we first and foremost strive for an optimal risk-adjusted return on our investments. We believe that a good pension is worth more in a liveable world. That is why investing in a sustainable manner is important to us. We are convinced that integrating Environmental, Social and Governance (ESG) issues leads to improved financial performance in the long run. We believe that financial and social return go hand in hand.

This paper defines water scarcity as a global challenge, as a systemic risk and investment opportunity, and explains why PFZW cares about it.

The opposite of water scarcity is water security, which the UN defines as *“The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability”*¹.

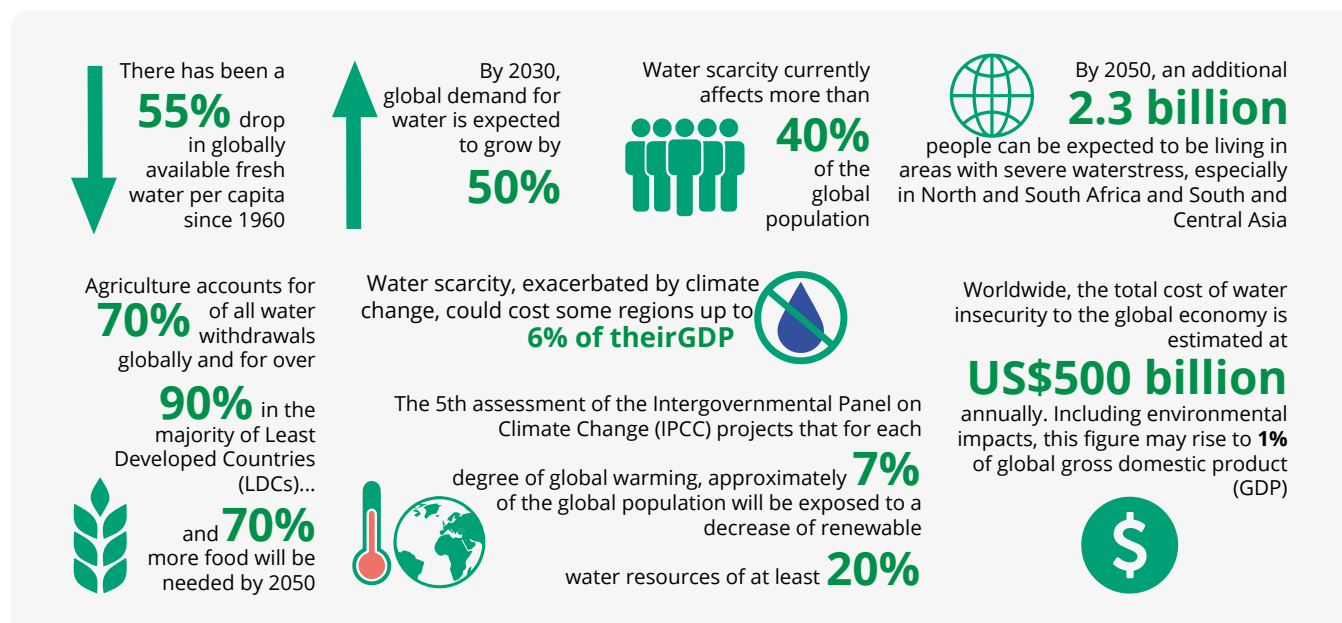
6 SCHOON WATER
EN SANITAIR



1. <http://www.unwater.org/publications/water-security-infographic/>

That water scarcity requires special attention (like other ESG externalities) is because water is underpriced relative to its value. The consequences are that it is both overused and underinvested. Similarly, the social cost of water pollution is rarely paid by the polluter, which worsens (clean) water scarcity.

The graphic below summarizes the key challenges with regard to water scarcity that this paper will address.



Source: UNU-INWEH. *Water Crisis Report* (2017)

This paper serves three purposes:

- Being transparent to our external stakeholders about PFZW's views on water scarcity
- Communicating views by PFZW on water scarcity to the companies it invests in².
- Providing guidance for PFZW asset managers for integrating water scarcity in investment decisions.

The position paper will first define the importance of water scarcity, both in general terms and more specifically for PFZW as an institutional investor and 'universal owner' of assets. It proceeds with a framework to address water scarcity in the portfolio as an investment risk and as an investment opportunity. The paper concludes with the position PFZW takes with regard to the various initiatives on water scarcity, and the instruments and steps for PGGM and external portfolio managers to take to implement PFZW policy.

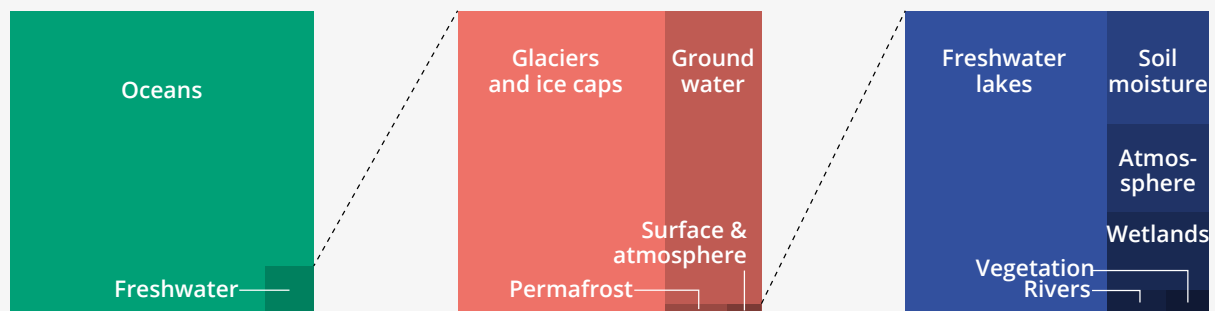
2. As NBIM does with its water expectation document, see <https://www.nbim.no/en/the-fund/responsible-investment/risk-management/water-management/>

2 The importance of water scarcity

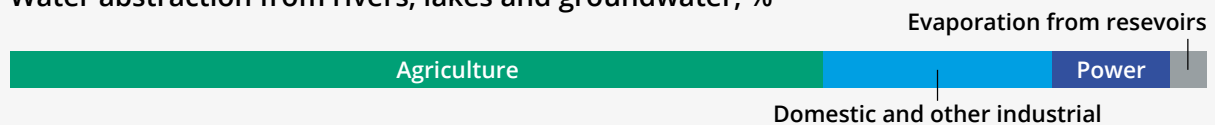
Physical need³

Even on the blue planet fresh water is scarce since of all the water on earth 97.5% is salty and a further 1.75% is frozen at the poles, in glaciers or in permafrost. So all life and all economic activity on earth relies on just 0.75% of water either as surface water or groundwater. It is important to distinguish consumptive water use (water that is evaporated and 'lost' to the atmosphere) and water abstractions—where water is used and returned to rivers, lakes or groundwater. Agriculture is the largest evaporator of water by far. But industry and power, sectors that merely abstract water, similarly rely on the availability of water (for process and cooling purposes).

Global water resources, %



Water abstraction from rivers, lakes and groundwater, %



Consumptive use of abstracted water, %

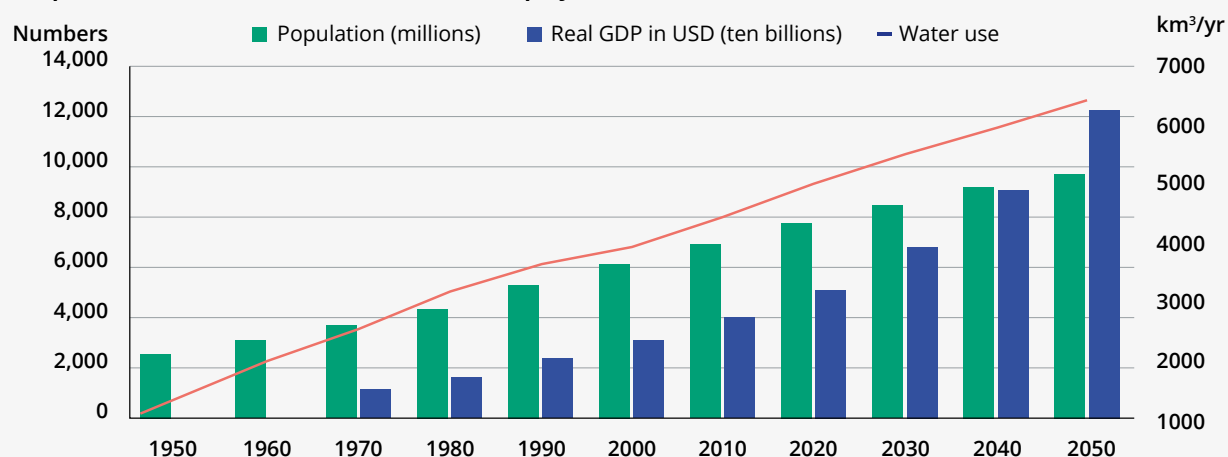


Source: *The Economist. Special Report on Water* (2019)

3. This section is adapted from the Special Report on Water by The Economist (2019)

Meanwhile agricultural, industrial, power and domestic demands on that 0.75% of the world's water are growing apace with the world's population but especially with its wealth, largely driven by changing diets (more meat).

Population, GDP and water use - historical and projected data

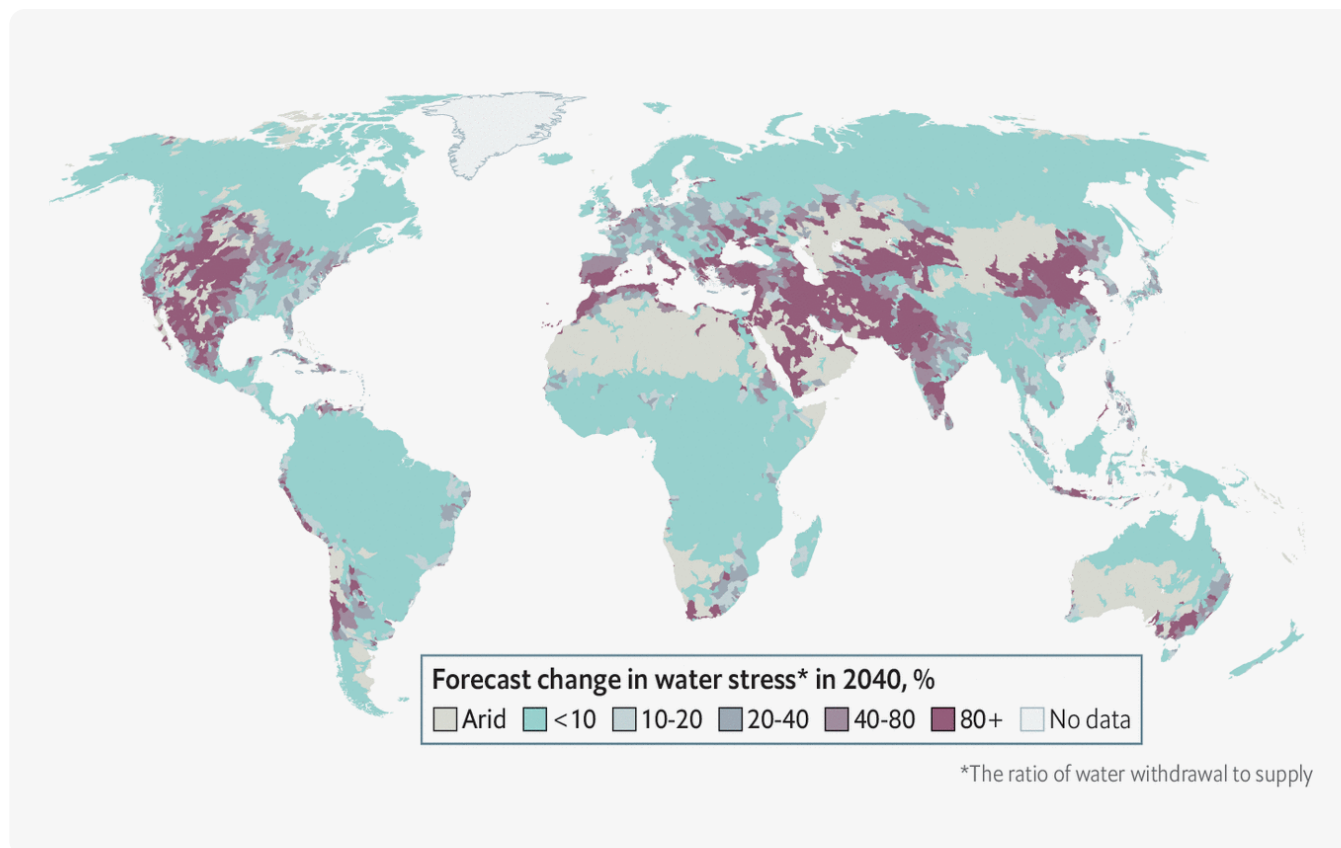


Source: HSBC. *Global Equities Water* (2018)

According to the UN's latest annual World Water Development Report⁴ current global water use is six times greater than it was a century ago—and is expected to increase by another 20-50% by 2050. The volume of water used—about 4,600 cubic kilometers a year—is already near the maximum that can be sustained without supplies shrinking dangerously. A third of the world's biggest groundwater systems are already in danger of drying out.

And it will get worse: more than a quarter of humanity—1.9bn people, with 73% of them in Asia—live in areas where water resources will be over-stressed. The number facing shortages almost doubles if one counts those at risk of not having adequate access to clean water at least one month a year. And water shortages will not just be in poor countries. Australia, Italy, Spain and the US are going to be affected too as the map below shows.

4. <http://www.unwater.org/publications/world-water-development-report-2019/>



Source: *The Economist. Special Report on Water* (2019)

Socio-economic need

While population and economic growth drive up water demands, climate change worsens supply imbalances both in space and in time. The upshot is intensifying competition and conflict. In some cases this could be at the detriment of local communities, small businesses and subsistence farmers. Looming water crises have consistently ranked in the top five high in the annual Global Risks Report by the World Economic Forum, and did so again in the 2020 edition⁵.

As it is for many other issues, climate change acts as a magnifier of water scarcity too. Paradoxically, it is likely to both prolong droughts as well as cause more flooding. The World Bank has assessed the impact of climate change on GDP in 2050. Driven in large part by worsening water scarcity, GDP in 2050 may be suppressed by up to 7% in East Asia and 14% in the Middle East⁶.

Human need

Safe water supplies, hygienic sanitation and good water management are fundamental to global health and are indeed a human right⁷. Almost one tenth of the global disease burden could be prevented safe drinking water and sanitation facilities (every year 1.4 million children die from diarrhea) and better water management to reduce the risks of water-borne infectious diseases such as malaria (500,000 deaths), and accidental drowning during recreation (280,000 deaths). In addition, 5 million people could be protected from being seriously incapacitated from elephantiasis and another 5 million from trachoma (river blindness)⁸.

5. World Economic Forum, The Global Risks Report 2020 see: http://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf

6. World Bank, High and Dry (2016), see: <http://www.worldbank.org/en/topic/water/publication/high-and-dry-climate-change-water-and-the-economy>

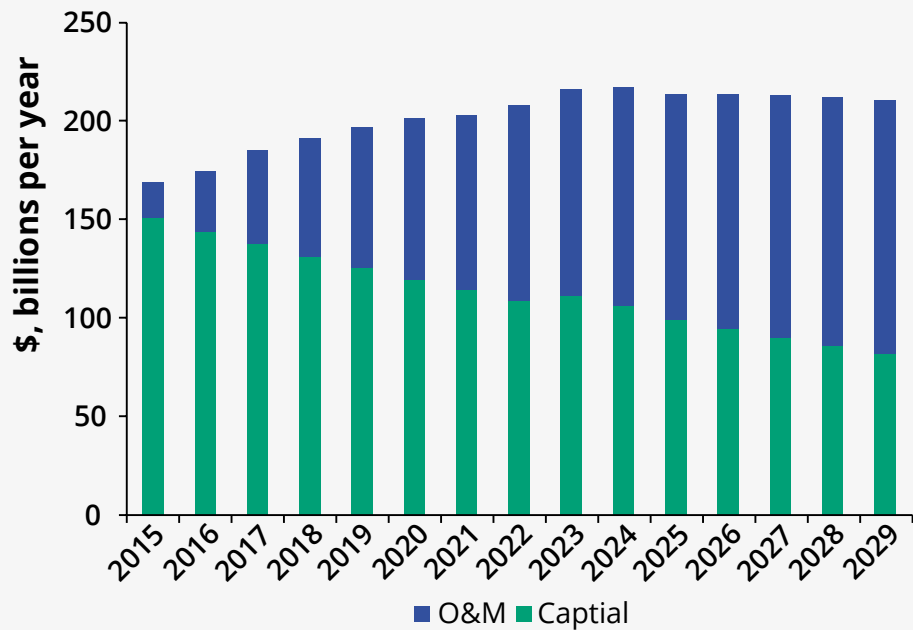
7. <http://www.unwater.org/water-facts/human-rights/>

8. World Health Organization, see: <https://www.who.int/features/qa/70/en/>

Investment need

Clean water for all, Sustainable Development Goal 6, has a number of targets, see Appendix 1. The total capital cost of meeting targets 6.1 and 6.2 are estimated at \$114 billion per year (range: \$74 to \$166 billion) until 2030. That is some three times current investment levels⁹.

Source: World Bank. *The Costs of Meeting the 2030 SDG Targets on Drinking Water, Sanitation, and Hygiene* (2016)



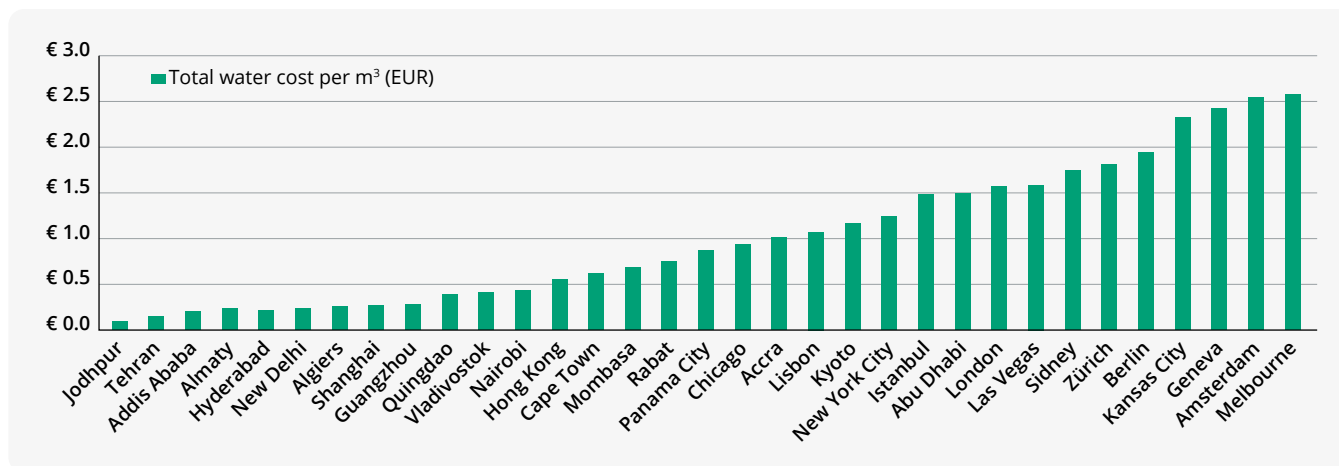
Note: O&M = operations and maintenance.

Including developed markets and waste water treatment, estimates of the required capital expenditures are higher still, from \$225 billion in 2016 to \$311 billion in 2023¹⁰.

That these investment needs are not being met is chiefly because water is underpriced, deterring investment in infrastructure and technology. Remarkably, utility water prices tend to be lowest in the most water-stressed of places.

9. Guy Hutton and Mili Varughese, *The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene* (World Bank, 2016)

10. Global Water Intelligence, *Financing Water to 2030* (2018)



Source: Global Water Intelligence (2017)

Heavily regulated prices for water do not relay supply and demand imbalances¹¹. Thus water shortages, albeit long in the making, can still surprise water users, companies and investors, witness Sao Paolo (2015), California (2017) and Cape Town (2018). Even the Netherlands was hit by an extraordinary drought over the summer of 2018 with unforeseen effects on, for example, river transport¹².

11. This is where water differs from oil (an often-made but mistaken analogy)

12. <https://newmobility.news/2018/11/28/low-water-level-rhine-cause-of-dry-gas-stations-in-the-netherlands/>

3 PFZW definition of water scarcity

The United Nations define water security as the opposite of water scarcity as *“The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability”*¹³.

Because of its many attributes, including cultural and (geo)political, PFZW has in 2015 chosen to focus on the first and most investment-relevant part of the UN definition: “safeguard sustainable access to adequate quantities of acceptable quality water” which it interprets to also include companies’ efficient use and the reduction of pollution of increasingly scarce water supplies¹⁴. With this definition PFZW can keep its commitment (as part of the Dutch pension funds’ Agreement on Responsible Investment, IMVB¹⁵) to the human right to safe drinking water and sanitation as recognized by the United Nations in 2010¹⁶ as well as to the OECD Guidelines for Multinational Enterprises¹⁷.

Water scarcity has been one of the priority thematic areas for PFZW to increase its positive impact since 2015. It is also one of the many ESG issues that it requires its asset managers to integrate in investment decisions, motivated by:

- Better world. Clean water for all is one of the Sustainable Development Goals (#6) to which PFZW wants to contribute at market-rate financial returns.
- Responsibility. The over-abstraction and pollution of fresh water creates adverse impacts on people and their environment. PFZW has committed itself to minimize such adverse impacts through various initiatives including the Dutch pension funds’ Agreement on Responsible Investment (IMVB). Water security is also embedded in some of issues and sectors tracked by the ‘Eerlijk Pensioenlabel’, notably Nature, Food and Mining.
- Risk & return. It falls within PFZW’s fiduciary duty to reduce direct and indirect portfolio risks that stem from worsening water scarcity.

This paper neither addresses excess water (flooding) nor sea level rise associated with climate change. These are aspects dealt with in the policy paper on climate change, pollution and emissions. Also not in scope is sanitation as the natural –and important- complement to the supply of clean water. Specific linkages with Human rights, Food security and Health will be explored in the respective policy papers. In fact, as part of the biosphere, water is linked to most of the other SDGs¹⁸.

13. <http://www.unwater.org/publications/water-security-infographic/>

14. <http://www.unwater.org/water-facts/scarcity/>

15. <https://www.imvoconvenanten.nl/nl/pensioenfondsen>

16. <https://www.unwater.org/water-facts/human-rights> and https://www.un.org/waterforlifedecade/human_right_to_water.shtml

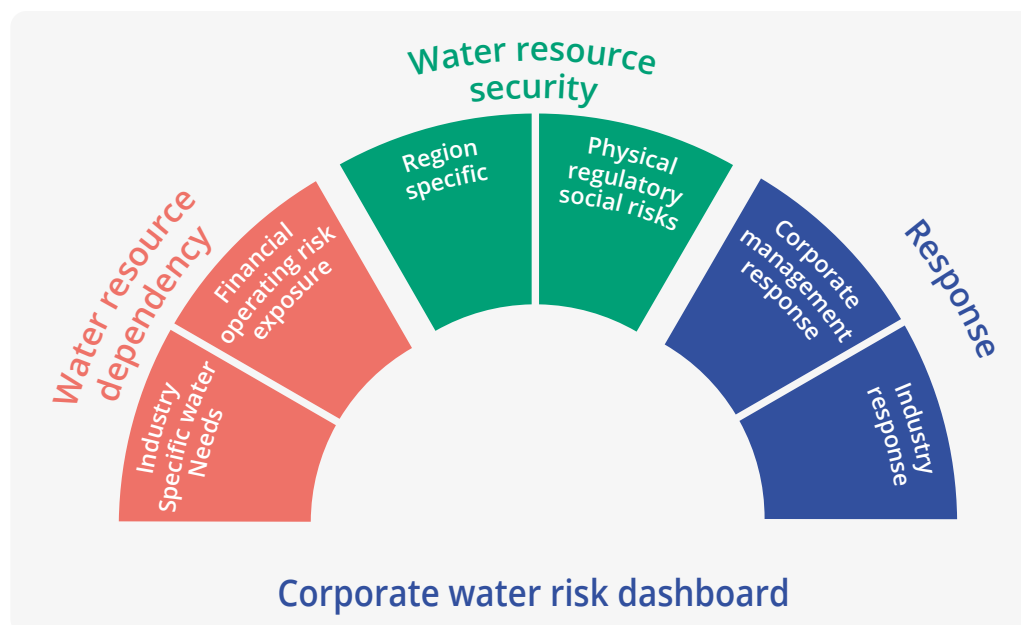
17. http://mneguidelines.oecd.org/MNEguidelines_RBCmatters.pdf and <http://www.oecd.org/daf/inv/mne/48004323.pdf>

18. <https://www.unwater.org/publications/water-sanitation-interlinkages-across-2030-agenda-sustainable-development/>

Relevant standards, data sources and evaluation methodologies

In the absence of water prices that reflect and pinpoint local water scarcity, it is all the more important to refine and standardize investors understanding of water scarcity risks and responses. To that end, company water use data must be combined with contextual water security data to assess the water risk a company (or utility or municipality) may be exposed to¹⁹. That exposure may be mitigated by management responses that either lower water dependence or raise the (collective) water security.

Source: Ceres. Investor Water Toolkit (2018)



Various water standards exist for the collection of comparable water dependency (use), security (context) and management response data. The most important are:

- CDP/Water, see <https://www.cdp.net/en/water>. This is the biggest repository of companies' water use data, mostly for use by investors.
- Global Reporting Initiative water and effluent standard: <https://www.globalreporting.org/standards/gri-standards-download-center/gri-303-water-and-effluents-2018/>. This is to guide companies' disclosure of their water-related impacts on people and the environment.
- World Resources Institute Aqueduct, see <https://www.wri.org/our-work/project/aqueduct>. This is a series of maps projecting various dimensions of current and future water risk.
- Ceres Aquagauge, see <https://www.ceres.org/resources/tools/ceres-aqua-gauge-comprehensive-assessment-tool-evaluating-corporate-management>. This is a tool to rate the companies' management response.
- CEO Water Mandate, see <https://ceowatermandate.org/humanrights/>. This is a UN-mandated commitment platform for corporate water action, including on human right to water building.

In addition to general standards, highly water-dependent sectors have issued sector-specific guidelines for oil and gas²⁰, mining²¹ and beverage²² sectors.

19. This is where water differs from carbon, the emission of which is place and time-independent for its climate change impact.

20. By IPIECA, the global oil and gas industry association for environmental and social issues, see <http://www.ipieca.org/our-work/environment/water-management/>

21. By the International Council on Mining and Metals (ICMM), see <https://www.icmm.com/water-disclosure-standard>

22. By the Beverage Industry Environmental Roundtable (BIER), see <https://www.bieroundtable.com/water>

While CDP Water remains the principal repository of water use data, its coverage is patchy and the response rate seems to have peaked. For complete coverage and comparable data most investors depend on data providers such as Bloomberg, MSCI or S&P/Trucost. Big data and satellite (spatial) data in particular promise to be a welcome supplement to voluntary disclosure²³. Asset-mapping is taken up by a number of other organizations in support of the assessment of various spatially-defined risks²⁴.

In recent years a number of tools have been developed to assess or monetize companies' exposure to water risks in different asset classes.

Tool/Dataset/Resource	Best Suited For	Primarily a...	Evaluates Water Risk Exposure	Evaluates Corporate Response to Risk	Corporate Locations Embedded in Tool	Financial Data in Output
Bloomberg Water Risk Valuation Tool (WRVT)	Equities	Financial Model	●	○	●	●
CDP Corporate Water Database	Equities	Questionnaire & Dataset	●	●	●	●
Ceres Aqua Gauge™	Equities	Questionnaire	○	●	○	○
Ceres SEC Water Risk Search Tool	Equities	Data Mining	●	●	○	●
Earth Genome	Private Equity	Maps & Datasets, Services	●	●	○	●
EcoLab/Trucost Risk Monetizer	Equities	Model & Datasets	●	●	○	●
Equarius waterBeta	Equities	Financial Model, Services	●	●	●	●
InVEST-Integrated Valuation of Ecosystem Services & Trade-Offs	Private Equity	Models, Datasets, Services	●	●	○	●
NCFA Bank Drought Stress Test Tool	Bank Credit Portfolios	Scenario Models, Datasets	●	○	○	●
NCFA Corporate Bonds Water Credit Risk Tool	Corporate Bonds	Model & Datasets	●	○	●	●
Sustainable Water Management Profiling	Municipal Bonds	Assessment Standard	●	●	N/A*	N/A
WRI Aqueduct™	Equities	Maps & Datasets	●	○	●**	○
WWF-DEG Water Risk Filter	Equities	Maps, Datasets, Models	●	●	○	●

● Has Information ● Some Information ○ No information

* Profiles Water Agencies

** If used in Bloomberg corporate location overlay possible

Source: Ceres. Investor Water Toolkit (2018)

23. Combining various data, the World Resources Institute for example has estimated Indian utilities exposure to water shortages, see <https://www.wri.org/blog/2018/02/water-shortages-cost-indian-energy-companies-billions>

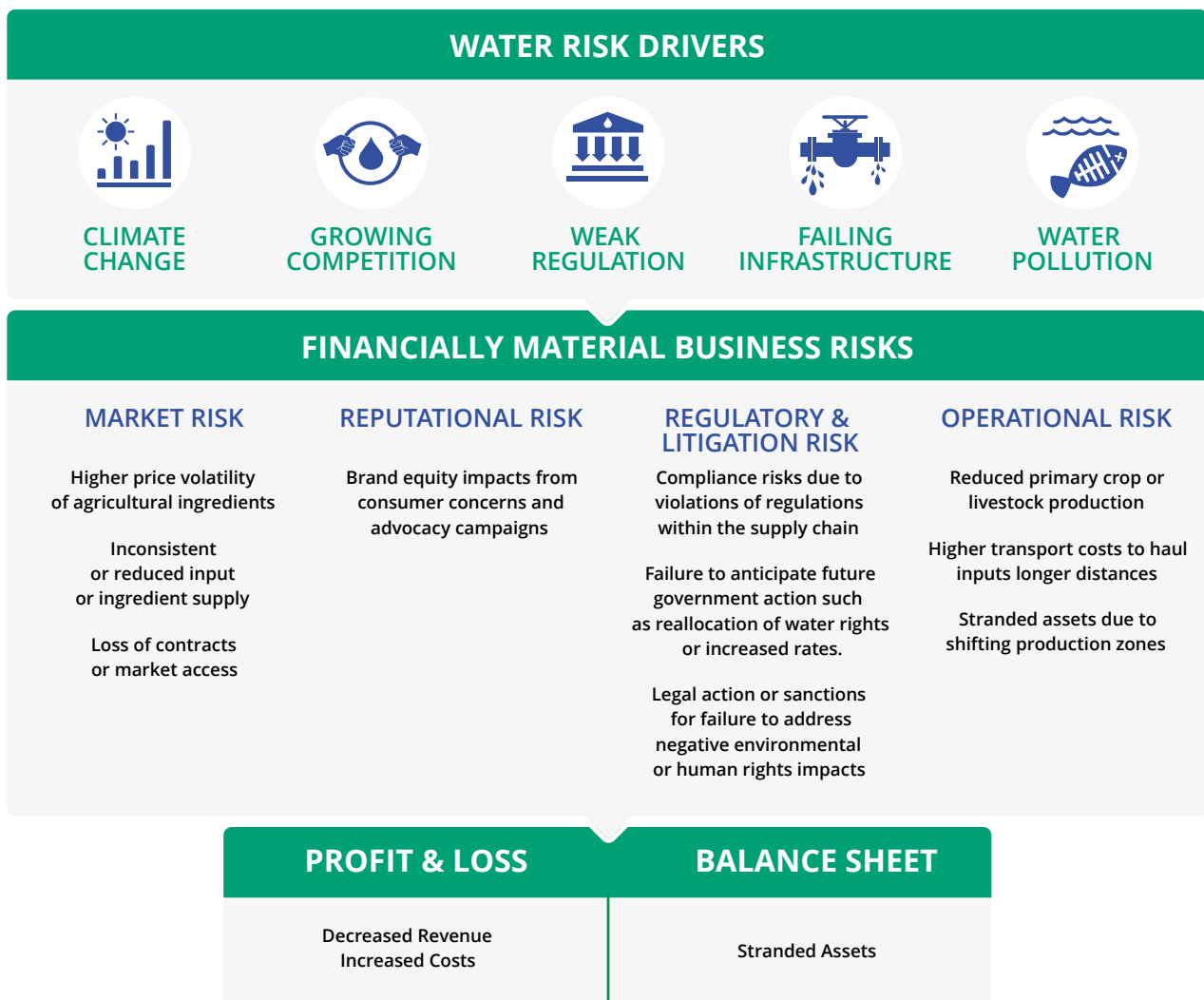
24. For example by FourTwentySeven for climate change (including droughts and floods), see <http://427mt.com/our-solutions/>

4 Framework to address water scarcity in the investment portfolio

Integrating financially material risks

Water scarcity (i.e. insecurity) is the ultimate systemic risk, one that universal asset owners like PFZW cannot run away from. It is an externality (since water prices rarely reflect its scarcity value or the social cost of pollution) that can suddenly morph into an 'internality' for investors with a long-term horizon and global scope. Thus it can affect various sectors and asset classes, from listed equities and fixed income to real estate and infrastructure.

At the company level water scarcity can be a financial risk through a number of drivers that ultimately affect revenues and growth prospects, operating costs and licenses, capital expenditures and costs of goods sold, and/or the value of the asset itself.



Source: Ceres. Investor Water Toolkit (2018)

On the basis of the materiality map by the Sustainability Accounting Standards Board (SASB), Ceres has classified material water quantity and quality risks across the value chain for different industries.

GICS Industry	Supply Chain		Operations		Product Use / End of Life	
	Water Quantity	Water Quality	Water Quantity	Water Quality	Water Quantity	Water Quality
Food Products						
Beverages						
Household Durables						
Construction Materials						
Paper & Forest Products						
Oil, Gas & Consumable Fuels						
Energy Equipment & Services						
Metals & Mining						
Water Utilities						
Electric Utilities						
Chemicals						
Containers & Packaging						
Hotels, Restaurants & Leisure						
Real Estate Management & Development						
Internet Software & Services						
Semiconductors & Semiconductor Equipment						

■ = High Risk
 ■ = Medium Risk
 = Unclear or Low Risk
 Indicates Ceres Addition

Source: Ceres. Investor Water Toolkit (2018)

Highly water dependent industries are obviously more vulnerable to water scarcity. These typically include power, energy and mining, and food and beverage. The latter mostly because of the large water footprint of their agricultural supply chains.

Water footprint

650 Barley

650 Wheat

1400 Sorghum

2500 Millet

650 Toast

750 Cane sugar

90 Tea

840 Coffee

2500 Burger

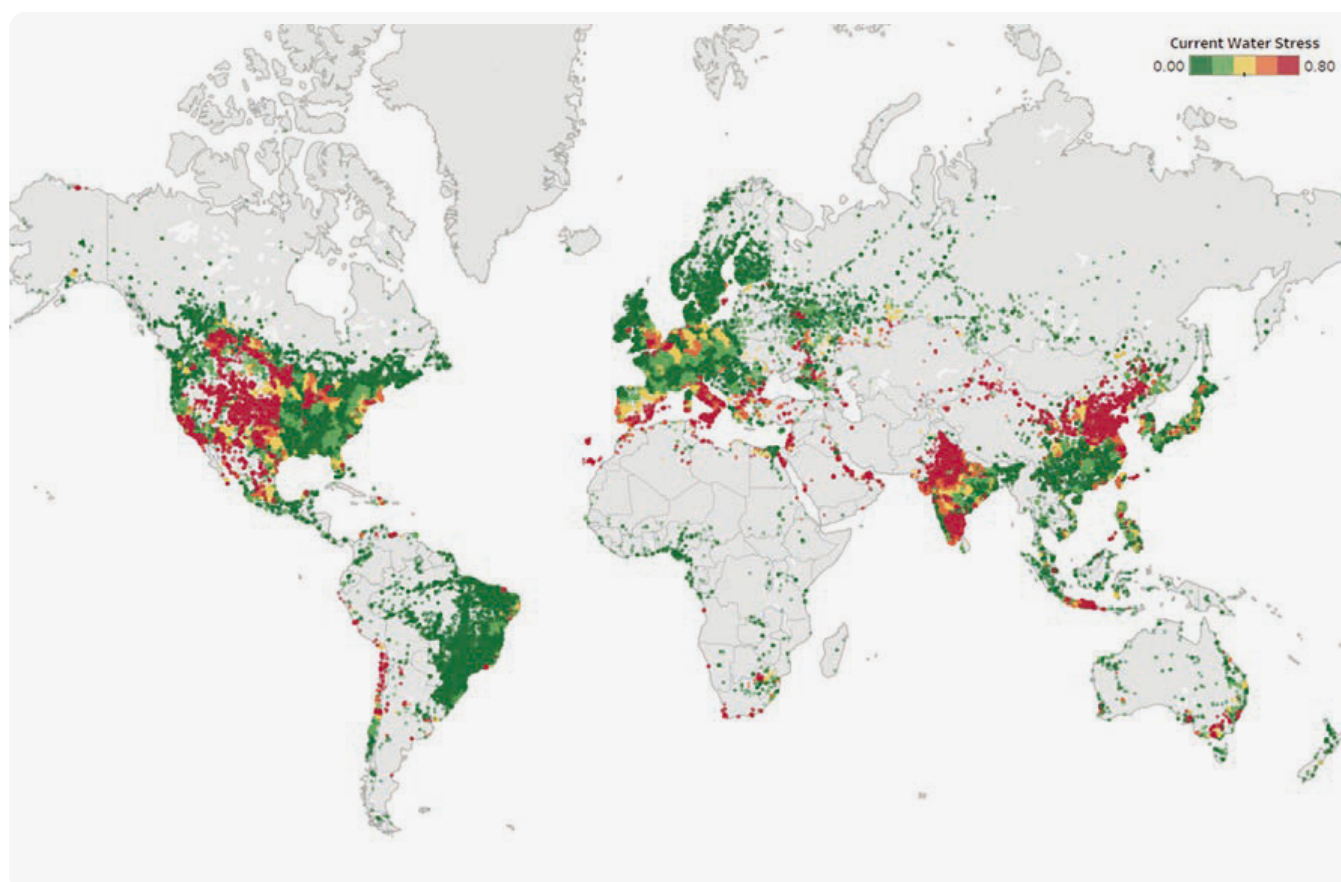
4650 Beef

1000 Milk

2500 Cheese

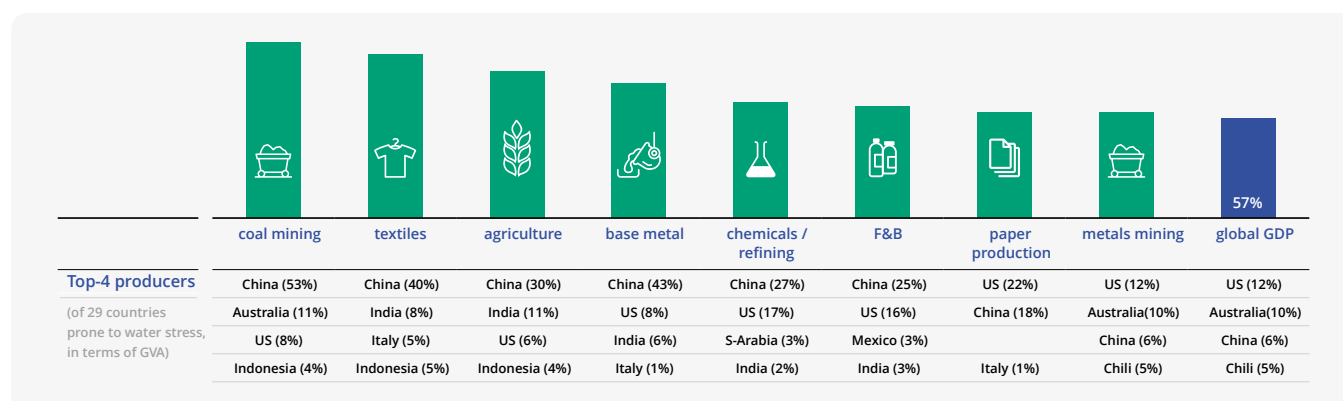
Source: Water Footprint Network

A large water footprint may be a financially material water risk where the continued provision of clean water is imperiled, i.e. where water-dependent industries are located in water-insecure places.



Source: DNB. Values at risk (2019)

Some industries and commodities are concentrated in water-stressed countries.



The extent of companies' exposure can be expressed in different ways, depending on data availability. A first, rudimentary approximation is simply the number and percentage of production locations in water stressed areas. Further refinements are the percentage of production capacity and the percentage of actual production in such areas. Finally, that exposure can be expressed as the business value (EBIT) at risk as estimated by, among other tools, Ecolab's Water Risk Monetizer²⁵. Companies can reduce that risk by a variety of measures to either increase water use efficiencies and/or improving water security, underpinned by proper governance arrangements including performance incentives.

25. <https://www.ecolab.com/sustainability/water-risk-monetizer>

The scarcity of water as a production factor also has a macro-dimension that is not directly related to the location or even the water use of a company. Prolonged shortages of water may push up a variety of commodity and input prices (inflation) or depress economic growth²⁶. Estimates depend on the structure of the economy; in India water shortages may cost up to 6% of GDP²⁷.

PFZW requires its asset managers to reduce financially material water risk in the portfolio. The principal instrument for this is engagement with selected companies in sectors that are highly water-dependent with operations in regions that are acutely water-stressed. In the absence of meaningful water prices, it also engages with some of the market initiatives to develop the data and standards to support investors' water risk assessment. See Appendix 3.

Reducing negative impact

Water is life. As the most basic of human needs, water is often a very emotive issue. Over-abstraction and pollution of water have an immediate potential to affect people's access to clean drinking water and their livelihoods. Highly water-dependent and polluting sectors such as energy²⁸, mining²⁹, pharma³⁰ and food and beverage³¹ can cause large negative impacts on surrounding communities and their environment, either through withdrawing or through polluting scarce water. See Appendix 2 for more examples. Groundwater depletion and groundwater pollution are cause for particular concern as negative impacts are near-impossible to remedy. Large scale hydro-energy development has its own adverse impacts, notably through community displacement and loss of biodiversity.

Competition for and pollution of scarce water tends to receive close scrutiny by civil society and NGOs (at least where such is allowed). Ceres maintains a database as part of its Water Investor Hub with various water-related news, including negative impact and incidents³². For consumer-facing companies (and by extension their investors) negative impact can quickly turn into a material risk as examples from the food & beverage sector suggest³³.

26. To draw a parallel with CO2 disclosure this could be referred to as 'scope 4' water risk exposure in addition to a company's on-site water use (scope 1), its water purchases (scope 2), and its suppliers or product markets (scope 3)

27. <https://www.bbc.com/news/world-asia-india-44492994>

28. <https://www.ft.com/content/fa7893bc-9175-11e8-b639-7680cedcc421>

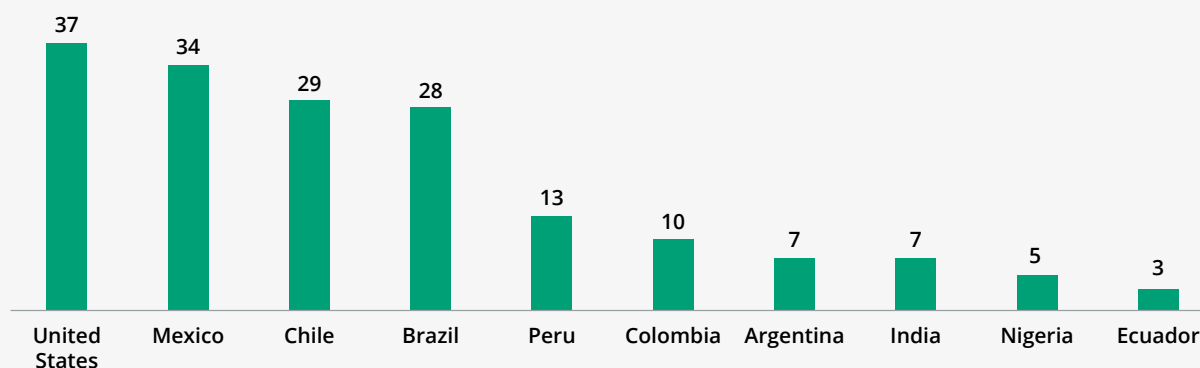
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31. <http://www.mightyearth.org/tyson-responds-to-environmental-campaign-and-public-pressure-addresses-pollution-in-supply-chain/>

32. <https://investorportal.ceres.org/s/report/0001H000007yWqdUAE/materiality-news-for-investor-water-hub>

33. See for example https://en.wikipedia.org/wiki/Plachimada_Coca-Cola_struggle and <https://www.businessinsider.nl/nestle-closes-controversial-arizona-plant-2019-2/> and <https://www.bbc.com/news/science-environment-47029485>



Source: ISS. *Dealing with Water Scarcity—an ESG perspective* (2018)

PFZW seeks to prevent, stop or remedy the negative impact of its investments, including water-related impacts. According to the Dutch pension funds' Agreement for Responsible Investment (IMVB) it will do so through investment policy, implementation and reporting. That Agreement is anchored in the OECD Guidelines for Multinational Enterprises³⁴ and UN Guiding Principles of Business and Human Rights³⁵ that spell out companies' duties to protect the interests of their various stakeholders.

To establish negative impact it relies on data providers such as Sustainalytics which screens listed companies' compliance with the OECD guidelines. Minimum standards will also be observed in private markets using instruments such as the ESG toolkit by British development bank CDC³⁶.

Increasing positive impact

The various global trends of “too little, too much or too dirty” do not just drive water risk, they drive investment opportunity as well.

Source: Impax Asset Management. *Investing in water* (2016)

Global trend	Response
 Demand for clean water outpaces supply	Water scarcity is a top risk identified by governments, corporations and academia
 Required investment in global infrastructure	\$7.5 trillion projected spending globally over next 15 years in water infrastructure
 Tightening global water regulation	\$300 billion directed to address water pollution by China's water 10 plan
 Adaptation to changing weather patterns	Increasing incidence of both drought and flooding cause investment requirements in water systems
 Innovation and evolving technology	New technology and upgrades to existing systems create further investment opportunities

Since many regions have already maxed out their sustainable water supplies, most investment opportunities are in water demand management through increasing efficiencies and waste water treatment and reuse. Desalination is the exception as it does increase water supplies albeit at high cost compared to waste water reuse.

Waste water collection and treatment is of particular importance for its links to public health. That includes the removal of pharmaceutical and micro-pollutants, a relatively new problem.

34. <http://mneguidelines.oecd.org/guidelines/>

35. <http://www.unwater.org/water-facts/human-rights/> and <https://www.ohchr.org/Documents/Publications/FactSheet35en.pdf>

36. <https://toolkit.cdcgroup.com/es-topics/>

The investment opportunity set grows considerably when water treatment is combined with energy and food production. This so-called energy-water-food nexus includes various technologies ranging from energy and resource recovery from wastewater to hydrogen as a fuel, energy store or feedstock for the production of synthetic proteins³⁷. The taxonomy developed with APG for solutions to the Sustainable Development Goals (SDGs) is an attempt to capture and define relevant and investible opportunities, including those for SDG6.

These opportunities can be pursued through a variety of asset classes including listed equities (BOA), rates and inflation (blue bonds), infrastructure and private equity. However, the water market is highly fragmented where current mandates require opportunities to be sizable, low-cost delivering market-rate returns.

37. <http://www.unwater.org/water-facts/water-food-and-energy/>

5 Conclusion and further steps

This paper has defined water scarcity as a global challenge and as a portfolio risk for PFZW. It also addresses the investment opportunities that stem from an issue that is bound to grow in importance and urgency—both in terms of financial materiality as well as in terms of impact on public and environmental health.

PFZW will pursue water scarcity-reducing investment opportunities, notably in infrastructure, private equity, fixed income and listed equity. It will do so on the basis of the taxonomies of solutions and decision rules developed for Sustainable Development Goal 6.

On the risk side, PFZW will continue its involvement in initiatives that aim to improve investors' understanding of future water-related risks, and indeed their ability to compare companies' exposure to and management of water risk. It will continue its engagement with selected companies in the most water-dependent sectors and the most water-stressed geographies, and adjust its priorities according to the Dutch pension funds' Agreement on Responsible Investment and the 'Eerlijk Pensioenlabel', as appropriate. In addition to financial materiality more attention will be paid to negative impacts on vulnerable people and their environment by companies in large-footprint sectors such as mining and energy.

6 Sources

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Appendix 1: Sustainable Development Goal 6

6 CLEAN WATER AND SANITATION



ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

BEFORE COVID-19

DESPITE PROGRESS,
BILLIONS STILL LACK
WATER AND SANITATION SERVICES



2.2 BILLION PEOPLE
LACK SAFELY MANAGED
DRINKING WATER
[2017]



4.2 BILLION PEOPLE
LACK SAFELY MANAGED
SANITATION
[2017]



TWO IN FIVE
HEALTH CARE FACILITIES
WORLDWIDE HAVE
NO
SOAP AND WATER OR
ALCOHOL-BASED
HAND RUB
[2016]



COVID-19 IMPLICATIONS



3 BILLION
PEOPLE WORLDWIDE
LACK BASIC HANDWASHING
FACILITIES AT HOME
↓ ↓ ↓
THE MOST EFFECTIVE METHOD FOR
COVID-19 PREVENTION



WATER SCARCITY
COULD DISPLACE
700 MILLION PEOPLE
BY 2030



SOME COUNTRIES EXPERIENCE
A **FUNDING GAP OF 61%** FOR ACHIEVING
WATER AND SANITATION TARGETS

Appendix 2: Examples of water-driven business impacts

Company	Date	Industry	Location	Description
NTPC	Mar-2016	Utilities	Kolkata, India	NTPC is forced to shut down its 1,600 MW Farakka thermal power plant due to a water shortage, which leads to an increase in power prices on the India energy exchange.
EDELCA	Mar-2016	Utilities	Caracas, Venezuela	A prolonged drought reduces electricity output from the Guri dam and forces the government to ration electricity and water supplies.
Growthpoint Properties	Mar-2016	Real Estate	Johannesburg, South Africa	The worst drought in South African history led to a 33% reduction in the country's corn harvest in 2015 and contributed to general economic weakening. Property companies are struggling with rising vacancies and unpaid rents.
KPCL	Mar-2016	Utilities	Karnataka, India	Water scarcity forces the shutdown of two units at the Raichur Thermal Power Station, a 1,750 MW thermal power station.
Sabesp	Sep-2015	Utilities	Sao Paulo, Brazil	Brazil's worst drought in 80 years leads to an 80% collapse in net income for Sabesp, Brazil's largest publicly traded water utility.
Starbucks	May-2015	Food Products	California, US	Starbucks elects to move its bottled water business from California to Pennsylvania due to drought conditions.
EDP	May-2015	Utilities	Sao Paulo, Brazil	EDP tells investors that impacts from the ongoing drought in Brazil could reduce earnings by USD 167–223m in 2015.
J.M. Smucker	Apr-2015	Food Products	Sao Paulo, Brazil	Increases prices on Folger's K-Cup coffee packs by 8% in response to negative impact of Brazil's drought on coffee harvest.
Campbell Soup	Mar-2015	Food Products	California, US	Reports a 28% decline in profits at its California-based carrot division due in part to drought conditions.
Anglo American	Jan-2015	Diversified Metals	Atacama, Chile	The company discloses that water constraints at the Los Bronces copper mine in Chile have led to "a material decrease in production".
GrainCorp	Nov-2014	Food Products	Brisbane, Australia	GrainCorp discloses a 64% drop in 2014 profits due to drought conditions that impact grain deliveries and exports.
Coca-Cola	Jun-2014	Food Products	Uttar Pradesh, India	Coca-Cola is forced to abandon an USD 81m bottling factory in India due in part to local water shortages and allegations of excessive water use.
Infosys	Jul-2013	Software & Services	Chennai, India	A severe water shortage pushes Infosys to the brink of a shutdown. Projected losses were estimated to be more than USD 1m per day.

Appendix 3: Key water initiatives

Groups and Organizations that Provide Investor Support and Resources	Investor Water Groups	• Ceres' Investor Water Hub • Interfaith Center for Corporate Responsibility (ICCR) — water working group • Principles for Responsible Investment (PRI) — water working group • China Water Risk
	Climate and Sustainability Groups <i>Note: Climate and water issues are often connected.</i>	• Ceres' Investor Network — North America (working groups include focus on deforestation, disclosure, green bonds, etc.) • Asia Investor Group on Climate Change (AIGCC) — Australia and Asia • Investor Group on Climate Change (IGCC) — Australia and New Zealand • Institutional Investors Group on Climate Change (IIGCC) — Europe • International Corporate Governance Network (ICGN) — Global • Council of Institutional Investors (CII) — North America • RIA Canada and SHARE Canada • US SIF and European SIF • Global Investor Coalition — Global (Ceres, AIGCC, IGCC, IIGCC)
Guides on the Human Right to Water and Sanitation and the United Nations' Sustainable Development Goals		• The United Nations' Sustainable Development Goals (SDG 6) • The UN Guiding Principles on Business and Human Rights and Universal Declaration of Human Rights: The Human Right to Water and Sanitation • CEO Water Mandate and SHIFT's Guidance for Companies on Respecting the Human Rights to Water and Sanitation • ICCR's Stakeholder Responsibilities in Managing Access to Water
Reports on the Economic Importance of Water		• World Economic Forum's Global Risks Report 2017 — highlighting water's high-level position in the context of global threats • Charting Our Water Future, McKinsey & Company • High and Dry: Climate Change, Water and the Economy , The World Bank
Research Resources Analyzing the Materiality of Water Risk		• Ceres' Investor Water Handbook • Ceres' SEC Filing Water Search Tool • Ceres' Water Earnings Impact Tracker, available via Investor Water Hub membership • Ceres' The Ripple Effect, Water Risk in the Municipal Bond Market • Ceres' Feeding Ourselves Thirsty: Tracking Food Company Progress Toward a Water-Smart Future • Bloomberg's Transcript Analysis Function (TA), where investors can search earnings calls for topics such as "drought, flood, water scarcity" to see how often they are linked to lower revenue and earnings. • CDP Annual Global Water Reports and associated company-specific questionnaires • Sustainability Accounting Standards Board (SASB) industry briefs, including analysis of material water risks for specific industries (see SASB website and Buy/Sell Chapter) • Investor Water Risks in the Mining Sector, NBIM and Columbia University Study
Guides on Developing Investment Beliefs and Policies		• Ceres' The 21st Century Investor Blueprint for Sustainable Investing • Action on Climate: A Practical Guide for Fiduciaries , SEIU, Responsible Endowments Coalition • How Asset Owners Can Drive Responsible Investment: Beliefs, Strategies and Mandates, PRI • Writing a Responsible Investment Policy: Guidance for Asset Owners , PRI