



**Drought:**  
the heat is on for investors!

This summer many countries are hit by long periods of drought. Drought interacts with a complex system of environmental and social risks that are most likely and impactful as identified by The Global Risks Report 2018 of the World Economic Forum. They are extreme weather events, water crises, food crises, biodiversity loss and ecosystem collapse and large-scale involuntary migration.<sup>1</sup> In turn these generate both financial risks and opportunities that are of interest to investors.

Although some consider drought an extreme weather event due to climate change, others regard it as related to the occasional heatwave that is lasting a bit longer than expected. Similarly, some countries and businesses are well prepared for more extreme drought scenarios now and in the future. Whilst others estimate that the frequency of extreme droughts will not accelerate in the near future and are therefore betting on the occasional scarcity in the market with resulting price hikes of commodities. The question is: what is the best strategy to adopt as an investor?

## LET'S INVESTIGATE THE ENVIRONMENTAL AND SOCIAL EFFECTS OF DROUGHT

Drought takes on varying forms and interacts with other climatic parameters, which have environmental and social consequences. A direct environmental effect of drought is more pressure on water reservoirs, resulting in reduced water availability. The agricultural sector sees clear consequences; it is estimated that heat, drought and flood events will have a one-in-twenty chance per decade to cause failure of maize production by the largest growers in China and the United States.<sup>2</sup> That is, for each degree Celsius increase the yield of corn, soy, wheat and rice may drop between 3.1% (soy) and 7.4% (corn).<sup>3</sup> In addition, drought affects biological diversity, for example causing a drop in insect populations critical to food systems. Besides, through interaction with increasing global CO<sub>2</sub> emissions, drought also negatively affects plants' natural defence mechanisms and lowers the nutritional value of crops.

Another indirect effect stems from the increase in heatwaves, which can hit the electric utilities sector. As people are aiming to cool down, their demand for energy will surge. For example, drought in the northern part of China has induced a 6.3% increase in energy consumption, which led the country to switch from hydro to coal-fired power generation. Again, this feeds into the cycle of interactive effects in the form of carbon emissions. Plus another issue is that drought makes it more complicated to cool down power generating facilities, thereby intensifying the risk to disrupt operations.


In terms of social effects, shortage of clean drinking water and food, and heat will instil people to move to places where they can live more comfortably. This potentially results in migratory flows with unknown political and economic consequences. As confirmed by Dutch Chief of Defence General Middelburg, who highlighted how the issue of desertification destabilised the situation in the Middle-East. Thus, this can generate financial risks and opportunities for investors.

This is a publication of ACTIAM's Sustainability & Strategy team, consisting of 9 professionals with an average of 10 years in the industry.


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<sup>1</sup> [http://www3.weforum.org/docs/WEF\\_GRR18\\_Report.pdf](http://www3.weforum.org/docs/WEF_GRR18_Report.pdf)

<sup>2</sup> Kent, C., E. Pope, V. Thompson, K. Lewis, A. A. Scaife, and N. Dunstone. 2017. "Using Climate Model Simulations to Assess the Current Climate Risk to Maize Production". *Environmental Research Letters* 12 (5). <http://iopscience.iop.org/article/10.1088/1748-9326/aa6cb9/meta>

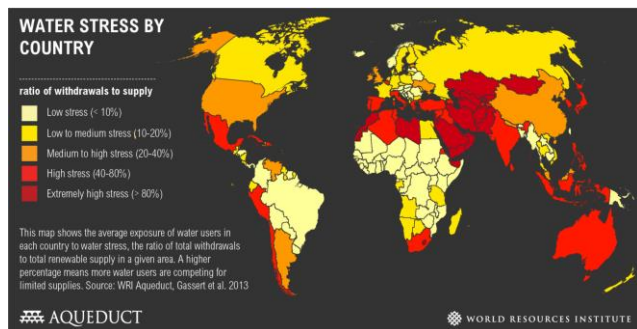
<sup>3</sup> Chuang Zhao, Bing Liu, Shilong Piao, Xuhui Wang, David B. Lobell, Yao Huang, Mengtian Huang, Yitong Yao, Simona Bassu, Philippe Ciais, Jean-Louis Durand, Joshua Elliott, Frank Ewert, Ivan A. Janssens, Tao Li, Erda Lin, Qiang Liu, Pierre Martre, Christoph Müller, Shushi Peng, Josep Peñuelas, Alex C. Ruane, Daniel Wallach, Tao Wang, Donghai Wu, Zhuo Liu, Yan Zhu, Zaichun Zhu, and Senthold Asseng. Temperature increase reduces global yields of major crops in four independent estimates. *PNAS* August 29, 2017. 114 (35) 9326-9331; published ahead of print August 15, 2017. <https://doi.org/10.1073/pnas.1701762114>

## SO WHICH FINANCIAL RISKS DOES DROUGHT GENERATE?

The financial risks related to drought can stem from both long-term climate risks and short-term financial costs. The latter is illustrated by the recent case of Energias de Portugal (EDP), whose Q2 2018 revenues are expected to be affected by the ongoing drought in Iberia. The company had to replace its low-case hydro power generation with its more expensive conventional fleet. In 2017 severe droughts in Iberia already had a negative effect for the company of around € 300 million.

Regardless of your horizon as a financial institution it is useful to map and identify the risks and opportunities associated with drought. There are various ways in which this can be done, but one of the tools that has been developed for financial institutions to map risks in their portfolios is the drought stress-testing tool.<sup>4</sup> This tool provides insight in the water risks to which companies are exposed in varying scenarios and company's probability to default. It captures direct risks associated with water availability and indirect effects such as power shortages and supply chain disruptions due to water scarcity.

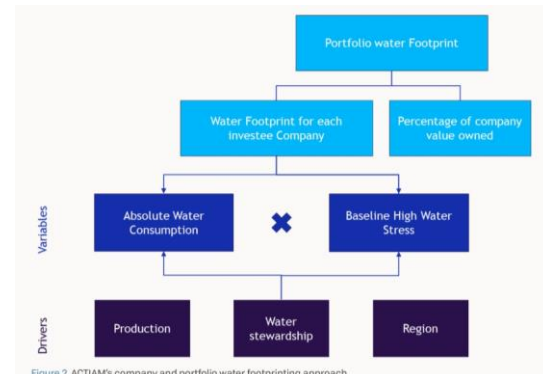
It can be expected that an increasing number of companies and financial institutions will provide insight in the impacts of climate-related issues such as drought on value creation in varying scenarios as this was also included in the Task Force on Climate-related Financial Disclosures (TCFD) recommendations.



## BUT THEN THERE ARE PLENTY OF FINANCIAL OPPORTUNITIES AS WELL

Some agricultural businesses for example can benefit in the short term from drought through failures in crop yields in the market or for a part of the year, thereby resulting scarcity in supply will drive up the price and potentially result in higher revenues. In the long term, opportunities arise in the form of technological innovations such as drought-tolerant hybrids or nutrient-efficient genetically modified organisms (GMOs) to address potential food shortages. When it comes to increasing the access to clean drinking water there are also promising initiatives, for example wastewater purification technologies that can become more cost-effective than a water desalination plant or dehumidifying technologies, which harvest water from evaporation. As with any innovation, these developments also bring up questions regarding their long term effect on societal wellbeing, which needs to be researched.

Benefiting from drought opportunities in the financial sector can take shape in the form of conservation and restoration finance. For example, through investments in real estate and urban areas that integrate vegetation, soils and natural processes. Or financing sustainable agriculture, through companies that plant specific tree types that generate cooling shades, reduce soil temperature and retain soil moisture.



Taken together, there are many reasons why investors should care about drought and the many effects associated with it. As one thing is for sure; it will bring us an unknown but exciting future.

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4 <https://www.ceres.org/sites/default/files/reports/2017-02/Water%20Toolkit/Water%20Toolkit%20Case%20Study%20PDFs/IWT%20Case%20Study%20-%20Citi.pdf>