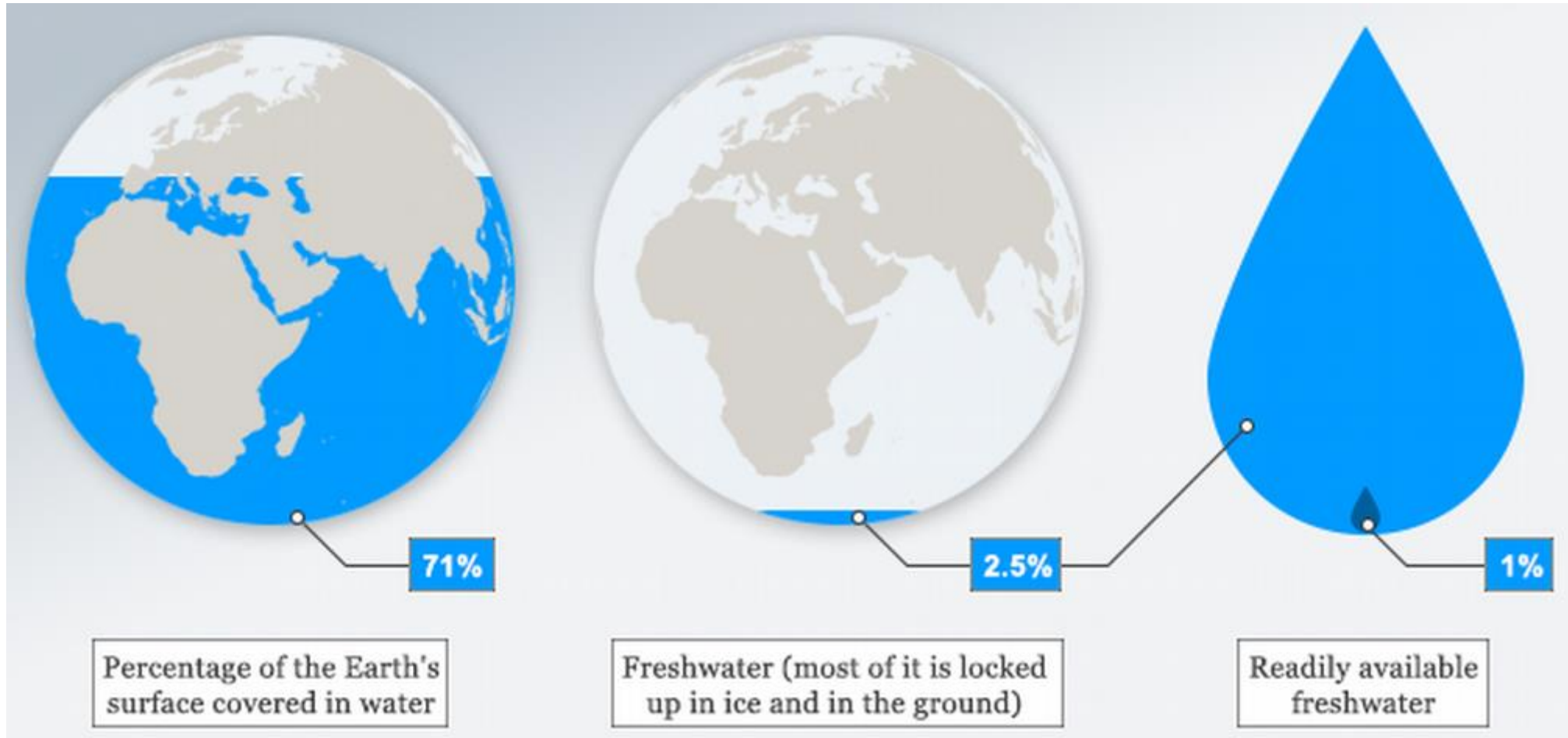




Chap I: Generalities why we need to manage water?

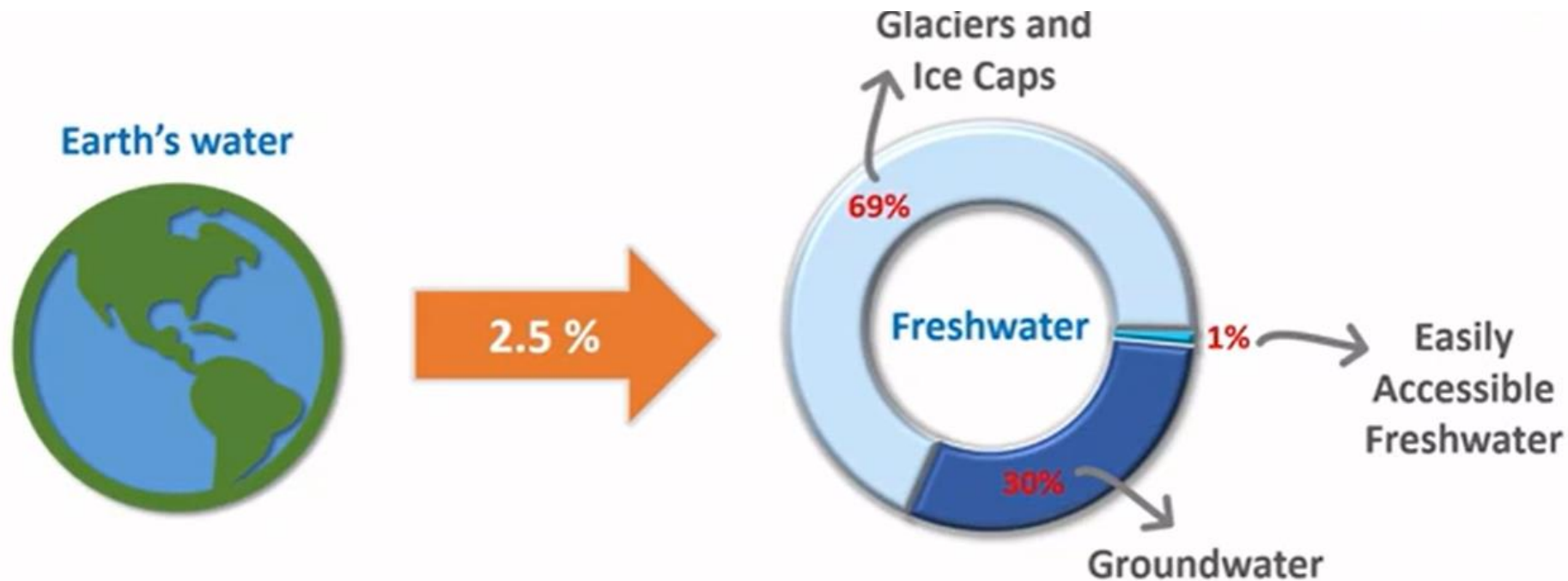


Source: USGS



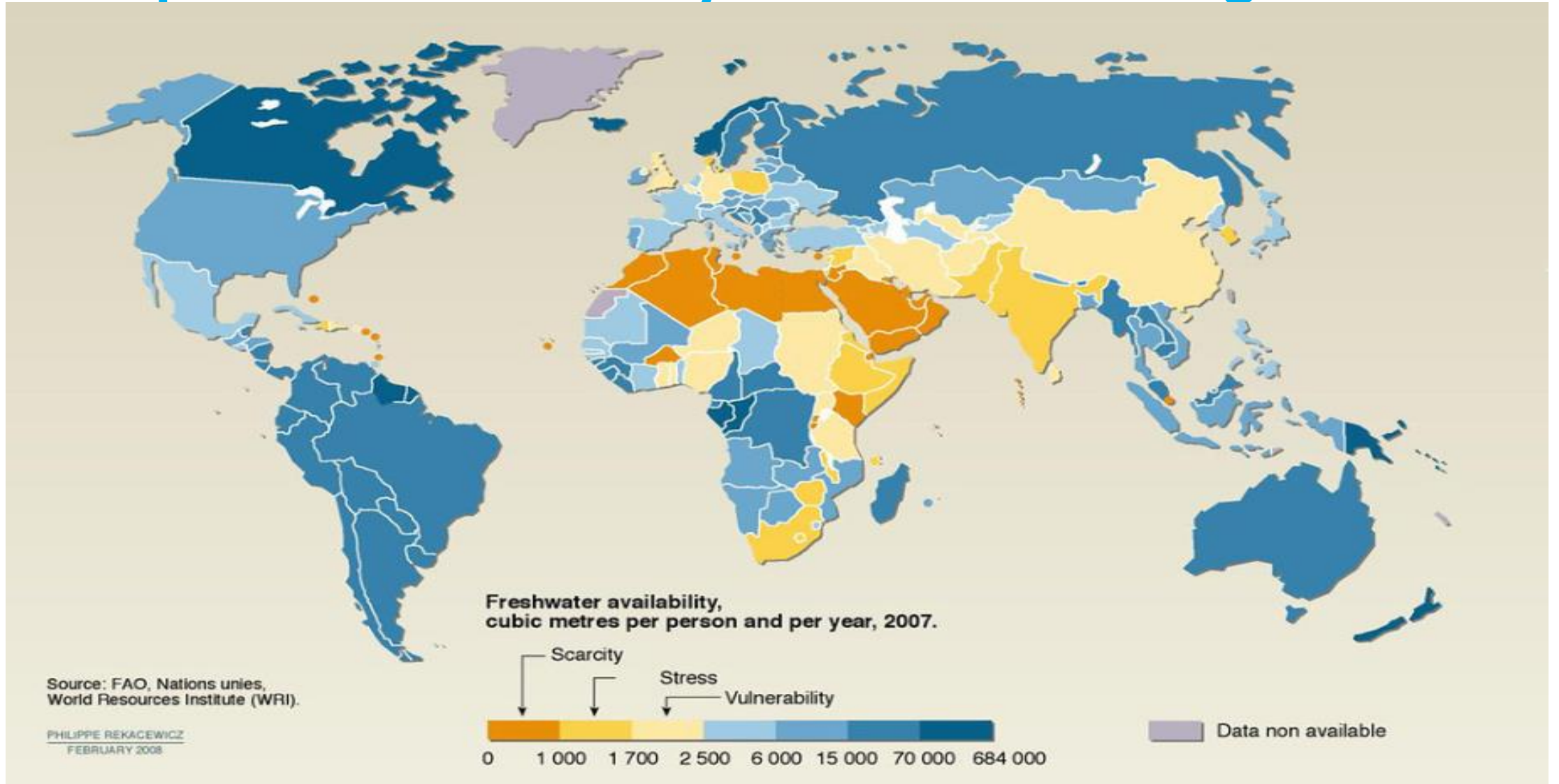
Chap I: Generalities why we need to manage water?

Introduction: Only 2.5% of the Earth's water is freshwater, with over 99% of this crucial resource locked in glaciers + ice caps (69%), and underground (30%), causing extreme, uneven distribution (Fr. Répartition inégale). While some regions have abundant water, billions face scarcity due to climate-driven droughts, population growth, and poor infrastructure, causing severe economic and social strain.





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Fresh water availability cubic meter/person/year 2007 (Source FAO)



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1.1 Basic Notions

Water resource systems have benefited both people and their economies for a long time. They ensure the prosperity of any civilisation but inaccessibility to this resource raise many problems that can transform to conflict. Currently in many regions of the world they are not able to meet even basic drinking water and sanitation needs.

Definition: **Water scarcity** (Pénurie d'eau نذرة المياه) occurs when the amount of water withdrawn from lakes, rivers or groundwater is so great that water supplies are no longer adequate to satisfy all human or ecosystem requirements, resulting in increased competition between water users and other demands.

According to the UN [World Water Development Report 2023](#), between two and three billion people experience water shortages for at **least one month** per year, posing severe risks to livelihoods (moyen de subsistance سبل العيش), notably through food security and access to electricity produced from water.

"Water is our common future and we need to act together to share it equitably and manage it sustainably. We have a responsibility to plot a collective course ensuring water and sanitation for all." **Audrey Azoulay** UNESCO Director-General



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- In 2020: 26% of population (2 billion people) did not have access to safely managed drinking water. UN World Water Development Report 2023.
- 153 countries share 286 transboundary river and lake basins and 592 transboundary aquifer systems, but only 58% of basin areas have an operational arrangement for water cooperation.
- In 2022, 2.4 billion people were living in areas that are exposed to extreme water stress.

Definition: Water stress is the condition where the demand for water exceeds the available amount during a certain period, or when poor quality restricts its use. It is measured as the ratio of total fresh water withdrawn to total renewable resources, with levels above 25% indicating low stress and over 100% indicating critical, unsustainable demand.

According to the UN classification:

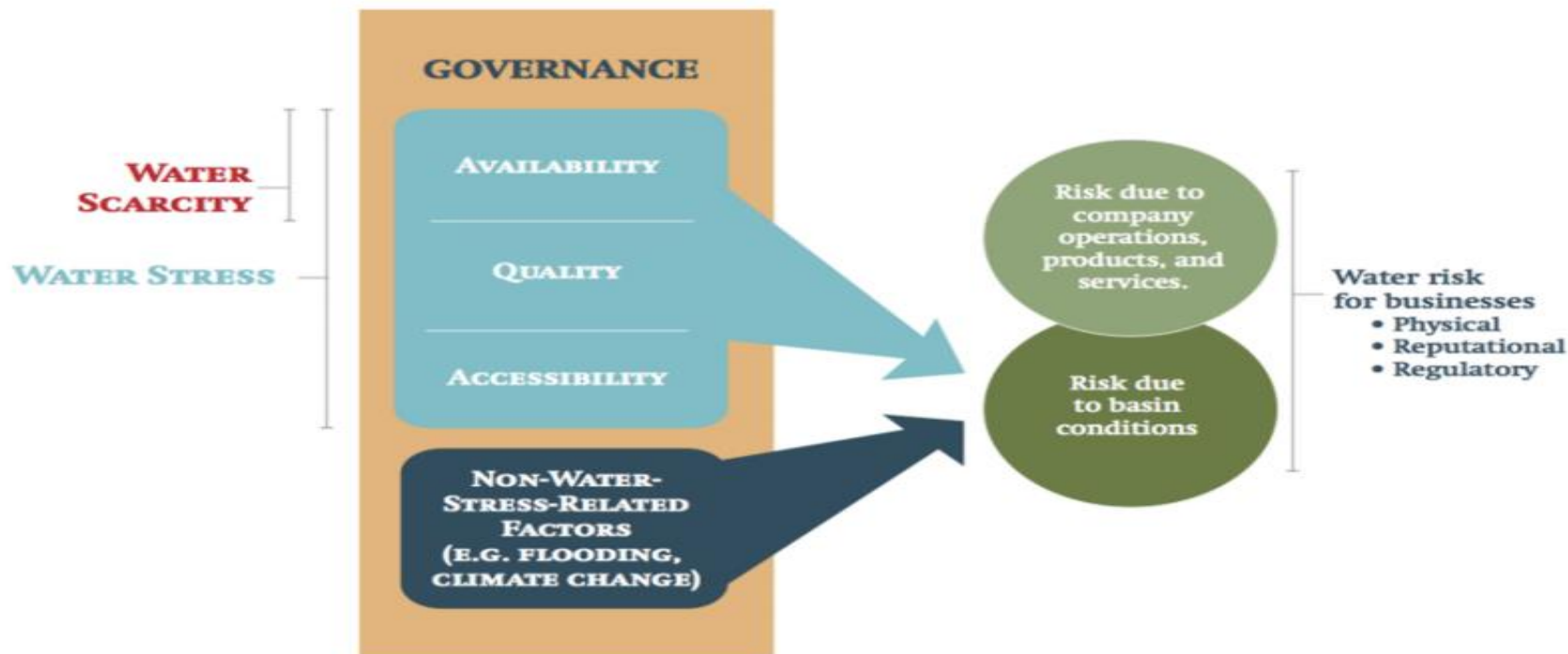
<25%: No stress

25–50%: Low stress



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- **50–75%:** Medium stress
- **75–100%:** High stress
- **>100%:** Critical stress
- Unlike water scarcity, which can refer to a long-term, absolute lack of water, water stress is a broader term incorporating availability, quality, and accessibility.



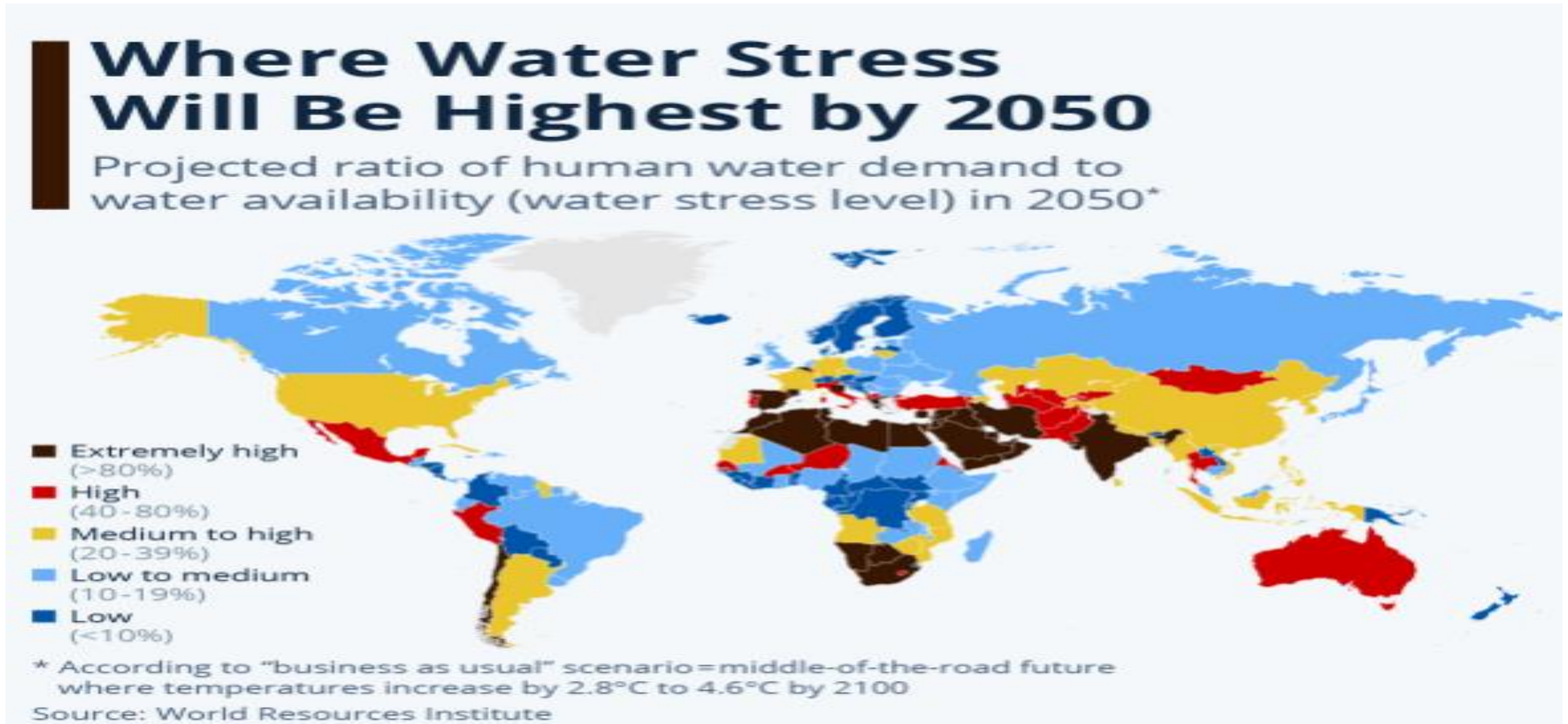
•Posted by [CEO WATER MANDATE SECRETARIAT](#)

•UN Global compact Pacific institute

•Date JANUARY 17, 2017



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1.2 What can be the situation of water resource in future ?

It is not possible to forecast exactly how high water stress will be by 2050 due to numerous factors such as the global population or economic and political developments of countries. This is why researchers are currently working with scenarios better than precise estimates that has too much uncertainty.

We are sure the demand for water will increase steadily and that many countries are already consuming more than they have available. (Martin Armstrong, 2024)

According to World Resource Institute **51** of the **164 countries** and territories analyzed are expected to suffer from **high** to **extremely high** water stress by **2050**, which corresponds to **31 percent of the world population**. The scenario used corresponds to a "business as usual" future with temperature increases of between **2.8** and **4.6 degrees Celsius** by **2100** and a world that remains unequal. In addition to the entire Arabian Peninsula, Iran and India, most North African countries such as **Algeria**, Egypt and Libya are among the countries that are expected to consume at least **80 % of the available water by 2050**. (Martin Armstrong, 2024)

water scarcity is not limited to emerging countries. Southern European countries such as Portugal, Spain and Italy are concerned by a high water stress.



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1.2 What can be the situation of water resource in future ?

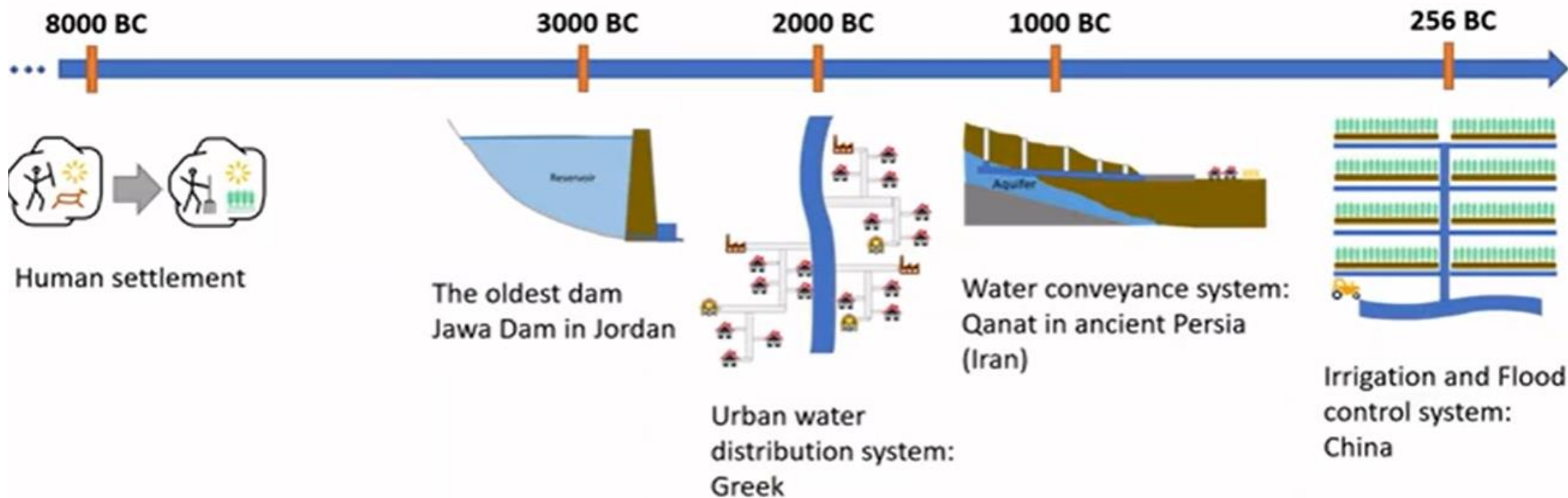
By 2050

- **6%** of GDP (Gross Domestic Production الناتج المحلي الخام) lost in some countries due to water scarcity – spurring (تحفز) migration and conflict.
- **2.4 billion** People in urban areas face water scarcity (up to half of global urban population).
- **US\$650 billion** In economic losses from floods 2000–2019, affecting **1.65 billion people** and resulting in over **100,000 deaths**. Over the same period, droughts affected another **1.43 billion people**, with recorded estimated losses of nearly **US\$130 billion**.



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1.3. History of water resource management: Historically, management focused on supplying water and irrigation, but grew in complexity with urbanization, transitioning toward sustainable, watershed-based, and politically informed strategies in the 20th and 21st centuries.



Source: Leila Eamen;2021