

A transformational framework for Water Risk

An institutional framework on addressing water risk across asset classes

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Overview

An estimated US\$670 billion of annual spending is required until 2030 to meet the sustainable goals associated with water. Yet, water is the risk where the least progress has been made. DWS is part of a working group, organised by the World Economic Forum (WEF), on 'Transformational Investment'. The initiative targets new approaches to convert global systemic risks into a sustainable return. Water is one of the six systemic risks identified by the WEF¹.

How water has become an important risk

Water is a finite resource with only 2.5% potentially being usable for life on earth². In the past 100 years, water per capita has decreased significantly as a result of population growth while water quality has deteriorated. Today, 785 million people lack a basic water-drinking source and two billion people use a contaminated drinking water source³.

Two of the seventeen SDGs are directly related to water, with water linked to many of the other SDGs, yet the 2030 water targets outlined by the UN will most likely not be met without stronger new actions⁴. While the European Environment Agency 2020 report paints an upbeat picture regarding greenhouse gas emission targets stating these are largely on track, the EEA cites that for 2020 most water-related targets will be 'largely missed' with many displaying a deteriorating trend. **That 60% of European surface water is polluted⁵ 50 years after the first European Water Charter was declared in 1968, is a sign of how public policy to date has largely failed.**

¹ WEF (May 2020). Transformation Investment: Converting Global Systemic Risks into Sustainable Returns. The other systemic risks include: climate change, population growth, geopolitical uncertainty, negative interest rates and technology disruption

² FAO Water: A finite resource (1995) www.fao.org/3/u8480e/u8480E0c.htm

Water risk is understood at the macro level

Over the past two decades, a significant body of research has taken place to understand water risks. The polyhedric nature of water, its importance to humanity and the risks we face are clear, but, progress on addressing such risks is slow. Our failure to properly address water risks is likely due to factors, including (i) the fragmented nature of water regulation, (ii) the characteristics of water investments, and (iii) our misplaced belief that water is plentiful and cheap. Further, population growth, climate change and our inability to redress the damage created by past action have the potential to make a bad situation even worse.

How to address water risk

The investment community could have an important role to play in addressing water risk. In the end, our fiduciary role is about looking after the capital, deploying that capital and ensuring sustainable returns. In this report, we propose an ambitious, but, pragmatic approach to addressing water risk. However, many challenges exist.

A 'transformational investment' requires a solid foundation, requiring investors to move from an 'outside-in' focussing on how sustainability issues affect financial risk management, to an 'inside out' approach of using investor influence for a positive, transformational change.

³ WHO (June 2019). Drinking water

⁴ SDG Index (July 2020). www.sdgindex.org/

⁵ EEA (December 2019). The European Environment – state and outlook 2020

For Institutional investors and Professional investors

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But this is not enough, as investors currently face a hodge-podge, characterised by:

- (i) Ambiguity about the definition of risks,
- (ii) Incorrect alignment of roles along the investment value chain
- (iii) Too much onus on the investment community to identify, measure, manage risks and use their influence to
- (iv) Doing the right thing is expensive both for individual consumers and investment firms.

The result is a tower of Babylon of ideas and approaches, marring progress on water risk and ESG altogether.

A **'transformational investment'** should start with a **'transformational framework'** that:

1. Ensures that the person on the street, the end consumer/citizen/retail investor, as well as institutional investors, are clear about sustainability and water risk
2. Reassessing the roles of the different functions along the 'investment chain': by bringing back Aristotle and Montesquieu's concept of the separation of powers:
 - a. Governments should legislate: using the EU Water Charter to guide policies
 - b. Accountants should measure: We need a full ESG Globally Accepted Accounting Principles (GAAP) with auditing of countries, companies and investors

regarding their entire environmental and social impacts

- c. Investors should invest: implement an investment framework across all asset classes with a clear distinction between 'do nothing', ESG integration (outside-in) and impact/transformational investment (inside out)
3. The investment products that truly address water and/or other ESG risks ought to have lower fees than non-ESG/transformational investment products. Governments should apply a 'sustainability fee' to investment products that are not addressing the sustainability challenge. The highest fees should exist for 'do nothing' investment products, the intermediate fee for ESG integration investment products and lower/no government sustainability fees for impact investments. An alternative could be a tax credit, like for investors in US municipal investments, to make true ESG investments truly competitive. An alternative could be a tax credit, like for investors in US municipal investments, to make true ESG investments truly competitive⁶.

Failing to achieve a transformational framework will likely condemn water and possibly other ESG factors to risks that investors simply try to avoid even though they become a major challenge for humanity by the end of this decade.

The publication of this working paper marks the start of a more in-depth consultation we are undertaking with water experts, investor groups and other relevant stakeholders. Together, our aim is to deepen our understanding and refine the proposals introduced in this paper with the aim of them becoming operational.

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⁶ In the future, we will examine the merits and challenges of taxation versus supporting credit

Executive Summary: Addressing water risk

“Water, water, everywhere and not a drop to drink”

Around the year 360 B.C., Plato wrote the *Timaeus*. In his narrative, the world is made of four elements: fire, earth, air and water. The solid elements are fire and earth requiring air and water, two intermediates, to bring life to the world. Using Plato’s framework, one could argue that climate change is simply humans messing up with the proportions. Still, if ‘air’ has been the focus of attention over recent years, the debate is now also focusing on ‘water’. Clearly, Plato understood the complexity of ‘water’. As he defined a shape for each element, he gave water the most complex structure of the four elements, an icosahedron—a polyhedron with 20 faces. Its structure consists of tiny little balls and when the structure breaks, the balls flow out of one’s hand. How appropriate!

A new framework for water risk is necessary

Complexity is definitively the issue with water, which is possibly why water is one of six global systemic risks where the least progress has been made, according to the World Economic Forum. Their initiative on ‘Transformational Investment’ aims at assessing ways to convert a global systemic risk into a sustainable return. They estimate⁷ that an annual spend of US\$670bn is required to achieve the two sustainable development goals directly related to water by 2030. Still, the evidence suggests that we are already running behind schedule. **The objective of this paper is to:**

- _ **better understand water risk, and**
- _ **provide a holistic framework for assessing and implementing water risk.**

The WEF argues for a ‘transformational investment’ to address water risk. **However, an essential pre-requisite for delivering a transformational investment is a ‘transformational framework’ in our view.**

Transformational initiatives such as access to free education in the late 19th century or the establishment of the National Health Service (NHS) in the UK started with a bold idea that became a central plank of policymaking across multiple government departments. **Water risk has been recognised at a policymaking level and there is plenty of material about its importance, but it is complex and there is no single framework driving it through the investment process.** More than fifty years since the European Union set up a ‘water charter’ in 1968, some of the main principles of the

original charter are still unmet. Quality of water in Europe is still an issue; water risks have just been ‘exported’ (virtual water); there is still much confusion about how to measure water risks at an investment level, and ‘investors’ need to rely on un-audited third-party data that claim to provide unique insights into the risk, but that do not certify the validity of their analysis. More importantly, there is still little understanding of what water risk means at the investment level. It is rather a hodgepodge of approaches. Clearly, **a transformational investment cannot be built on such a weak foundation.**

There are multiple reasons for our collective failures. The main one, in our view, is that being a primary element supporting life, water should have a special place in policymaking, but this is not the case. Its importance has often been overlooked. *‘Although water is not mentioned in the Paris climate agreement per se, it is an essential component of nearly all the mitigation and adaptation strategies. However, water is identified as the number one priority for adaptation actions in most of the intended nationally determined contributions and is directly or indirectly related to all other priority areas. Similarly, water is hardly mentioned in the Sendai Framework [for Disaster Risk Reduction] itself, even though water flows through each of [its] priorities for action’⁸.*

At a macro level, the harsh reality is that **water is subordinate to policies, rather than guiding them. The unfortunate side-effect is an excessive fragmentation of water policies.** This becomes evident when one reads the experience, for example, of new water projects by the World Bank in developing countries. The ‘fracturing’ of the water agenda at a policymaking level appears to be a cause for investment delays.

At an investment level, **the management of water risk has been left to the ‘market’**, where by ‘market’ we mean that it has been primarily ‘self-regulatory’ in nature. For investors, for example, the difficulties start from the very definition of water risk: what is it and how do we measure it? Any reader familiar with company accounts will concur that published accounts do not provide information about such risks, but such information is essential. Stated accounts are there to inform investors on capital, profitability and risks. The chartered accounting profession came about in Scotland in the 1850s⁹. It was essential for the development of a capitalistic economy where ownership of capital is separated from control. In the age of ‘ESG’, published accounts do not provide investors with the details related to the impact of ESG risks.

⁷ WEF (May 2020). Transformation Investment: Converting Global Systemic Risks into Sustainable Returns

⁸ UN (March 2020). UN World Water Development Report 2020. Water and Climate Change

⁹ Hobsbawm’s book ‘Age of Capital’ published in 1975

If the concept of ‘Asset’ is associated with an economic benefit lasting more than a year, the obvious question for an investor is ‘how the implementation of a Paris Aligned target will impact that asset?’

It is certainly possible for accountants to estimate the impact of a shortening of economic life because of climate change. However, this is not happening. Why? On the 29th October 2020, TCFD¹⁰ published the ‘Third TCFD Status Report’. More than 1,500 organisations worldwide had expressed support for TCFD-aligned disclosures to help cut carbon emissions, up 85% since last year’s update. However, the report highlights the need for greater climate-related disclosures and transparency.

Investors lack the required information to assess ‘water’ risk, which is often common in ESG, but they also lack the understanding of whether such risks are referring to the potential impact that integrating water (ESG) risk may have on the portfolio or refer to the implication of not investing in certain areas and the impact that this may have, for example, on the SDGs for water¹¹. Even, when the focus is just on assessing outside water/ESG risk on a portfolio, it is a dystopian situation, where investors are being asked to:

- (i) Become experts in understanding such risks
- (ii) Measure those risks across different asset classes without any assurance about the quality of the underlying data
- (iii) Search for and validate data from third-party data providers¹², who take no risks for quality and instead transfer all the risks of data usage onto investors
- (iv) Create a portfolio of investments where the concept of ESG ‘risk’ is inconsistent with traditionally accepted ‘risk’ concepts, such as factor analysis
- (v) Deal with regulators and fund management boards who want to ensure that this new concept of risk is not detrimental to the risk-reward framework that the final consumer of investment products normally enjoys
- (vi) Engage with the management of the company that he or she is investing in to drive change (this is supposed

- to take place while the portfolio manager (PM) remains an expert on other issues that companies face, such as politics, business dynamics, valuation, and so on).
- (vii) Report and possibly educate institutional and retail clients, regulators, their own shareholders and a wide range of voluntary initiatives on their portfolios and firm-wide approach to ESG.

We have probably forgotten a few other issues, but the reader should get the idea. It is a **‘tower of Babylon’ of confusing roles, meanings and purposes**. Everything could be labelled ESG and water risk, with the rampant risk of greenwashing and no impact on real problems. The question is ‘if we as operators are not sure that the current framework will be a driver of change, if we are sceptical that the majority of the water and ESG funds will not address water and ESG risks, how can we convince the final consumer that a ‘water risk’ fund will be a driver of change?’ The most likely outcome is that the end consumer will shy away from considering water and other ESG risks in its investment decisions. **Thinking of a transformational investment in such a context is sheer utopia**. We first need a ‘transformational framework, which, to be fair, is not specific to water, but to all ESG and all other systemic risks identified by the World Economic Forum. Once such a framework is in place, we can then discuss true transformational investments driving change.

Defining such a framework and implementing it need not take long. Still, it is conceivable that it may take this entire decade, as the debate about ‘water risk’ is still in its early stages. But, water will eventually become as important as air and CO₂. In the meantime, we urge asset management companies to start thinking of water risk in a different manner, less compartmentalised and more holistic in nature, to move ahead of future dynamics and legislation and to (i) adopt a water charter with the view of driving their own operations as well as their investment activities, (possibly in collaboration with other asset management companies), and (ii) ask companies to do the same.

¹⁰ The Task Force on Climate-related Financial Disclosures (TCFD) was set up in 2015 by the Financial Stability Board (FSB), which coordinates financial rules for G20 countries. In 2017, the TCFD published a voluntary set of disclosures to help inform investors on the impact of climate change.

¹¹ There is an interesting debate at present about the merits of an initiative undertaken by the WEF with the Big Four accountancy firms: *Measuring Stakeholder Capitalism. Towards Common Metrics and Consistent Reporting of Sustainable Value Creation* as a group of sustainability accounting academics have told the IFRS Foundation that its recent consultation on the subject has

taken an investor-oriented approach that lacks “adequate evidence-based justification” and ignores the UN Sustainable Development Goals (SDGs) (Responsible Investor, *IFRS Foundation’s ESG reporting proposals lack SDGs focus, scholars say*, Carlos Tornero, Oct 15th, 2020).

¹² In assessing water risk, the investor is being guided by an increasing number of data suppliers, all unregulated, arguing that they each provide, at a very expensive price, unique insights about risk, but they also argue that if there is an error in the data, the risk is yours! How handy.

Section I: Understanding how water risks affect investments

Water risk affects all investments

To the novice, water risk is about ‘water infrastructure’ or protection against water-related events such as rising sea levels. However, **water risk is about the management of water through its entire cycle and its interaction with humans and the environment. Risk can be either direct or indirect in nature.** Direct risk is about access to water, how we use and dispose of it. Indirect risk is about owning an investment indirectly responsible for high water risk activities (financials), or about recognising that water is an input factor in goods and services that we use (food, energy, clothing). Indirect risks are important as we may not realise the very detrimental effect that our consumption patterns have on water risks.

Water is essential to all activity and all asset classes are affected (Equities, Fixed Income, Multi-Assets, Alternatives; Passive and Active; Private and Public). Hence, a holistic approach to water risk is best, which we will discuss later.

The five areas of water risk

We identify five ‘water risks’:

- A. Demand growth for water given resource constraints**
- B. Sustainability of water (water in the economic cycle)**
- C. Water-related infrastructure**
- D. Virtual water**
- E. Climate change**

There are several nexuses associated with water such as over-fishing, sea-level rise and flooding, plastic pollution. In a new WRI Commentary¹³, Sara Walker, a WRI expert in water and agriculture, illustrates the linkages with stories from Zimbabwe, Cambodia and Pakistan, then points to solutions. “*The international development community cannot afford to keep kicking this down the road,*” she writes. “*The time for integrated action to address the water-energy-food nexus is now.*”

Water is everywhere, so plenty of connections can be defined and analysed, but we believe that they will ultimately be reconciled to the five risk categories. It is certainly true that if we are dealing with ‘water risk’ as separate factors, the cascade of implication would become an important reference, although possibly in a separate paper.

A. Demand growth given resource constraints

The UN estimates¹⁴ that water use has increased by a factor of six over the past 100 years and continues to grow at 1% per year as a result of increasing population, economic development and shifting consumer patterns. Today, 2.2 billion people already lack safely managed drinking water and 4.2 billion lack safely managed sanitation. The WHO also calculate that over a third of the world’s population currently lacks basic handwashing facilities at home¹⁵, the most effective method for COVID-19 prevention. This is taking place in a context where the world’s population will hit 10.9 billion by the end of this century, compared to 7.7 billion currently¹⁶. Most of the demand growth for water is likely to come from Africa and Asia, i.e. in emerging economies. Against such a demand growth we need to consider that the quantity of water is fixed and that 70% of the water is actually used in agriculture, 20% for industries and the remainder for humans.

While this may appear good news, the World Bank expects that population growth will require an increase in agriculture products of 70% by 2050! Three-quarters of the Earth is covered with water, but less than 2.5% is fresh water and only 1% can sustain all terrestrial life and the ecosystem¹⁷. In assessing the risk it is important to understand that lack of water can give rise to conflicts, famine and large-scale migration. Hence it is not a risk that can be easily confined to certain regions, but rather spill-over effects exist. It is also important to assess that water infrastructure is capital intensive and invasive, with long economic life and low returns. The following table shows the operational characteristics of water-related investments, with a long asset life, low cash returns, high capital intensity and high financial leverage.

FIGURE 1. CASH RETURNS AND ECONOMIC LIFE OF WATER COMPANIES

	Cash Returns	Assets Life	Capital Intensity (Sales/Capital)	Financial Leverage
Water Utilities	3.2%	39y	0.10	81%
Rest of the Market	6.2%	15y	0.59	31%

Source: DWS, CROCI. The table shows aggregate data of CROCI’s coverage of companies globally. Water Utilities shows aggregate data of American Water Works, Severn Trent and United Utilities. Data as available on 06 November 2020.

¹³ World Resources Institute (October 2020). Triple Threat Water, Energy and Food Insecurity

¹⁴ UN (May 2018). World Water Development Report 2018: Nature based solutions for water; facts and figures

¹⁵ WHO (June 2019). 1 in 3 people globally do not have access to safe drinking water

¹⁶ United Nations Population Division. World Population Prospects 2019

¹⁷ FAO Water: A finite resource (1995) www.fao.org/3/u8480e/u8480e0c.htm

It is also a type of investment that demands considerable macro stability, which is often lacking in many developing nations. This is why, for example, one of the major investors in water-related projects in emerging economies is the World Bank. The World Bank has an entire department focusing on 'water' investments. There are four focus areas in the World Bank Water project: (i) Water Supply; (ii) Water Sanitation, (iii) Water Resources Management and (iv) Water in Agriculture which combined aim to achieve "A Water-Secure World for All".

Given their supranational status, one would expect the World Bank to have a significant impact on addressing Water Risk. Still, the World Bank is the first to admit the challenges on the matter. '*... due to its own fracturing of the water agenda in the Bank, there has been limited attention to addressing the higher level policy drivers of water use in agriculture, linking it to the overall integrated water resources management agenda, and facilitating broader water stakeholder cooperation. Project development objectives and indicators have focused almost exclusively on farmer income, and inconsistently highlight water service improvements, though recent programs have begun to explicitly consider improvements in overall water quantity and quality impacts. The Bank has also been constrained by the challenges of difficult implementation. Most irrigation and drainage projects take longer than planned, and even then are completed with less than fully satisfactory outcomes due to basic challenges in design and contracting. As a result, even where institutional and other aspects are addressed by project design, there is little space during implementation for the Bank and client to focus on broader issues of incentives and behavioural change prior to project closing, but rather all efforts are committed to completion of physical works*¹⁸. (bold added).

A transformational framework requirement for addressing risk: Demand growth for water given resource constraints

A transformational investment that addresses demand growth in a sustainable manner requires both public and private firms to put water ahead of any other development. Every nation should have a strategic water plan which helps shape social and industrial activity. A transformational plan attracting private capital requires a strong framework that will ensure that private investors are rewarded for their capital over the entire life of their investments, that population has access to water at a fair price and that the investment is sustainable with regard to ESG considerations.

B. Sustainability of water

Notwithstanding some progress made in the past 50 years, a recent study presented by CDP estimates¹⁹ that:

- 80% of the world's wastewater is returned to the environment untreated
- 50% of US rivers and 60% of European surface water are polluted
- A third of the rivers in Asia, Africa and Latin America are severely polluted by pathogens

In the report²⁰ 'Quality Unknown - The Invisible Water Crisis', the World Bank argues that nitrogen in water is responsible for fatally inflicting what is known as blue baby syndrome, which starves infants of oxygen. They estimate that 'an additional kilogram of fertiliser per hectare increases yields by 4-5 percent. However, the release of nitrates into water poses a risk large enough to increase childhood stunting by 11-19 percent and decrease later-life earnings by 1-2 percent.

The vast subsidies accruing to fertilizers therefore generate damage to human health that is as great as, or even greater than, the benefits that they bring to agriculture. In their damning report, they conclude: '*high-income status does not confer immunity from water quality problems. This contradicts what one might assume based on the environmental Kuznets curve hypothesis, which posits that pollution eventually declines with prosperity. Not only does pollution not decline with economic growth, but the range of pollutants tend to expand with prosperity*' (pp. XII).

¹⁸ World Bank. Water in agriculture www.worldbank.org/en/topic/water-in-agriculture#2

¹⁹ CDP (April 2020). Cleaning up their act

²⁰ World Bank (August 2019). Quality Unknown - The Invisible Water Crisis

A transformational framework requirement for addressing risk: Sustainability of water

Water is an essential resource for several processes in society and business. However, our economic model thinks of water in a linear manner (access, use, dispose), without considering the environmental impact of extracting water, what happens to disposed water and the impact that pollution has on the ecosystem and humans. Sustainability is about thinking of the water cycle. It is about moving from a linear to a circular economy and ensuring that the full costs through the cycle are properly taken into account.

A transformational framework requirement for addressing risk: Water related infrastructure

It is easy to build without assessing the full implications and impact, but this approach is not sustainable. There is much need for integrating 'grey infrastructure' with 'green infrastructure' and other innovations on better water management. In a recent documentary (Brave new world: Racing to solve our water crisis) by Netflix, there is plenty of evidence of how innovations to address functions normally performed by expensive water infrastructure are possible.

C. Water related infrastructure

Water infrastructure is both a solution to problems as well as a cause of problems. Traditional water infrastructure is capital intensive, with low levels of profitability and long asset lives. Water infrastructure uses materials (steel, cement) with high levels of CO₂ emissions and can have significant detrimental impacts on ecosystems.

Historically none of these factors were considered, as the economic benefit of providing water for economic activities out-weighted any other consideration. This is no longer the case as the impact of such projects on existing ecosystems can become all too evident.

For instance, diverting water courses caused the drying up of the Aral Sea and a significant increase in salinity levels, with substantial socio-economic impact. At the same time, Jakarta, the capital of Indonesia, is according to the World Economic Forum, one of the world's fastest disappearing cities²¹. This is the result of the lack of proper water infrastructure (aqueducts) and high pollution levels in nearby rivers.

²¹ World Economic Forum (August 2018). The Greater Jakarta area, home to almost 30 million people, has sunk by 4 meters in the last 30 years. The situation is worst in North Jakarta, one of the city's five districts, which has sunk by an alarming 2.5 meters in the last 10 years alone. It is estimated that 95% of North Jakarta could be under water by 2050. There are several reasons for the city's sinking, particularly residents' extracting of groundwater, which when pumped out, the land's surface sinks. Regulations allow private individuals and businesses to dig their own wells at will. The city consequently

D. Virtual Water

The concept of virtual water concerns the water impact related to consumption, with specific attention to water risk in the countries where the product is made, but, not consumed. Think of water risk for a gold ring sold in the UK, or water risk for a cotton T-shirt. Most of the water risks attached to gold and cotton arise outside Europe. Virtual water is about making sure that we attach the associated water risk to what is consumed. The European Environment Agency's European environment - state and outlook 2020 report (SOER 2020) highlights when it comes to consumption the EU is a net importer of environmental impacts since many internationally traded goods are produced in regions with low production costs and weak environmental regulation. Yet the prices of internationally traded goods rarely incorporate the costs of environmental externalities. Tukker et al (2016) estimate that 40% of the water needed to produce what is consumed in Europe, is used outside the EU²².

There is much focus on direct water consumption and its effects, but it is also essential that the management of water incorporate indirect risks as change will not take place until the indirect impacts are also properly assessed. Water is required for all the products we consume, but some products require significantly more water and have much larger environmental impacts than others. Investors in developed economies may feel quite shielded from water risks in developing nations, but they should not. The concept of virtual water brings water to the heart of the investment when it comes to investing in companies whether through equities, bonds, or through public or private markets.

needs urgent public infrastructure to remove such practices. The development of high rise buildings may have also added weight on a swamp area, thus making it sink. Floods become worse as the ocean barrier, originally conceived to protect against the sea, is now preventing water from flowing into the ocean.

²² Tukker et al (2016). Environmental and resource footprints in a global context: Europe's structural deficit in resource endowments

FIGURE 2. VOLUME OF WATER REQUIRED TO PRODUCE COMMON FOODSTUFFS

Foodstuff	Quantity	Water consumption (litres)
Chocolate	1 kg	17,196
Beef	1 kg	15,415
Sheep Meat	1 kg	10,412
Pork	1 kg	5,988
Butter	1 kg	5,553
Chicken meat	1 kg	4,325
Cheese	1 kg	3,178
Olives	1 kg	3,025
Rice	1 kg	2,497
Cotton	1 @ 250g	2,495
Pasta (dry)	1 kg	1,849
Bread	1 kg	1,608
Pizza	1 unit	1,239
Apple	1 kg	822
Banana	1 kg	790
Potatoes	1 kg	287
Milk	1 x 250ml glass	255
Cabbage	1 kg	237
Tomato	1 kg	214
Egg	1	196
Wine	1 x 250ml glass	109
Beer	1 x 250ml glass	74
Tea	1 x 250 ml cup	27

Source: IME (January 2013). Global food: waste not, want not

A transformational framework requirement for addressing risk: Virtual water

Investors in listed equities, corporate bonds and high yield must develop an understanding of the impact that global trade has on water risk and ensure that risks are properly accounted for. Assessing the water impact is the first step, but assessing the sustainability of the water being used remains a very complex task. Take the example of cotton. There is no fixed amount of water used to grow one kilo of cotton (Turkey, Egypt, India and the US will each have different water requirements) and farming cotton in each country or state will have a different environmental impact both in terms of pesticides as well as of the impact of the water infrastructure used to farm the cotton.

But assessing the water usage and the environmental impact of a food and non-food retailer, is highly complex and may simply be out of investors' grasp. The simple question is: *"if owning equities is equivalent to owning a small piece of a company, shouldn't the owner have clarity about such issues? And shouldn't the fiduciary PM ask for proper disclosure, rather than use proxies to estimate the risk?"* Ultimately, this should be disclosed in the accounts and have a chartered accountant that certifies it all. Products ought to disclose water usage and a rating about the level of sustainability relating to water. It is not feasible to ask a portfolio manager or research analyst to do such a detailed analysis on hundreds of listed stocks to integrate ESG or water risks at the portfolio level.

The economic risk is that the inability to properly measure risk may lead to starving entire sectors (mining, energy, utilities, food producers and distributors and non-food retailers) of capital, while letting those financing highly controversial water projects off the hook because they are not directly involved. **Transformational change is about making sure that good practices expand and bad practices stop, that disclosure about direct and indirect risk is widened, while not starving economic activity.** Achieving such an objective requires accounting disclosure that is simply not there. It requires traceability along the supply chain, the ability to engage and have full awareness of the costs and their impacts. All the necessary steps which are essential for properly addressing water risk in a sustainable manner.

The case of cotton farming and water

It can take 2,700 litres of water to make just one cotton T-shirt²³ and an estimated 75% of the fashion market is concentrated in Europe, USA, China and Japan²⁴. Between 2000 and 2014, clothing production doubled with the average consumer buying 60 percent more pieces of garment compared to 15 years previously. Yet, each clothing item is now kept half as long²⁵. While the final consumption of cotton may be in the developed world, the production largely takes place in developing economies.

Understanding and changing consumer activity in developed countries can have a far reaching impact well beyond how developed economies manage water risk. This is evident when one analyses cotton farming, which has had devastating effects on many regions.

In its water footprint of water consumption study²⁶ published by the UNESCO in 2005, the authors note: *“The impacts of cotton production on the environment are easily visible and have different faces. On the one hand, there are the effects of water depletion, on the other hand, the effects on water quality. In many of the major textile processing areas, downstream riparians can see from the river what was the latest colour applied in the upstream textile industry. The Aral Sea is the most famous example of the effects of water abstractions for irrigation. In the period 1960-2000, the Aral Sea in Central Asia lost approximately 60% of its area and 80% of its volumeas a result of the annual abstractions of water from the Amu Darya and the Syr Darya – the rivers which feed the Aral Sea – to grow cotton in the desert.”*

Importance of understanding what type of water and the yield used for cotton farming

There are several issues associated with water farming (i) the amount of blue or green water used for farming, (ii) the yield, (iii) the use of agrochemicals, insecticides and pesticides and the impact they have on grey/wastewater

After the major cotton producing countries of India, China, the US and Brazil, which combined account for 74 percent of global production, Uzbekistan, Turkey, Turkmenistan, Egypt and Syria, are relatively large cotton producers, together representing 7% of global production²⁷. However, because of climatic conditions, the environment for cotton production is becoming less attractive. Evaporation is very high while effective rainfall is very low. In the case of Uzbekistan, only 2% of the water used comes from rainfall, the remaining 98% comes from irrigation introduced in the 1970s by the Soviet Union, which resulted in the drying up of the Aral Sea²⁸. The high use of nitrates in Uzbekistan has also contributed to the increase in the level of salinity, leading to fish contamination, biodiversity loss, as well as having an impact on humans.

Cotton production affects water quality both in the stage of growing and the stage of processing. The impact in the first stage depends upon the amount of fertilizers used and the plant fertilizer uptake rate. The latter depends on the soil type, available quantity of fertilizer and stage of plant growth. The total quantity of pesticides used, in almost all cases, gets into either ground water or surface water bodies. Only 2.4 percent of the world’s arable land is planted with cotton yet cotton accounts for 24 percent of the world’s insecticide market and 11 percent of the sale of global pesticides²⁹. The nutrients (nitrogen, phosphorus, potash and other minor nutrients) and pesticides that leach out of the plant root zone can contaminate groundwater and surface water.

²³ WWF (January 2013). The Impact of a Cotton T-Shirt

²⁴ Business 2 Community (May 2015). 30 Shocking Figures and Facts in Global Textile and Apparel Industry

²⁵ UNECE (July 2018). UN Alliance aims to put fashion on path to sustainability

²⁶ UNESCO-IHE (September 2005). The water footprint of cotton consumption

²⁷ USDA (October 2020). Production, Supply & Distribution online database

²⁸ Unesco-IHE (September 2005), Value of Water Research Report Series n.18, p.15

²⁹ WWF (January 2013). Living Waters; Thirsty Crops

E. Climate change and water

In a comprehensive report³⁰, 'Water and Climate Change', the UN goes through the details of how water may affect climate change. The researchers appear to have more confidence in arguing that climate change will result in more extreme events such as heavier precipitation, extreme heat, and prolonged droughts than in identifying a clear direction about annual precipitation totals and seasonal patterns. At a practical level, the focus is hence on understanding the effects of extreme events on:

_**Existing infrastructure** as climate change generates additional risks to water-related infrastructure, requiring an increasing need for adaptation measures. In a City of Montréal report³¹ it examines relevant impacts on the environment, namely:

- a. Higher levels of erosion
- b. Contamination of water-courses via leaching of nutrients and pollutants and sewer overflows
- c. Slope instability
- d. Reduced pollination by certain insects
- e. Creation of temporary ponds that can foster the growth of mosquito larvae which are vectors for diseases such as the West Nile Virus

_**The need for new infrastructure** for risk reduction associated with extreme weather events.

_**Energy and industry** as water stress can put a stop to manufacturing and energy generation.

Humans and human settlements. Food and food availability can become an issue as a result of extreme events, but with most of the world population living in coastal areas, rising sea level is also an issue.

A transformational framework requirement for addressing risk: Climate change

There is much focus on climate change especially on the negative effects that climate change has on existing assets and investments. There has also been much attention on investments required in water related areas to address climate change risks. There has been less attention on how water, can be a solution to some climate change issues. An integrated approach is desirable for a transformational change.

How water risks have been implemented in the asset management world

Having defined risks, this part of section I briefly touches on how 'water risks' have been implemented in the investments world.

Equities is the asset class where most progress can be observed and we can identify four types of products:

- _**Risk control approaches** – investing in the market by minimising exposure to stocks and sectors that possess high water risks
- _**Thematic Equity fund** – investing in companies associated with the 'water' theme
- _**Positive approaches** – investing in stocks that are actually driving either innovation for the management of water risk or positive change with regard to how water risk is managed
- _**Engagement/stewardship** – using investor influence with companies can be undertaken in all equity products but a transformative focus entails much wider and deeper engagement with investees, focusing on real world change and not just improved financial risk management and disclosure

Tilting an equity portfolio away from companies with high carbon emissions or high water use/pollution, may reduce financial risk for an asset owner if those companies' profitability falls due to risks such as regulations, carbon or water pricing, faster expansion of renewable technologies and market perception.

However, shifting equity ownership and/or divestment does not necessarily affect carbon emissions, water use, pollution, real world resilience to physical climate impacts or other issues such as companies' treatment of workers or diversity and equality.

Thematic fund are not transformational in nature as they often provide exposure to the theme (water utilities, desalination machinery, infrastructure companies) rather than managing the 'risk', under the hope that having some 'water related stocks' in the portfolio will mean management of the risk.

Positive approaches and engagement or stewardship approaches have the highest potential as drivers of change, but they are limited thus far and more due diligence is required in understanding their specific aims when it comes to managing 'water risk'

Outside equities, a similar framework as for equities can be applied to **debt-related issuance for corporates** (investment grade and high yield). Fixed income engagement is

³⁰ World Bank (August 2019). 'Quality Unknown - The Invisible Water Crisis

³¹ City of Montréal (2015) Climate Adaptation plan 2015-2020

less well developed than equity investor engagement, but there is a strong case for this type of investor action³². We note that there can be differences in priorities between fixed income and equity investors, but both should have similar views on the importance of companies strengthening their sustainability policies and actions.

Limited progress on ESG integration has been made for **Sovereign debt**³³, but this needs to become an important focus area, as governments are responsible for defining legislation about the use of natural resources as well as economic activities and urban structure, which have significant impacts on water risk. Our view is that we should define a rating structure, which could be the basis both for risk assessment and positive engagements. At the end of the day, from an investment perspective, it is all about capital and returns and the final consumer wishing to ensure that the user of that capital is considering water risk.

Estimating water risk for governments is certainly possible, as is investor engagement with governments. Vast resources are used in countries' national offices for statistics. It is time that such offices start to report on all water risks. In the same way as rating agencies use a multiplicity of indicators to rate companies, a number of indicators ought to be defined to highlight water risks and report on progress being made.

Proper sovereign bond assessment of water risks would also provide a sound framework in a context where investors ought to look at investment in sovereign bonds versus investments in private companies. If an investor decides to engage with a private company because it does not have a proper water purification plant, investors should also put pressure on governments to strengthen water policies and increase public water-related infrastructure investments. Having a water risk framework for sovereigns bonds is of paramount importance in providing capital to developing economies where there is a water risk related to the growing population. The simple questions that a person in the street will ask is 'why investments in water and water sanitation in a developing country are taking a backseat versus investments in other areas?' is there a framework in place to ensure that agriculture uses sustainable methods? Is water at the heart of urban planning? In the end, there must good reasons if most large cities in the world have been built around water basins.

If one takes the example of Jakarta, the obvious question is why the Indonesian government did not intervene? The city of Tokyo had the same problem as the city of Jakarta has

now, but it was addressed in a different way. "*There is technology to replace groundwater deep at its source but it's extremely expensive. Tokyo used this method, known as artificial recharge, when it faced severe land subsidence 50 years ago. The government also restricted groundwater extraction and businesses were required to use reclaimed water. Land subsidence subsequently halted*". But Jakarta needs alternative water sources for that to work. Heri Andreas, from Bandung Institute of Technology, says it could take up to 10 years to clean up the rivers, dams and lakes to allow water to be piped anywhere or used as a replacement for the aquifers deep underground³⁴.

The simple question to ask of the government of Indonesia (and indeed any sovereign bond issuer), is whether there is an implementation plan and investment in place that are cleaning rivers and enabling the creation of aqueducts to protect the population?

Having a clear framework at the national level is essential. Water and water infrastructure is capital intensive, with long life and low cash return. Ensuring that developing economies have a proper 'water framework' is in place is of paramount importance. Capital should be sustainable, providing capital to a developing nation without considering such issues is not sustainable. Investor engagement with sovereign bond issuers is still at an early stage, but, we believe that investors can and should use their role in representing the long-term interests of citizens, by being more vocal in working with national policy-makers. As well, investors should encourage governments to expand their budgets relating to water.

Within Fixed Income, significant opportunities exist in **Municipals bonds** since much of the water infrastructure is managed by municipalities. This asset class is particularly well suited for addressing water risk as municipalities can issue 'revenue bonds' which have been widely used in the past to fund activities related to 'water & sewer and electric'. Such an investment category is thus ripe for addressing 'water risk', assuming the right framework is in place.

Bringing diverse asset classes together in a **Multi-Asset** portfolio is a challenge given the lack of a homogeneous definition of water risk and we note that, for example, a framework about integrating climate change risk in Strategic Asset Allocation is just in the making.

Within the alternative asset classes, the picture is more mixed. We see significant challenges for **hedge funds** and **funds of funds**, because of the challenge in defining and interpreting an objective measurement of risk, but **private**

³² PRI (April 2018). ESG engagement for fixed income investors www.unpri.org/esg-engagement-for-fixed-income-investors-managing-risks-enhancing-returns-/2938.article

³³ PRI (Nov 2019). A practical guide to ES integration in sovereign debt www.unpri.org/download?ac=9696

³⁴ BBC (August 2018). Jakarta, the fastest-sinking city in the world

equity, unlisted real estate and infrastructure can play an essential role in addressing water risk. As we have seen in the case of Jakarta, cities have a high level of impact on water risk at a macro level. In a recent paper³⁵ by Rachel Cooper 'Nature-based solutions and water security', presented by SIWI, the author goes through the details of some of the best practices of nature-based solutions for water security.

Cooper's paper focuses on urban green infrastructure and China's Sponge cities and their plan to have by 2030, 80% of urban areas using such methods to 'intercept, absorb and reuse 70% of rainwater'. The author argues that 'Combining green and grey infrastructure can improve storage and supply, lower costs, produce more resilient services, enhance system performance and better protect communities'. She also argues that 'there is some evidence that green infrastructure performs equal or better than grey infrastructure and is cost effective in comparison.' (p. 4). However, the author also notes the challenges with scaling-up nature-based solutions. 'Currently only 1% of water resources finance goes to NbS despite their potential. This may partly be due to barriers NbS present for financing, for example, there are challenges in valuing the benefits derived from NbS.'

³⁵ GSDRC (June 2020)

The current landscape: Different asset classes have different abilities to facilitate real world change

Figure 3 summarises our views about the potential impact associated with different types of investments. It is frankly disappointing and we fear that it will not lead to any transformational investment that will address systematic risks. From a purely utilitarian perspective, one must question whether the results are worth the gigantic efforts going towards it.

to create the level of private investment necessary. Demand growth and lack of water and water access and sanitation in emerging economies must start through a framework where the state is putting water at the centre of its policy agenda.

If water is a human right, we must question the impact of financing economic activities in a country or region that may not be aligned with the fundamental nature of water as a human right.

FIGURE 3. DIFFERENT STRATEGIES’ CERTAINTIES OF CREATING POSITIVE REAL WORLD CHANGE

Strategy	Works if...	Certainty of real world change
Impact or real asset investing	Focused where additional capital makes a difference	High
Equity engagement	Pursues realistic change with the correct targets, with sufficient depth	High
Equity tilting or divestment	Policy is made public and leads to societal shift	Low
Equity best-in-class	Corporates change policies and capex decisions in response to investors	Low
Fixed income tilting or divestment	The debt cost of capital for laggard companies increases due to investors shunning their bonds, and if the debt cost of capital reduces for leading companies	Medium
Fixed income engagement	Sufficiently broad and deep engagement by investors, stronger fixed income investor rights	Medium
Sovereign bond engagement	Sufficiently broad and deep engagement by investors with governments	Medium

Source: DWS analysis based on Preventable Surprises, June 2018

Our view is that the current framework is excessively skewed at addressing risk from a risk management perspective, as a protection to a portfolio, rather than addressing the risk related to lack of water and sanitation, growth in demand or how we can move towards a more sustainable model. The risks are known, but the process of implementation is taking the wrong avenue.

The idea of ‘transformational change’ is currently based on the idea that private entrepreneurship can play a key role in ‘saving the world’. Hence the focus is on private sector initiatives and private capital for private market investments that are long lived and capital intensive. However, structural uncertainty creates low profitability making it near impossible

Stewardship may play a role in a transformational framework

The only area that currently has the potential of having a transformational role is stewardship. We think that this is an intermediate solution that may have a long lasting effect only if followed with a proper transformational framework and enforcing legislation. Hence it deserves the attention of investors, but qualified to it happening in a broader framework. In November 2019, the PRI’s Director of Stewardship wrote³⁶:

“The ills of society continue because many institutional investors have been reluctant to use the influence they have. Where they have used this influence, they’ve taken tentative steps, focusing on the short-term and on individual holdings in their portfolio rather than the bigger picture. Exacerbating

³⁶ PRI, November 2019 www.unpri.org/pri-blogs/stewardship-is-failing-us-yet-remains-our-best-hope/5126.article

this problem is that many investors have not properly re-sourced policy advocacy functions that could move the needle on some of these issues. Of course, there are examples of positive investor action. The foundation of the PRI itself back in 2006 was in part a response by the investment industry – in particular, asset owners – to these exact problems. We've recently seen further successes as part of Cli-mate Action 100+, with tangible commitments made by [some] companies to set scope 3 emissions targets. Unfortunately, these successes are the exception, not the rule. As we face growing systemic risks that cannot be diversified away – from trade wars to climate catastrophe – the willingness to act more assertively to safeguard long-term outcomes for beneficiaries is not keeping pace with the actions needed or being undertaken at the scale required.”

Evidence for the insufficient level of investor engagement can be seen in:

- The still low number of shareholder ESG resolutions receiving majority support: over each of the last five proxy voting seasons, a roughly flat ~40% of environmental resolutions received majority support (Proxy Insight, October 2020)
- The largest asset managers continuing to vote against most climate resolutions (Morningstar September 2020)
- The proportion of a portfolio that is engaged: only 18% of PRI signatories engaged 51-90% of their equity portfolios, and 12% individually engaged 90-100% of their holdings while 40% of PRI signatories individually engaged 0-9% of their portfolio³⁷
- The depth of engagement: 56% of PRI signatories state that the majority of their engagement involves only one interaction with a company while 65% report that they rarely or almost never have four or more interactions with a single company

The PRI's conclusions led to the publication of “Active Ownership 2.0”³⁸, a proposed aspirational standard for improved stewardship. One way that the PRI is helping to strengthen the incentives, requirements and disclosure of better stewardship in line with this document, is by updating the annual PRI assessment framework³⁹ to integrate stewardship into each asset class. As well, an optional ‘outcomes’ reporting module is being implemented for the 2021 reporting cycle.

Case study on water risk integration in equities

If opportunities exist, a good starting point is an analysis of how ‘water risk’ is actually integrated in equities. Back in 2011, Ceres was amongst the first business/investor association to provide a framework for equities water risk management, Aqua Gauge⁴⁰: ‘A framework for 21st century water risk management’.

In 2015, PRI supported by WWF and PwC, started a collaborative engagement on water risks in agricultural supply chains. The first phase involved 41 investors with US\$5.7 trillion in assets, engaging with 32 companies in the food, beverage and apparel sectors. The report on phase one of the PRI initiative included examples of corporate best practices, and examples of how water risk can be incorporated into investment decision-making for relevant listed equity companies⁴¹.

The PRI initiative also developed an investor guide for engagement on agricultural supply chains⁴², including a set of questions that investors can use. The first part of the guidance is about defining the framework. The authors go through many details in (i) defining some of the water risks for companies, and (ii) detailing what an engagement framework could look like. **PRI recognises that the ‘complex and localised nature of water and the mix of qualitative and quantitative information available makes it difficult to integrate water risk data into their company analyses’ (p. 27).**

The Ceres Aqua Gauge™ is neither a survey nor another channel of corporate disclosure. Its primary aims are to help equity investors interpret and evaluate the information provided by companies on their management of water issues, and to provide a framework to guide investor engagement and dialogue with companies. It focuses on governance and management, stakeholder engagement and disclosure. Its primary aims are to help equity investors interpret and evaluate the information provided by companies on their management of water issues, and to provide a framework to guide investor engagement and dialogue with companies. It also benefits companies by giving them a complete picture of leading practice in water management, a resource to help inform and strengthen their own water management strategies, and a methodology for assessing their performance.

³⁷ PRI 2020 Listed equity snapshot www.unpri.org/listed-equity/listed-equity-snapshot/6541.article

³⁸ PRI (2019). Active ownership 2.0: The evolution stewardship urgently needs <https://www.unpri.org/investment-tools/stewardship>

³⁹ PRI (November 2020). Investor reporting guidance <https://www.unpri.org/reporting-and-assessment/investor-reporting-guidance/5373.article>

⁴⁰ Ceres (October 2011). Ceres aqua gauge www.ceres.org/resources/tools/ceres-aqua-gauge-comprehensive-assessment-tool-evaluating-corporate-management

⁴¹ PRI (March 2018). Growing water risk resilience www.unpri.org/download?ac=4195

⁴² PRI (2018). PRI coordinated engagement on water risks in agricultural supply chains www.unpri.org/download?ac=4154

The PRI **proposes a lengthy and expensive process for understanding and measuring water risk.** They certainly provide a comprehensive list of tasks that investors ought to perform to address water risk. In the second part of the PRI-WWF framework, they define four different techniques for integrating water risk:

- (i) Qualitative Analysis
- (ii) Quantitative Analysis
- (iii) Investment Decision (Sensitivity / scenario analysis)
- (iv) Active Ownership Assessment (Engagement)

There are many merits in the PRI-WWF framework and we applaud the efforts made by investors and by those companies that strove to improve their practices. However, there is a significant question about how to scale up the level of engagement and changes by companies.

For instance, after two years, it was found that across 25 indicators, 84% of the companies improved their disclosure of water risks though retailers were the biggest laggards with one company's score dropping by 71%. Some of the leading companies began to engage their own key suppliers on water risk, but, only 25% of companies measure if supplier water management responses are effective and whether local water stewardship is supported.

A second phase⁴³ of the initiative involved 37 investors with US\$5.9trn in assets, targeting 17 laggard companies from phase 1. It was found that over an 18 month period, limited progress was made by companies: 11 companies made incremental improvements to disclosure while the company that progressed the most only scored 66% of total available points. Apparel and luxury goods companies made the most progress while retailers continued to lag.

All of the companies began to map their tier one suppliers for key commodities, but, only eight companies disclosed the extent of their mapping to tier two suppliers. With simple narrative reporting by companies, it was difficult for investors to comprehensively assess how these companies are systematically managing their overall water risks. Only two companies showed any evidence of working with stakeholders at a water basin level to develop regional solutions to water scarcity.

⁴³ PRI (June 2020). Summary: engagement on water risks in agricultural supply chains https://www.unpri.org/water/summary-engagement-on-water-risks-in-agricultural-supply-chains-phase-2/5864.article#fn_2

Section II: From understanding water risk towards defining a transformational framework

The two pillars of a ‘Transformational Framework’

A ‘transformational framework’ for ‘transformational investment’ has two components, a generic one applies to all systemic risks and a specific one for ‘water’.

Transformational framework – general principles

1. Transformational Investments require an ‘Inside out’, more than and ‘Outside In’ approach.

Risk can have a negative or positive connotation. **Within the world of investment, an ‘ESG risk’ generally has a negative connotation. It is about how the outside world affects the risk adjusted return of existing investments. This concept is at the core of ‘ESG Integration’ as defined by the PRI.**

Over the past few years, there has been much focus on such risks. In 2019, the Dutch regulator De Nederlandsche Bank (DNB) explored the potential financial risks posed by a number of environmental, social and corporate governance (ESG) issues⁴⁴. They estimated that Dutch financial institutions had invested at least EUR 97 billion in businesses operating in extremely water-scarce regions. In their analysis, the regulator found that only four institutions (out of twenty-five) regularly analysed their portfolios for social and ecological risk and argued that most of them could improve integration of sustainability risks into their operations to prevent reputational risk and manage expectations with a better risk management framework.

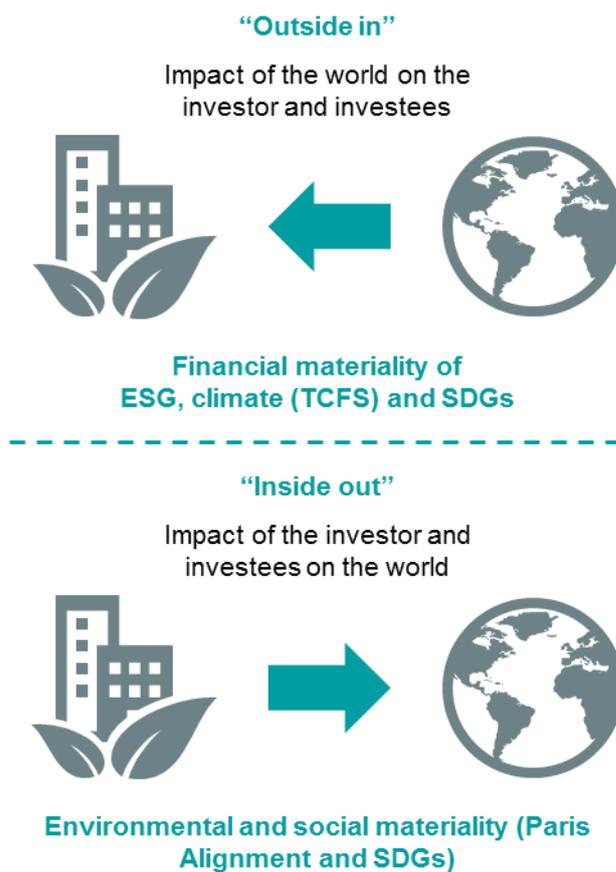
Assessing the negative impact on existing investments is essential but not enough. Transformational investment cannot be based on an ‘outside-in’ approach. Impact happens because capital is purposefully deployed to address a risk.

Transformational investments can be best described as ‘inside-out’ approaches, as shown in **Figure 4**. This is about ensuring that capital is deployed sustainably, that it has a positive impact, that the SDGs on water are actually achieved and water and water sanitation are accessible to all.

Historically, an inside-out approach has not been a core function of the investment industry. The current definition of fiduciary duty is about assessing how sustainability issues affect investment decisions, but, not how the investment decision affects sustainability issues. But times are changing.

The Principles for Responsible Investment (PRI) recognise that the ‘third generation’ of responsible investors are beginning to measure, account and integrate the real-world sustainability impact of their investment activities.

FIGURE 4. DOUBLE MATERIALITY PERSPECTIVE FOR INVESTORS



Source: DWS based on European Commission June 2019

We agree with the PRI’s contention that it is crucial for investors to assess, account for and aim to improve the sustainability impacts of their activities. The PRI, UNEP FI and Generation Foundation have appointed a major law firm, Freshfields Bruckhaus Deringer, to assess⁴⁵ how laws in 11 major jurisdictions either require, encourage or impede assessing and accounting for sustainability impact as a core part of investment activity.

⁴⁴ ‘Value at Risk, Sustainability and Goals in the Dutch Financial sector’ (DNB, 2019)

⁴⁵ PRI (Jan 2019). A legal framework for impact

The European Commission's May 2020 consultation on a renewed sustainable finance strategy⁴⁶ asks: *"Do you see merits in adapting rules on fiduciary duties, best interests of investors/the prudent person rule, risk management and internal structures and processes in sectorial rules to directly require them to consider and integrate adverse impacts of investment decisions on sustainability (negative externalities)?"*

The PRI⁴⁷ agrees that fiduciary duty should incorporate the impact on sustainability, stating that: *"Even where impact is mandated, practical challenges will remain without clear guidance on resolving potential conflicts between sustainability impact and financial return. Clarifying duties is part of the solution. However, we recommend the EU consider how the overall policy framework can be designed in a way that ensures that investors systematically assess, measure and manage the sustainability impacts (positive and negative) of their investment decisions"*

We believe that legislators in many key markets, will likely take-up PRI recommendations that fiduciary duty include must sustainability impacts. Moving to an inside-out approach that has **sustainability at the heart of the investment approach, with clean air and water available to all, is an essential step for transformational change.**

2. Ensuring that the person on the street, the final consumer/citizen/retail investor as well as institutional investors are clear about sustainability and water risk

Transformation requires clarity about the purpose, about the role of financial institutions and other stakeholders and the path to follow. This is not currently the case. In a blog published by Matthew Orsagh, Director, Capital Markets, CFA Institute, on the PRI website *'Four areas of misunderstanding around ESG integration'* (23 October 2019), the author highlights *'After holding 23 workshops in 17 markets over the past two years, a key takeaway on the state of ESG integration is that we are far from agreement on the definition of ESG itself and, by extension, ESG integration. No matter where we went, nearly a quarter to one-third of those in the room equated ESG integration to simple negative screening'*.

The simple question is how can one expect to explain to the man on the street the purpose of ESG Investing if 25% of our colleagues are not able to understand what ESG integration is?

The person on the street may expect, for example, that 'ESG Integration' in a fund may mean that the fund is about investing in good causes with an attractive return or that the fund will not be invested into certain companies or sectors. But ESG Integration is not about 'values', it is about measuring the materiality of ESG on risk adjusted return of a portfolio. Such ambiguity can be lethal for the success of ESG.

A clear global taxonomy is required used by all and driven by regulation. If ESG Integration is about integrating ESG risk to a portfolio, then we should stop talking about ESG investing, as it leads people to think that something good will come out of such investment and also creates many risks for greenwashing. **A possible taxonomy is required to differentiate between:**

- (i) Do nothing\ traditional funds (no ESG risk is considered),**
- (ii) ESG funds where the financial materiality of ESG risks is considered**
- (iii) Impact or transformational funds (investments for change)**

3. Reassessing the roles of the different functions along the 'investment chain': Bringing back Aristotle and Montesquieu's concept of the separation of powers

Modern democracy is based on the concept of separation of powers. At the highest level, a government is divided into branches, each with separate, independent powers and responsibilities so that the powers of one branch are not in conflict with those of the other branches. Such a concept permeates all major economic activities and is specifically important in the world of investment.

Over the past few centuries, we have seen the increasing separation between the 'owner of financial capital' and 'the user of financial capital'. Such progress has been possible because there is a clear framework in place with the user of capital on one side and the provider of capital on the other. In between, there exist a number of functions (regulators, accountants, lawyers etc.), performing essential roles and providing transparency and legality.

At the moment, the distribution of powers with regard to ESG and Impact investing are all over the place and this is ultimately failing (i) consumers as they are bearing the costs of a malfunctioning framework, (ii) future generations as

⁴⁶ EU Commission (May 2020). Consultation on the renewed sustainable finance strategy

⁴⁷ PRI (July 2020). Consultation response to EU Renewed Sustainable Finance Strategy

they will carry the costs of our inadequacies. Here is what we refer to:

- Governments should legislate
- Accountants should measure
- Investors should invest

But what we have instead is a situation where governments are not legislating and accountants are not measuring. They are providing some vague guidance and asking investors to ensure that they consider all risks. The net result would make Aristotle⁴⁸ and Baron Montesquieu turn in their graves as ‘the officiality’ associated to ESG risks is left to either ‘unregulated organisations’ or to portfolio managers.

One may argue that this is nothing new as PMs have always dealt with risks. Fair point, but in the past PMs were asked to assess the potential impact of a recession of rising unemployment, trade deficits, and so on, but they were never asked to go and define unemployment, measure it and then integrate it into their portfolios. Though it is fair to say that they are supported by unregulated data providers and NGOs, which (and at the same time), (i) argue the risk, (ii) define it, (iii) measure it, and (iv) sell the data.

How can such a democratic concept such as sustainability and impact investing or ESG be based on such an undemocratic framework? Just consider the enormous costs that the system must bear as a result of a lack of officially recognised standards as investors are asked to make-up their own mind about how to define risk and the resulting ‘green-washing’ activities. Time to go back to the classics and re-define the roles in the chain!

4. Having accounting standards that provide full disclosure of ‘water’ risks

This issue is directly connected to the one before, but it needs to be further analysed. **We now need to develop a full ESG Globally Accepted Accounting Principles (GAAP) for ‘transformational investment’.**

One of the authors of the report you are reading now is an expert in equity valuation, having spent twenty years on the matter and having recently published a book⁴⁹ entitled “Valuing and Investing in Equities”.

He has significant concerns about comparing and contrasting such risks across listed stocks with the kind of confidence required as when buying a piece of a company with

its own money, which is what buying equities in a fiduciary framework ought to be.

Curto argues that it is possible to estimate certain risks for some stocks, but, it is a significant effort with large margins of error. One may know the business, but understanding water risks and how and why it may affect different parts of the value chain is no mean feat. This means having to rely on third-party data to highlight potential risks.

The essential problem with third-party data is that vendors often disclaim their responsibility with the data. The ESG data space is also a maze, where there are significant finding and running costs. Take a fashion stock, will third party data be able to identify if the cotton is coming from Egypt or Turkey or India or the US? Or what about companies implementing ‘dry plant’ concept? Who will capture that? Such information is essential to estimate water risk in a proper fiduciary framework and it can only be certain if such disclosure becomes a requirement.

Accounting standards need to evolve. The double entry accounting system was developed in the 15th century by a Franciscan friar, Luca Pacioli, where he presented the system used by merchants in Venice for book keeping of their investments. In the 19th century, the ‘chartered accounting profession’ developed as a way to ensure that stated accounts presented a truthful picture of economic activities in companies primarily related to their assets and liabilities. This role was to remove the conflict of interest where a company would prepare their own accounts.

We now need to develop a full ESG Globally Accepted Accounting Principles (GAAP) for ‘transformational investment’. There should not be any one-on-one reporting outside of company audited accounts (i.e. through voluntary reporting initiatives). It should be on stated accounts providing transparency to all about risks. This would then free the portfolio manager to focus on understanding the company risks, and engaging for change.

One could argue that understanding and measuring ESG risks are far too complex, but it was not easy when steelmaking was developed to estimate the economic life of a plant. It is just about keeping pace with economic development. In the new standards, there ought to be clarity about the impact of economic activities, both about direct and indirect impact (through the supply chain, for example, but also what is the impact of the product they distribute). This will

⁴⁸ Aristotle (384-322 BC) in his book “The Politics” stated that: “There are three elements in each constitution in respect of which every serious lawgiver must look for what is advantageous to it; of these are well arranged, the constitution is bound to be well arranged, and the differences in constitutions are bound to correspond to the differences between each of these elements. The three are,

first, the deliberative, which discusses everything of common importance; second, the official; and third the judicial element.”

⁴⁹ Curto, Francesco (April 2020) www.elsevier.com/books/valuing-and-investing-in-equities/curto/978-0-12-813848-9

provide clarity to the final investor and form a sound basis for 'transformational investments' earning fair returns.

5. The investment products that are truly addressing water and/or other ESG risks ought to have lower fees than non-ESG/transformational investment products

How can a transformational investment take place when non-ESG products are cheaper than ESG or impact products? From a simple economic perspective, the most likely outcome is that ESG and transformational products will always be the minority because of the higher fees. This is particularly important at a time where many pension funds and the broader community need to deal with low expected return and there is more attention to costs.

Running a process that is truly addressing water (or other ESG) risks (i.e. 'deep green or impact') is an expensive affair. It ought to include wide and deep engagement activities with most of the fund's important investees as well as government policy engagement. A minimum cost allocation for engagement has been proposed to address the 'race to the bottom' in broad investment fees. For instance, Willis Towers Watson's Thinking Ahead Institute⁵⁰ suggests 0.25 basis points/€ AuM be devoted to stewardship.

However, this means that ESG and sustainable investing will never become mainstream as there is a low incentive for asset owners to pay such a fee or for asset managers to apply such a fee to their funds or to make this level of internal resource allocation.

Transformation is about making sustainable investing the core at an economic level, recognising the hidden costs of the previous economic framework and applying the concept of 'polluters pay', either directly or indirectly.

As things stand investors cannot make polluters pay directly, but we can make them contribute to change indirectly, through an additional level of fee on traditional products, versus 'transformational' or ESG products. **We call for governments to apply a sustainability fee on investment products that are not addressing the sustainability challenge.**

We foresee three levels of fees, the highest for the 'do-nothing' products, an intermediate fee for 'outside-in' products (products where ESG risk is integrated but there is no posi-

tive impact) and no fees for impact products, with the additional conditions that within the same firm, the do nothing suite of products will always be the most expensive.

Defining the "Northern Star" for water risk and some practical steps

Having addressed the general pre-requisites for a transformational framework, we now focus on the requirements that are specific to 'water risk'. **Transformational change in managing 'water risk' is about changing our attitude to water.** This is already happening at Norges Bank Investment Management (NBIM) and Ceres. NBIM⁵¹, for example, makes the following demands to provide capital at risk:

- _ Integrate relevant water management challenges and opportunities in strategy and investment planning
- _ Integrate material water risk in risk management
- _ Disclose strategy and report material risk
- _ Transparency on interaction with policy makers and regulators and engagement with other stakeholders

Ceres⁵² aims to *'build investor and business leadership to protect freshwater supplies around the globe, integrating capital market solutions into everything we do. We seek to turn smart water management into a business fundamental and water stewardship into an economic imperative.'*

These are important steps, but it is not 'transformative, in our opinion, it does not make water core to operations.

The Dutch government's Valuing Water Initiative (VWI) is the initiative that is closest to our way of thinking. Launched at the World Economic Forum in January 2019, the initiative aims **'to bring systemic change in the way water is valued in policy, practice, finance and behaviour and to inspire others to do the same.'**⁵³

The VWI aims to generate experience on how to sustainably, efficiently, and inclusively allocate and manage water resources and deliver and price water services accordingly. **'VWI aims to move away from fiddling at the margins of the status quo and get to the systemic core of the big water challenges. Addressing that core is essential. Without it, systemic change is unlikely to happen, and nothing less than systemic change is required to get us back on track. Not only for SDG6 but for all other water-related SDGs as well.'**

⁵⁰ Willis Towers Watson (2019) www.willistowerswatson.com/en-GB/News/2019/04/willis-towers-watson-calls-for-a-step-change-in-investor-stewardship

⁵¹ NBIM (March 2020). Water management

⁵² CERES (February 2014)

⁵³ Government of the Netherlands (January 2019). Valuing water initiative – better decisions impacting water www.government.nl/topics/water-management/valuing-water-initiative

While we agree with their views, we find that the approach has so far followed a traditional approach, i.e. trying to integrate water risk into a framework that does not recognise the special role of water. In such a framework water will be just one of the risks, but there is no life without water (as there is no life without air). In a way Plato with his Timotheus has it right—air and water are essential to anything that happens in the world and we argue that their special place ought to be recognised.

The good news is that the steps to take are easy as the path has already been defined. Back in 1968, the European Union defined its 'Water Charter', which was further revised in 2001, in highlighting the principles, the Council of Europe *'recommends member states to take note of the charter and apply its principles as appropriate in the framework of their national policies'*.

Transformational change starts with governments recognising that water is a human right, a scarce resource and the entire society and its economic activities move to a sustainable framework. Does everyone have access to a sufficient quantity of water for his or her basic needs? Is the water policy and law based on the principles of prevention, precaution and correction at source as well as the "polluter-pays" principle? If so, is it the case that polluters are actually paying for it? If so, why is there water pollution?

The same should apply at a corporate level, with the added onus of indirect responsibility, i.e. analysis of the supply chain as well as of how capital is actually used. If special due diligence must be in place for your client regarding money laundering processes, what stops financial organisations from asking questions about potential financing activities with high water risk?

Our view is that the water charter should serve the same role as a constitution, such that it drives policies, laws and behaviour. This is the best way to ensure we do not face fragmentation and is well within the spirit of what has been argued by the Dutch government in our view. Treating it as a constitution would bring that impetus that has been absent for the past 50 years. What we call for is investors to adopt the water charter as their northern star and start to follow and report what needs to be done and what needs to stop, to use such an understanding to drive policies that will help the world move toward a sustainable framework.

What a transformational framework could look like in practice

It is always easier to argue for change than to find a practical way to implement it. Here is our first attempt at what a 'transformational framework for addressing water risk could look like:

1. Adopt the EU Water Charter as a reference point both for its own operations and to define an investment framework
2. Walk the talk. Assess whether the organisation is actually in line with the principles of the water charter, if not why and what is being done to address it.
3. Define a holistic investment framework for addressing water risk across asset classes (Equities, Sovereign, High Yield, Investment Grade, Muni, Infrastructure, Private Equity, Real Estate), with a clear distinction between the three sets of products (do nothing, ESG Integration (outside-in), impact investing (inside out) and what to do in Active and Passive.
4. Work with NGOs, other stakeholders and investment companies to clearly define the type of disclosure that is required to be able to integrate risk in an objective manner for 'outside-in' approaches for the different asset classes
5. Define the purpose of 'impact' or transformation for positive change across asset classes. Such investments will need to be audited to ensure that the lower level of fees is a guarantee of contributing to addressing sustainability issues in society.
6. When impact/transformation is sought, it is essential to enable asset owners and asset managers to conduct wide and deep engagement activities with most of the fund's most important investees as well as government policy engagement.
7. Agree with regulators, accounting firms and other investment companies a standardised disclosure framework, helping consumers get the transparency and certainty required.

Conclusion to Section II: Transformational Framework

We are fully aware of the challenges associated with some of our proposals, but let's look at the current path. Can a transformational investment take place in the existing framework where:

- (i) There is fragmentation of policies
- (ii) 50 years since the EU's first water charter, only marginal progress has been made on improving water risk in Europe
- (iii) Most of the water risks have just been offshored or ignored
- (iv) The World Bank is one of the few major large institutions trying to address water risk attached to population growth, but by its own admission, it is struggling to address the many aspects of water
- (v) Multiple definitions of risks and possibilities for ESG integration, that are costly to define and maintain
- (vi) There is no economic incentive in buying ESG products or impact products in a world where investment costs (investment product fees) are important
- (vii) There is no clarity about ESG (even amongst operators) and about whether it is about risk management or impact
- (viii) Data providers are the only category benefitting out of the ESG trend, but they are unregulated and conflicted

We are possibly forgetting a few issues. The point is that transformation never comes easy.

Changing the roles along the value chain, having fully certified ESG reporting, enforcing lower fees for ESG products, embracing a water charter at every level in society to recognise the primordial role of water for humanity and implementing a holistic approach to managing water risk within the organisation will not come easy.

This may resemble something more akin to a chapter in Thomas Moore's 1516 Utopia, than something possible in modern times, but ultimately, isn't this what transformational frameworks are all about?

European Charter on Water Resources⁵⁴ (October 2001)

1. Fresh water resources must be used in keeping with the objectives of sustainable development, with due regard for the needs of present and future generations.
2. Water must be equitably and reasonably used in the public interest.
3. Water policy and law must protect the aquatic ecosystems and wetlands.
4. It is up to everyone to help conserve water resources and use them prudently, in conformity with this charter.
5. Everyone has the right to a sufficient quantity of water for his or her basic needs.
6. Public and private partners must introduce integrated management of surface water, ground water and related water that respects the environment as a whole, takes regional planning into account and is socially equitable and economically rational.
7. Integrated management must be based on an inventory of water resources and aim to ensure their protection, conservation and, if necessary, rehabilitation. In particular, any new deterioration and exhaustion of these resources must be prevented, the recycling of waste water encouraged and, where appropriate, limitations placed on certain uses.
8. Water policy and law must be based on the principles of prevention, precaution and correction at source as well as the "polluter-pays" principle.
9. Underground water resources must be the subject of special protection, and their use for human consumption must take priority.
10. Water resources must be regularly monitored and their general state periodically assessed.
11. The terms of water concessions must be compatible with this charter. Concessions must be granted for a limited duration and must be subject to periodic review.
12. Large-scale consumption of water in agricultural or industrial processes must be carefully assessed and monitored with a view to ensuring better protection of the environment and avoiding unsustainable utilisation.
13. At each state level, central, regional and local authorities must adopt and implement water management plans in a spirit of solidarity and co-operation.
14. Decisions on water must take into account the particular conditions at regional or local level and be implemented by the relevant authorities closest to the areas concerned in keeping with water management plans.
15. States must co-operate, preferably within permanent institutions, to agree on an equitable and reasonable method of managing international watercourses and other shared water resources in conformity with international law and the principles of this Charter.
16. The public must have access to information on the state of water resources.
17. The public must be informed in a timely and appropriate manner of water management plans and projects for the utilisation of water resources. It has the right to take an active part in planning and decision-making procedures concerning water.
18. The persons and bodies concerned must be able to appeal against any decision relating to water resources.
19. Without prejudice to the right to water to meet basic needs, the supply of water shall be subject to payment in order to cover financial costs associated with the production and utilisation of water resources.

⁵⁴ Recommendation Rec(2001)14 of the Committee of Ministers to member states on the European Charter on Water Resources (October 2001);

Section III: Potential transformative actions by investors

We believe that scaling up solutions will require a broadening and deepening of investor engagement or stewardship across asset classes plus more and better engagement with policy makers on appropriate water sustainability governance.

This section provides several examples of how investors could accelerate positive trends:

- _ Better resource efficient agricultural production
- _ Corporate commitments to water sustainability
- _ Science and context specific targets for nature, including water
- _ Spreading access to clean water and sanitation for the world's poorest people
- _ Collecting and avoiding plastics in the ocean
- _ Reducing and replacing fossil fuel derived plastics

A responsible investment public policy framework which encourages, supports and requires investors to undertake more and deeper engagement and policy advocacy is necessary to support these priorities.

Better incorporation of water risks and opportunities into investment decision-making across asset classes is also required, but will need governments to set stronger disclosure requirements on companies. As well, investors could make more wide-spread use of big-data sources including from satellites and other sensors to improve risk and opportunity analysis.

While investors can and should be a stronger force for water sustainability, investors cannot and should not do it alone. As discussed earlier in this paper, governments need to set a stronger and better framework for water sustainability, guided by the European Charter on Water Resources. A stronger policy framework should also create an incentive for real asset investment by investors and companies, with real assets supporting water sustainability.

The Dutch model of feeding the world

The Netherlands is the world's second largest exporter of agricultural products by value, despite being 270 times smaller than the United States, which is the largest agricultural product exporter. The efficiency of production means that the Netherlands has one of the highest crop yields, with falling environmental impact of production.

For instance, the Netherlands produces more than 144,000 tons of tomatoes per square mile, many times larger than any other country⁵⁵. The total water footprint of the Netherlands tomato production is 1.1 gallons per pound compared to a global average of 24.6 gallons of water per pound of tomatoes while China's production is 25 gallons per pound.

With greenhouses covering 36 square miles (Manhattan is 23 square miles), the Netherlands is a powerhouse of precision, high production, low impact food production. From 2003 to 2014, vegetable production increased 28% while energy use dropped 6%, pesticides dropped 9% and fertilizer dropped 29%.

Spreading the adoption of the Netherlands' (and other countries') greenhouse infrastructure, crop science and agricultural technologies, is key to reducing the water and environmental footprint of food production, while coping with growing food demand.

Investors could play a role by encouraging companies to strengthen the adoption of these types of production processes and techniques. As well, investors could encourage governments to strengthen their agricultural and innovation policies and budgets including by partnering with innovative countries such as the Netherlands.

Corporate commitments to water sustainability: CEO water mandate and the Water Resilience Coalition

The CEO Water Mandate⁵⁶ is a UN Global Compact initiative. As of October 2020, 179 companies have committed to identify and reduce critical water risks to their businesses, seize water-related opportunities, and contribute to water security and the SDGs. This commitment spans companies' direct operations, supply chains and watershed management, collective action, public policy, community engagement and transparency.

In an effort to be even more ambitious, the CEOs of seven companies have pledged more ambitious action through a "Water Resilience Coalition"⁵⁷, pledging to achieve by 2050:

- _ Net Positive Water Impact: Deliver measurable net positive impact in water-stressed basins, focusing on the availability, quality and accessibility of freshwater resources. Net positive water impact is defined as contributing more to water basin health than what is taken from it.

⁵⁵ National Geographic (September 2017). This tiny country feeds the world www.nationalgeographic.com/magazine/2017/09/holland-agriculture-sustainable-farming/

⁵⁶ UN Global Compact CEO Water Mandate (2007) <https://ceowatermandate.org/>

⁵⁷ Water Resilience Coalition (March 2020). Founding members include: AB InBev, Diageo, Dow Inc., Ecolab, Gap Inc., Microsoft and the fashion company PVH Corp.

_Water Resilient Value Chain: Develop, implement, and enable strategies to support leading impact-based water resilience practices across the global value chain.
 _Global Leadership: Raise the ambition of water resilience through public and corporate outreach, and to inspire other industry leaders to join the Coalition

Investors could encourage more companies to join this initiative and could hold to account, those companies that have signed up to the initiative.

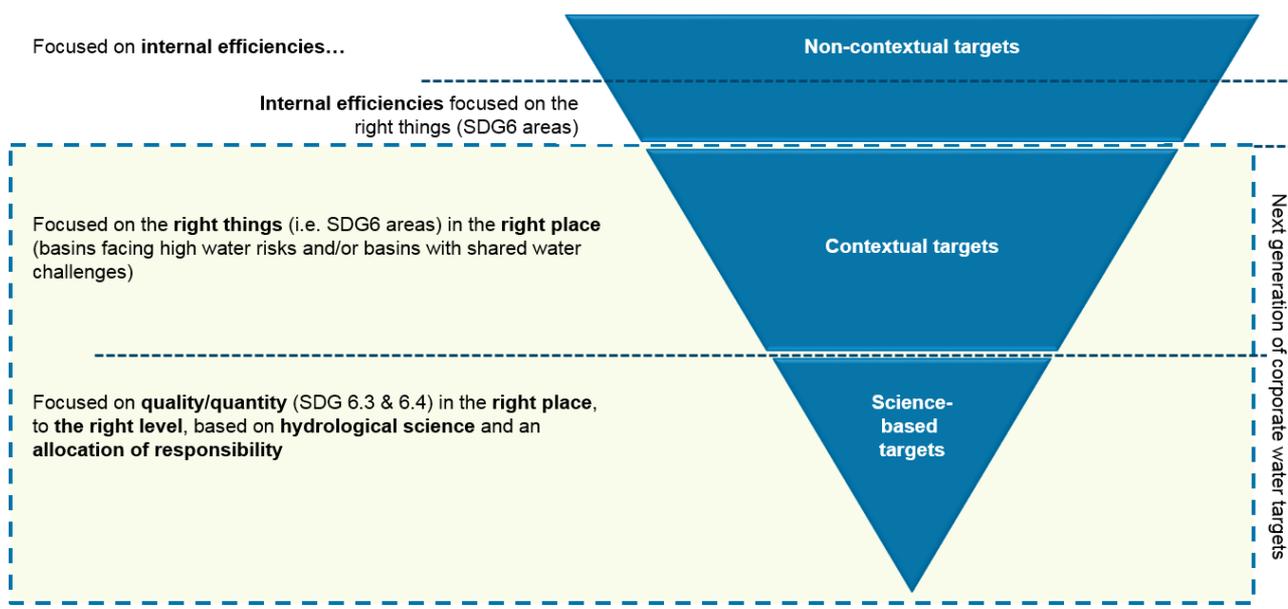
Science and context specific targets for water, land, oceans and biodiversity

More than 1,000 listed and private companies with a market capitalisation of US\$15trillion+ have adopted Science Based

Targets for cutting carbon emissions⁵⁸. The initiative is a collaboration between CDP, the UN Global Compact, World Resources Institute, WWF and the We Mean Business coalition. Multiple sector specific guides have been created in consultation with companies and experts.

WWF and many other organisations are starting to take this approach to develop a framework for ‘contextual, science based targets’ for water as well as for land, oceans and biodiversity, with initial guidance published for companies to set ‘Science Based Targets for Nature’⁵⁹. We hope that his framework could be adopted by the CEO Water Mandate as their technical guidance.

FIGURE 5. SCIENCE AND CONTEXT SPECIFIC TARGETS FOR WATER



Source: WWF 2020

WWF notes that: “The global/local trends of supply and demand imbalances that most water basins face will not be resolved by companies setting more “ambitious” efficiency targets. By setting water targets that respond to local water conditions (i.e., context), and that account for corporate water risk exposure, it ensures corporate actions are aligned to both risk reduction and improving shared basin challenges that benefits people and nature.”⁶⁰ An illustration of science and context specific water targets is shown in **Figure 5**.

⁵⁸ Science based targets initiative sciencebasedtargets.org/

⁵⁹ Science-based targets for nature (September 2020). Initial guidance for business r

⁶⁰ WWF contextual & science based targets for water [wwf.panda.org/our_work/our_focus/freshwater_practice/water_management/science_targets_water](https://www.panda.org/our_work/our_focus/freshwater_practice/water_management/science_targets_water)

Improving access to clean water and sanitation

Billions of people worldwide are trapped in a cycle of poverty and disease because they lack access to safe drinking water and basic sanitation. Ensuring access to water and sanitation for all is a focus for many governments' aid budgets, development finance institutions and individual philanthropy that supports a wide range of initiatives to address this challenge. One such organisation is the Centre for Affordable Water and Sanitation Technology (CAWST), based in Calgary, Canada.

CAWST teaches people on how to get safe drinking water, sanitation and hygiene in their own homes, using simple, affordable technologies. CAWST transfers research and specialist knowledge to field workers in organisations around the world. They have cumulatively helped 14.9 million people with better and sanitation by working with 6,000 organisations in 180 countries⁶¹.

One consumer goods company works to promote better water sanitation and handwashing. The company's soap brand has helped encourage over 1 billion people improve their handwashing habits and also marketing an affordable bar of soap in many emerging economies. Through a range of initiatives and campaigns with different organisations, the company believes that it has improved health for many children and adults around the world. The company notes that if everyone followed ideal handwashing habits, each person would use ~20 bars of soap per year but 1.5bn people use less than eight bars of soap per year⁶².

Investors have a role to play in encouraging relevant companies to follow this company's example of supporting and promoting efforts to improve clean water and sanitation amongst the poor.

Investors have a role to encourage companies and governments to increase their support for organisations such as CAWST. Larger and better targeted government aid budgets are needed to help address the water and sanitation SDGs for the world's poorest people.

Collecting and avoiding ocean plastics

The discarding or abandoning of fishing nets causes the death of millions of sea creatures and accounts for an estimated 46% of the plastic waste in the North Pacific Ocean, contributing to the micro-plastics found throughout our food-chain and our global environment.

The Ocean Clean-Up initiative⁶³ has successfully tested a floating boom to collect ocean plastic as well as a solar powered Interceptor™ to gather plastic in rivers. They aim to deploy Interceptors™ in 1,000 rivers and create a fleet of booms to collect 50% of ocean plastic within five years.

An estimated 80% of marine debris comes from land-based sources, with 50% originating from China, Indonesia, the Philippines, Vietnam and Thailand⁶⁴. As economic growth has increased in these countries, so has plastic consumption, which has outpaced the development of effective solid waste management systems.

Project STOP uses a "system enabler" approach in which a team of experts in waste management, plastic recycling, organics management, behaviour change, and program governance help a city design and then implement a low-cost waste management system in which all households and institutions benefit from collection, and plastics are kept out of the environment. Their aim is to create sustainable, low-cost waste systems that capture as much value from the waste as possible. The many existing local initiatives and informal waste pickers are supported and integrated into the business model.

Project STOP is working to support the Indonesian government's commitment to reduce the country's ocean plastic levels by 70% by 2025.

However, the problems of ocean plastics and discarded fishing nets will not be solved through corporate donations. Investors could lead a campaign with governments that calls for a tax on companies that use or benefit from the ocean, with the revenue used to dramatically scale up the collection of ocean plastics through organisations like the Ocean Clean-Up, Project STOP and Healthy Seas. Investor engagement with some companies could also support the work of these and other similar organisations.

Reducing plastic packaging

The Ellen MacArthur Foundation's New Plastics Economy is an initiative that brings together key stakeholders to rethink and redesign the future of plastics, starting with packaging. More than 450 organisations support the New Plastics Economy Global Commitment including governments and companies representing 20% of all plastic packaging produced worldwide⁶⁵. These organisations have committed to:

1. Eliminate all problematic and unnecessary plastic items
2. Innovate to ensure that necessary plastics are reusable, recyclable, or compostable

⁶¹ CAWST: Impact & Results www.cawst.org/

⁶² Unilever (2020). Heathy handwashing habits for life www.unilever.com/sustainable-living/improving-health-and-well-being/health-and-hygiene/healthy-handwashing-habits-for-life/

⁶³ The Ocean Clean-Up initiative was founded in 2013 <https://theoceancleanup.com/>

⁶⁴ Jenna R. Jambeck et al (2015). Plastic waste inputs from land into the ocean

⁶⁵ New Plastics Economy Global Commitment overview www.newplasticseconomy.org/projects/global-commitment

3. Circulate all the plastic items out of the environment

Supporting these goals are a series of “Plastics Pact” networks at the national or regional level that aim to implement a concrete set of ambitious, time bound local targets. Plastic Pacts exist across the UK, France, Netherlands, Portugal, Europe, Chile, and South Africa.

Investor engagement could encourage more companies to join this initiative and hold companies to account regarding measurable and time bound targets. Investors could also strengthen advocacy with policy makers to strengthen requirements, incentives and penalties in support of these goals.

Replacing fossil fuel derived plastics

Mining billionaire Andrew Forrest, through his Minderoo Foundation has launched a project⁶⁶ that aims to make fossil fuel based plastics more expensive to produce, more valuable to collect and will tip the incentive towards a circular economy approach to plastics.

The initiative proposes⁶⁷ that manufacturers of fossil-fuel based plastic pay a voluntary financial fee or tax. The rate would not be payable on recycled plastics, which could help drive the transition to use of recycled plastics in production and stem the flow of plastic waste. There are around 100 major plastic resin producers amongst the petrochemical companies who would need to be convinced.

Investors could help accelerate this initiative by using shareholder and bondholder influence with resin manufacturers and their customers, to make the production of virgin fossil fuel derived plastics more expensive. Investors could also use influence with governments to implement this idea through taxation policies.

⁶⁶ Minderoo Foundation www.minderoo.org/no-plastic-waste/

⁶⁷ Forrest et al. (Sept 2019). Eliminating Plastic Pollution: How a Voluntary Contribution From Industry Will Drive the Circular Plastics Economy www.frontiersin.org/articles/10.3389/fmars.2019.00627/full

Section IV: Water and the SDG policy agenda

When the Millennium Development Goals (MDGs) were signed by all 191 UN member states in September 2000, there was the commitment under MDG7 to ensure environmental sustainability and outlining governments' ambitions⁶⁸.

At the Johannesburg World Summit for Sustainable Development in 2002, this commitment was extended to include basic sanitation, and water was recognised as a critical factor for meeting all the MDGs. To promote the water agenda further, in 2003, the United Nations General Assembly proclaimed the period 2005-2015 the International Decade for Action "Water for Life". The aim was to promote efforts to fulfil international commitments made on water and water-related issues by 2015. At the time⁶⁹ the UN identified 14 critical focus areas relating to water:

1. Access to sanitation
2. Financing water
3. Gender and water
4. Human right to water
5. Integrated water resources management
6. Transboundary waters
7. Water and cities
8. Water and energy
9. Water and food security
10. Water and sustainable development
11. Water and the green economy
12. Water cooperation
13. Water quality
14. Water scarcity

Each area is significant in its own right. Take the issue of human rights to water. A decade ago on 28th July 2010, the United Nations General Assembly explicitly recognised in Resolution 64/292 the human right to water and sanitation and acknowledged that clean drinking water and sanitation are essential to the realisation of all human rights⁷⁰. At a practical level, the World Health Organization states that the human right to water means that between 50 and 100 litres of water per person per day is needed to ensure that most basic needs are met and few health concerns arise. In addition, the water source needs to be within 1km of the home, collection time should not exceed 30 minutes and water costs should be no more than 3% of household income⁷¹. Such a commitment needs to be seen in the context of the significant growth over the past century of people not having access to water. As the standard of living has improved in

to halve the number of people without sustainable access to safe drinking water by 2015

many countries, it is estimated that the number of people faced with water scarcity has increased from 15% of the global population (0.24 billion) in the 1900s to 58% (3.8 billion) in the 2000s. At the beginning of the 21st Century, 1.8 to 2.9 billion people were suffering from severe water shortages for four to six months a year, and about 0.5 billion people year round⁷².

Reconciling the complexities into an investment is a challenge for addressing water risk

How does such an issue as a human right reconcile with financing water? Access to water and access to all should therefore be guaranteed and free or cheap. At the same time, private companies providing the capital wish to maximise their return. How can such divergent perspectives be reconciled? Who will ensure a fair deal for all? Can it be left to the market? Letting the market operate on its own is an option, but we should not forget that investments in water infrastructure in developed nations were originally made mostly by public entities. Only later, once policies and frameworks had been established, investments were moved to private hands, while operating under a strong regulatory framework.

Water as a stand-alone SDG

The fourteen focus areas identified in the International Decade for Action "Water for Life" were instrumental in the next phase of water's prominence in global policy as it then became part of the 2030 Agenda under the UN's Sustainable Development Goals, signed by unanimous agreement by all UN member states in 2015.

The SDGs, unlike the MDGs 15 years earlier, agreed on a stand-alone water goal namely SDG6 "Clean Water and Sanitation" which aims to ensure the availability and sustainable management of water and sanitation for all. To assess progress in achieving SDG6, there are 11 global indicators which include measuring access to drinking water, sanitation services, hygiene, wastewater treatment, water quality, efficiency, water stress, water management, transboundary cooperation, water-related ecosystem change and official development assistance⁷³.

⁶⁸ UN Millennium Development Goals. We can end poverty www.un.org/millenniumgoals/environ.shtml

⁶⁹ UNDESA www.un.org/waterforlifedecade/

⁷⁰ UN The human right to water: Milestones www.un.org/waterforlifedecade/pdf/human_right_to_water_and_sanitation_milestones.pdf

⁷¹ UN (May 2014). Human right to water www.un.org/waterforlifedecade/human_right_to_water.shtml

⁷² Nature (December 2016). The world's road to water scarcity

⁷³ SDG Tracker <https://sdg-tracker.org/water-and-sanitation>

The implications of water scarcity are severe. Poor sanitation and hygiene led to almost 1.6 million deaths in 2017, more than the deaths from suicide, homicide, conflicts and terrorism combined. One third of the deaths from diarrheal diseases are children under five years old.

Addressing this requires eliminating the more than 1 billion people globally practicing open defecation and the provision of improved sanitation facilities⁷⁴. This demands investment, but, when compared with other sectors, such as education and health, sanitation and drinking-water receive a relatively low priority when it comes to official development assistance and domestic financing. This investment also needs to be gender sensitive, for example, when it comes to the construction of latrines at schools.

In addition, water is explicit in SDG3 and ensuring healthy lives for all and combating water-borne diseases, SDG11 and reducing the impact of water-related disasters, SDG14 and conserve and sustainably use the oceans, seas and marine resources and SDG15 and the protection of freshwater ecosystems and combating of desertification. Not surprisingly, many of the water-related goals and targets listed under the SDGs originated from the “Water for Life” work of the UN.

From a linear to a circular approach to water

Climate change and increasing population levels add stress on water resources. An integrated water resources management approach is essential to balance water reliability, scarcity and quality alongside increasing water demand from population growth, urbanisation and agricultural demand. Since water sources often cross international boundaries, competition for water threatens to promote transboundary water conflicts. A holistic approach is thus required.

Economic growth and international competition for water

The last 50 years have seen 37 acute disputes involving violence, compared to over 150 water treaties that have been signed⁷⁵. While these treaties have typically focused on navigation and boundary demarcation, there is increasing focus towards cooperating when it comes to the use, protection and conservation of water resources. Without regional and international water cooperation, increasing political and civil unrest will likely be inevitable.

To better understand the geopolitical risks around water scarcity, in 2018 the Water, Peace and Security (WPS) partnership was founded. Their efforts aim to address how water crises increasingly pose a threat to livelihoods, food production and energy security at local and national levels with a particular focus on scaling up preventative action as it relates to water stress-induced conflict, migration or other forms of social destabilisation. Their online tool uses climate models to predict which countries and regions are at risk of water conflicts⁷⁶.

Economic and population growth, urbanisation and slums

Part of the conflict risk reflects increasing rates of urbanisation, the growth of mega-cities over the past 100 years and the voracious appetite for water of their residents. With greater concentrations of populations in urban centres, and slum dwellings, it means their inhabitants are suffering from poor access to safe water and in certain geographies more and more people are now exposed to water-related disasters such as floods and droughts. In addition, urban dwellers typically consume more energy and a rural inhabitant, this then places increasing strains on energy systems and the competition for water resources which are already under pressure from the demands being placed on it by the agricultural sector.

Food security

Agriculture accounts for 70% of the world’s total freshwater withdrawal mostly through irrigation, but some 60% of this is wasted due to leaky irrigation systems and the cultivation of crops that are too thirsty for the environment in which they grow⁷⁷. It is estimated that by 2025, two-thirds of the world’s population will be living in water-stressed countries and that world GDP generated in water stressed regions will rise from 20% today to 45% by 2050⁷⁸. The sectors most likely to be exposed to substantive water risks are consumer staples, utilities, energy and mining. Part of the solution, and a way to safeguard biodiversity, is water needs to be valued and priced correctly.

Poor water quality is also becoming a more pressing issue particularly as a result of eutrophication from agricultural run-off, domestic sewage industrial effluents, fossil fuel burning and bush fires. An additional and emerging water quality concern stems from the growing personal care products and pharmaceutical industries, such as painkillers and antibiotics, and their impact on aquatic ecosystems.

⁷⁴ WHO (May 2017). Key facts www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease

⁷⁵ UN (October 2014) Transboundary waters www.un.org/waterforlifedecade/transboundary_waters.shtml

⁷⁶ Water, Peace and Security www.waterpeacesecurity.org/

⁷⁷ Global Footprint Network (May 2019). Advancing the science of sustainability database (2016 database)

⁷⁸ World Water Development Report 2019 (March 2019).

The expanding issues around water

In 2016, the United Nations General Assembly unanimously adopted the resolution “International Decade (2018–2028) for Action – Water for Sustainable Development” to promote the water agenda over the next decade. This work remains focused on addressing the lack of access to safe drinking water, sanitation and hygiene as well as combatting water-related disasters, scarcity and pollution which are being exacerbated by urbanization, population growth, desertification, drought and climate change⁷⁹.

Additional initiatives addressing water security include UNESCO’s Intergovernmental Hydrological Programme (IHP) and the UN-wide World Water Development Report, which in its latest report examines how climate change poses significant risks to the availability, quality and quantity of water⁸⁰. Indeed climate change and water is a different type of risk. It is not associated with water use and water disposal, but with risks associated with climate change, which are resulting in:

- (i) Desertification of certain geographic areas most notably much of north and southern Africa, western North America, Australia, the Middle East and Central Asia and home to 2.7 billion people⁸¹. This creates challenges to existing infrastructure or requires new infrastructure,
- (ii) Extreme weather events for example Palermo in Sicily⁸² registering 110mm of rain water in under two hours in the summer of 2020, the largest concentration of rain since 1797 and the increasing demands for climate resilient infrastructure
- (iii) Rising sea water linked to Antarctic sheet melt since the ice mass is equivalent to 58 meters of global sea-level rise⁸³ which would pose a significant risk to coastal communities, ecosystems and economies
- (iv) California wildfires have led to dangerous pollution risks with implications for local drinking water supplies⁸⁴

Conclusion to section IV

Water lies at the heart of many of the sustainable development goals from supporting basic needs such as ending poverty and hunger to protecting life on land.

Water can have also opposing impacts on economic growth from the benefits of irrigation, hydropower and flood management systems to the negative impacts of floods and the destruction of wetlands. If the natural environment continues to be degraded and unsustainable pressures put on global water resources, then it is estimated by 2050 52% of the world’s population, 45% of global GDP and 40% of global grain production will be put at risk⁸⁵.

The SDGs call on the private sector to deliver solutions, part of the challenge is the lack of information and disclosure relating to water. To assist institutional investors, in 2009 CDP announced the launch of its Water Disclosure programme to better understand the business risks and opportunities associated with water scarcity and other water-related issues. More than ten years later, **the market is faced with a variety of approaches to measure water risk from an investment perspective. This presents investors with a challenge in terms of understanding the various datasets and methodologies available and what exactly is being measured from a water risk perspective.**

At DWS our approach from a water risk management perspective has been to blend the approaches of leading data vendors to capture a more rounded picture of water risk. This then enables us to assess water risks and opportunities at a sector, sub-sector and individual security level basis.

⁷⁹ UN (March 2017). New decade for water www.unwater.org/new-decade-water/

⁸⁰ UN World Water Development Report 2020 (March 2020). Water and climate change

⁸¹ IPCC (October 2018). Global warming of 1.5C

⁸² La Repubblica (16 July 2020). Temporale a Palermo

⁸³ Nature (24 September 2020). More heat means less ice, higher seas – and no going back

⁸⁴ New York Times. 2 October 2020. “After Wildfires Stop Burning, a Danger in the Drinking Water” www.nytimes.com/2020/10/02/science/wildfires-water-toxic.html

⁸⁵ Boretti, Alberto and Lorenzo Rosa (2019) Reassessing the projections of the World Water Development Report. Nature Partner Journals: Clean Water (2:15)

FIGURE 6. MAJOR ANNOUNCEMENTS & INITIATIVES RELATING TO WATER

September 2000	Millennium Development Goals signed by all 191 UN member states
October 2001	European Charter on Water Resources
August 2002	Johannesburg World Summit for Sustainable Development
December 2003	UN Assembly proclaims International Decade for Action "Water for Life" (2005-2015)
July 2005	Report of the UN Secretary-General on Actions taken in organising the activities of the International Decade for Action 'Water for Life' 2005-2015
June 2008	Intergovernmental Panel on Climate Change (IPCC) publishes technical paper on climate change and water
November 2009	CDP announces the launch of CDP Water Disclosure programme
September 2015	UN's Sustainable Development Goals signed by all 193 UN member states
April 2016	The UN and World Bank Group convene a High Level Panel on Water, consisting of 11 sitting Heads of State and Government and one Special Adviser
December 2016	UN Assembly adopts the resolution International Decade for Action – Water for Sustainable Development (2018-2028)
March 2018	Water, Peace and Security partnership founded
March 2019	UN World Water Development Report estimates world GDP generated in water stressed regions will rise from 20% to 45% by 2050
March 2019	WWF project seeks Science-Based Targets for water
August 2019	World Resources Institute finds that 17 countries, home to one quarter of the world's population, face extremely high water stress
December 2019	Stockholm International Water Institute publishes policy brief "Implementing the Paris agreement through water solutions"

Source: DWS Investment GmbH (October 2020)

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