

The global implications of water shortages

Population growth, urbanization and voracious water use bring hazards and opportunities in sectors such as agriculture and utilities.

- _ 75% of the earth is covered in water. But only 2.5% is fresh water and no more than 1% is available to sustain all terrestrial life and ecosystems.
- _ Today, 25% of world GDP growth is from countries facing chronic water shortages. By 2050, this is expected to rise to 45%.
- _ DWS has developed a water risk score finding that sectors likely to be most at risk are consumer staples, utilities, energy and mining



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The World Economic Forum's 2019 Global Risks Report ranks water crises among the top 10 risks in terms of likelihood and impact.¹ Estimates by the research company Trucost suggest a cost of 1.9 trillion dollars per year, when including the full economic, social and environmental costs of water pollution, flooding and drought. The true cost of one cubic meter of water ranges from 0.10 dollars where water is plentiful to 15 dollars in areas of extreme scarcity. Businesses can take advantage of this wide range and align water use with its availability.² While three quarters of the Earth is covered with water, only 2.5% is fresh water and less than 1% is available to sustain all terrestrial life and ecosystems.³

Pollution, the loss of natural wetlands and the increasing frequency of droughts are placing growing strains on the planet's available water resources. Climate change exacerbates these trends as does the overexploitation of natural aquifers to meet water demand. In this regard, the countries of most concern are China, India, Mexico, Spain, South Korea and the United States.⁴ Water stress is therefore increasing in incidence within many parts of the world. The implications of water scarcity stretch from the impact on human health, via

hunger and disease, to shortages for key industries, such as agriculture, and ultimately political stability. Inevitably these are likely to have important implications for governments, corporates, investors and populations.

Water use has been growing at more than twice the rate of human population growth since the 1980s. This pressure on water resources shows no sign of abating.⁵ In the 20th century, the world's population increased from 1.5 billion to 6.1 billion, or by 4.6 billion. In this century, the UN estimates that the world's population will increase by 4.8 billion to reach 10.9 billion with 75% of this increase occurring in the first half of the century. Of the anticipated 2.1 billion growth in global population between now and 2050, 58% is expected to occur in Africa, with a further 33% of world population growth occurring in Asia.⁶

This growth coinciding with increasing levels of urbanization threatens biodiversity as well. In 1950, 30% of the world's population, or 751 million people, lived in cities. Today, this stands at 55% or 4.2 billion. By 2050, 68% of the world's population is projected to be urban. Just three countries – India, China

¹ World Economic Forum (January 2019). Global Risks Report 2019

² Trucost (2013) The True costs of water

³ UN Chief warns of widespread ills from global water crisis (March 2018); <https://www.apnews.com/278d9a84cff74c3a996c88fa2d8d69f3>

⁴ World Water Development Report 2019 (March 2019).

⁵ FAO (2017) Water for sustainable food and agriculture <http://www.fao.org/3/a-i7959e.pdf>

⁶ United Nations Population Division. World Population Prospects 2019

and Nigeria – are likely to account for 35% of the growth in the world's urban population between 2018 and 2050.⁷

Currently, it is estimated that 1.7 billion people in 44 countries are chronically short of water. By 2050, roughly half of the world's population, or 4.9 billion people, will live in a country where the lack of fresh water will be chronic or recurrent.⁸ Figure 1, using data from the World Resources Institute, shows that at a country level, water stress is most acute in the Middle East. Other emerging-market countries, most notably India, Chile, Mexico and Thailand are also likely to be severely affected. While developed-market countries appear more resilient at first glance, this masks significant divergences at a regional level. For example, on the WRI water-stress measure⁹ the United States scores 1.85, placing it in the low-to-medium risk category. However, looking more closely, New Mexico (4.26) and California (3.72) are rated on par with the United Arab Emirates and Spain, respectively.¹⁰

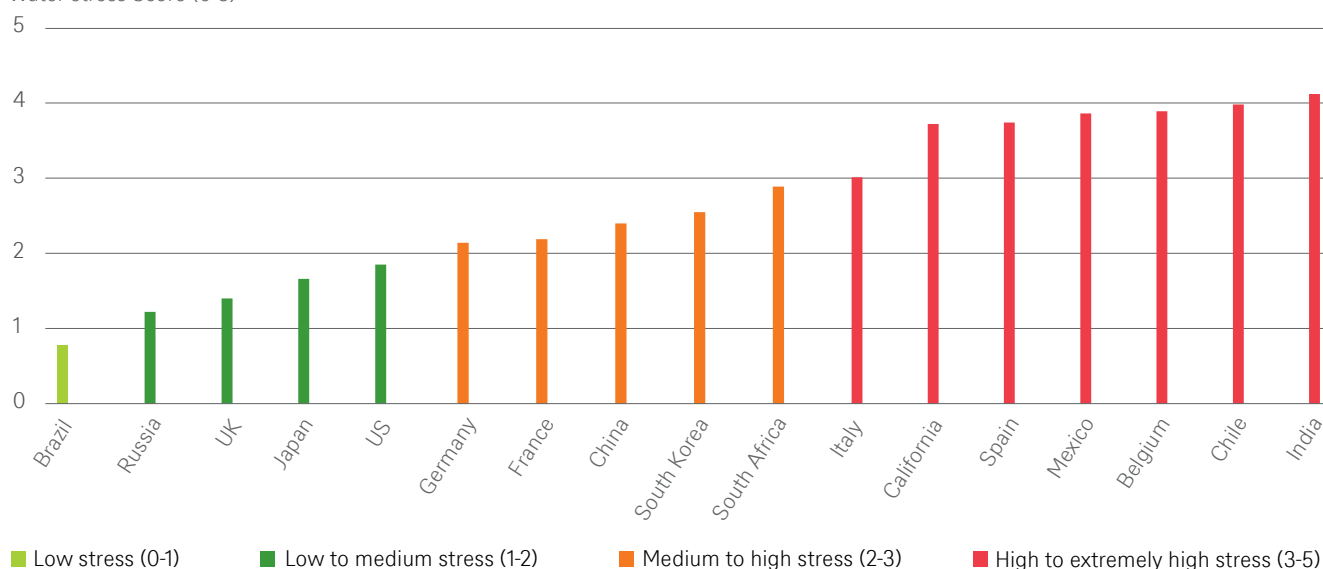
Water stress and migration also pose risks to political stability, particularly in emerging markets. A 2011 IMF study examined the link between food-price inflation and anti-government demonstrations across 120 countries between 1970 and 2007.¹¹ It found that a 10% increase in food prices led to a doubling in anti-government protests in low-income countries where food constitutes a high share of total personal expenditures. To a large degree, the Arab Spring in 2011 was arguably sparked by the surge in grain prices at that time. Civil unrest has also been an important factor contributing to global migration trends. The international migrant stock as a percent of the total population stands at 3.4%, compared to 2.8% during the 1990s.

These trends create risks for companies and their operations in water-stressed regions, including their license to operate. Indeed we have already witnessed beverage companies facing strong local opposition, for example in France and India,

WATER-STRESS SCORES BY COUNTRY

Water stress is most acute in the Middle East. Other emerging-market countries, most notably India, Chile, Mexico and Thailand, are also likely to be severely affected.

Water-stress Score (0-5)*



* The ratio of total withdrawals to total renewable supply in a given country or region. A higher score means more water users are competing for limited water supplies.

Source: World Resources Institute as of 08/2019

⁷ World Urbanization Prospects 2018; United Nations Economics and Social Affairs Division

⁸ World Water Development Report 2019 (March 2019)

⁹ The water-stress measure compiled by the World Resources Institute (WRI) refers to the ratio of total withdrawals to total renewable supply in a given country or region. A higher score means more water users are competing for limited water supplies.

¹⁰ World Resources Institute (August 2019). 17 countries, home to one quarter of the world's population, face extremely high water stress <https://www.wri.org/aqueduct>

¹¹ Arezki, R. ad Brueckner, M. 2011. Food prices and political stability. IMF Working Paper WP/11/62

for their overuse of water resources. Today, 20% of global gross domestic product (GDP) is produced in water-scarce regions and this could rise to 45% by 2050.¹² However, there are also business opportunities in these regions. The clothing industry demonstrates an extreme example of the high water demands: the production process of a T-Shirt can take up to 2,700 liters of water, illustrating the scope for efficiency gains.¹³

DWS has recently created a water-transition-risk score for companies, combining data from Sustainalytics, ISS-Oekom, MSCI and Trucost. Figure 2 depicts our findings that the sectors most likely to be exposed to substantive water risks (companies with E and F scores) are consumer staples, utilities, mining (within the materials sector) and parts of the energy complex. Conversely, there are plenty of examples of new or existing technologies to mitigate water risks. Such solutions include recycling waste water, rainwater harvesting, drip-irrigation technology, precision planting and hybrid seeds, improved infrastructure and pipes as well as introducing desalination facilities. Companies with low or no exposure to water-scarcity risks (A and B scores) or exposure to water-risk-mitigation technologies can be attractive investments.

Agricultural products are, of course, key inputs for consumer staples. As a result, this sector accounts for 70% of the world's total freshwater withdrawal mostly through irrigation. However, 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 grow.¹⁴ Since more than 75% of the world's food supply comes from just 12 plants and five animal species, the world economy is exposed to high risks of extreme crop failures or diseases.¹⁵

For the third year in a row, there has been a rise in world hunger such that the number of undernourished people has increased to nearly 821 million in 2017 from around 804 million in 2016. The most concentrated areas of undernourish-

ment are in India, China, Pakistan, Ethiopia and Indonesia. Climate change and population growth threaten to increase the number of undernourished people worldwide by 40 to 170 million this century, according to the Intergovernmental Panel on Climate Change (IPCC).¹⁶ Increases in crop yield in higher latitudes are likely to be outweighed by the negative impacts on yields and hence production in lower latitudes, where most agricultural-based emerging-market countries are located.

The investor and company sustainability association Ceres has published an analysis describing which food companies are making most progress towards a water smart future.¹⁷ Of the 35 publicly traded companies evaluated, 77% now specifically mention water as a risk factor in their financial filings, up from 59% in 2017. Despite this growing awareness, effective management of water risk still lags, with an average overall company score of 38 out of 100. Meat companies, which are particularly vulnerable to water risks, also continue to do the least to manage them.

These trends emphasize the importance of investors and companies assessing water risks and opportunities within their investment decisions. Many sectors exposed to substantive water risks, such as utilities, mining and energy, are also affected by climate-transition risks. However, the consumer-staples sector is an exception to this trend. While this sector is less affected by climate-transition risks, it is even more so impacted by climate change due to their exposure to water.

We are working on improving and eventually optimizing our existing sector allocation in light of water-scarcity risks, alongside other ESG themes, such as climate-transition risks in general. As indicated above, moreover, there are companies and sectors with the opportunity to benefit by offering solutions to mitigate water shortages. Taking all this into account remains important in our investment-decision process and something we will continue to intensively work on in 2020.

¹² World Water Development Report 2019 (March 2019)

¹³ World Wildlife Fund (January 2013). The impact of a cotton T-shirt

¹⁴ Global Footprint Network (May 2019). Advancing the science of sustainability database

¹⁵ Food and Agriculture Organization of the United Nations. (November 2018). What is happening to agrobiodiversity?

¹⁶ Intergovernmental Panel on Climate Change (October 2018). Global warming of 1.5°C

¹⁷ Ceres (2019). Feeding ourselves thirsty; https://www.ceres.org/sites/default/files/reports/2019-10/FOT2019_Executive_Summary.pdf

DWS WATER-STRESS SCORES BY SECTOR

Consumer staples, utilities, mining and parts of the energy sector are most exposed to substantive water risks. Potential winners tend to be easier to identify at the subsector level.

Equity sector



* The "water-transition-risk score" combines company data to evaluate each sector's exposure to water risks.
Source: DWS Investment GmbH as of 11/2019

GLOSSARY

Aquifers are underground layers of water-bearing permeable rock, rock fractures or unconsolidated materials such as gravel, from which water can be extracted using a well.

Consumer discretionary is a sector of the economy that sells non-essential goods and services.

Consumer staples is a sector of the economy selling essential products.

Emerging markets (EM) are economies not yet fully developed in terms of, amongst others, market efficiency and liquidity.

The **gross domestic product (GDP)** is the monetary value of all the finished goods and services produced within a country's borders in a specific time period.

Inflation is the rate at which the general level of prices for goods and services is rising and, subsequently, purchasing power is falling.

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Publisher: DWS Investment GmbH, Mainzer Landstraße 11-17, 60329 Frankfurt am Main, Germany

CRC 072382 (12/2019)