

Water Scarcity

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Water, water, everywhere? Maybe, but not at the time and place of demand! There is plenty of water on earth, but only 3% of the world's water is fresh water; about 69% of this is locked away in frozen glaciers and polar icecaps. The rest is found mainly as groundwater, with only a very small fraction available in surface waters or in the air [1].

The essence of global water scarcity, and forces driving it

- The following forces drive the rising global demand for water:
 - The increasing world population, improving living standards, changing consumption patterns, and increased crop irrigation to meet biofuel demand [2-5].
 - Water pollution and climate change are expected to amplify the problem [2-4].
- At the global level and on an annual basis, there is enough freshwater to meet the global water demand, but there is a geographic and temporal mismatch between water availability and demand, leading to water scarcity in several parts of the world during specific times of the year [5,6].
- Water scarcity can be due to physical shortage or scarcity in access due to the failure of institutions [7].

The challenges

- Water scarcity is a global concern, affecting everyone. The World Economic Forum ranks water crises as the greatest global risks in terms of potential impacts to economies, environments and people [8].
- Some 844 million people worldwide lack access to water; inadequate sanitation is a problem for 2.3 billion people [9].
- Two thirds of the global population (4.0 billion people) live with severe water scarcity at least one month of the year [4]. This figure is expected to increase to 4.8-5.7 billion by 2050 [10].
- Water bodies like the Colorado River and Lake Mead in Arizona are drying up.
- Around half the world's wetlands have disappeared [11].

How to mitigate the problem

- Unlike unpredictable natural disasters such as hurricanes or earthquakes, the general location and timing of water scarcity are well known [1, 11], giving us ample lead-time to mitigate the potential risks [10], if we are willing to act.
- Some of the actions that we need to take in order to minimize the threat posed by water scarcity to biodiversity and human welfare include, but are not limited to [12]:
 - putting caps on water consumption by river basin, and
 - setting benchmarks and increasing water-use efficiencies.

Sources

- [1] "[Earth's water distribution](http://water.usgs.gov/edu/earthwherewater.html)" United States Geological Survey, retrieved 2018-10-06
water.usgs.gov/edu/earthwherewater.html
- [2] "[Human Appropriation of Renewable Fresh Water](https://doi.org/10.1126/science.1255078)" Postel, S.L., Daily, G.C. & Ehrlich, P.R. (1996) *Science*, 271: 785-788
[science.sciencemag.org/content/271/5250/785](https://doi.org/10.1126/science.1255078)
- [3] "[Global Water Resources: Vulnerability from Climate Change and Population Growth](https://doi.org/10.1126/science.1213171)" Vörösmarty, C.J., Green, P., Salisbury, J. & Lammers, R.B. (2000) *Science*, 289: 284-288
[science.sciencemag.org/content/289/5477/284](https://doi.org/10.1126/science.1213171)
- [4] "[Water for Agriculture: Maintaining Food Security under Growing Scarcity](https://doi.org/10.1146/annurev-environ-030308.090351)" Rosegrant M. W., Ringler, C. & Zhu, T. (2009) *Annual Review of Environment and Resources* 34, 205-222
[www.annualreviews.org/doi/abs/10.1146/annurev-environ.030308.090351](https://doi.org/10.1146/annurev-environ-030308.090351)
- [5] "[Four billion people facing severe water scarcity](https://doi.org/10.1126/science.1255078)" Mekonnen, M.M. & Hoekstra, A.Y. (2016) *Science Advances*, 2: e1500323
[advances.sciencemag.org/content/2/2/e1500323](https://doi.org/10.1126/science.1255078)
- [6] "[Water scarcity indicators: the deception of the numbers](https://doi.org/10.1016/j.pse.2000.05.004)" Savenije, H.H.G (2000) *Physics and Chemistry of the Earth (B)* 25: 199-204
[www.sciencedirect.com/science/article/pii/S1464190900000046](https://doi.org/10.1016/j.pse.2000.05.004)
- [7] "[Water scarcity: Fact or fiction?](https://doi.org/10.1016/j.agwat.2006.05.002)" Rijsberman, F.R. (2006) *Agricultural Water Management* 80: 5-22
[www.sciencedirect.com/science/article/pii/S0378377405002854](https://doi.org/10.1016/j.agwat.2006.05.002)
- [8] "[The Global Risks Report](https://www.weforum.org/reports/the-global-risks-report-2018)" (2018) World Economic Forum
www.weforum.org/reports/the-global-risks-report-2018
- [9] "[Progress on Drinking Water and Sanitation, 2017 Update and MDG Assessment](http://www.who.int/water_sanitation_health/publications/jmp-2017/en/)" World Health Organization and UNICEF Joint Monitoring Programme (2017)
www.who.int/water_sanitation_health/publications/jmp-2017/en/
- [10] "[Water Futures and Solution: Fast Track Initiative](https://doi.org/10.1016/j.watres.2016.08.008)" Burek, P., Satoh, Y., Fischer, G., Kahil, M. T., Scherzer, A., Tramberend, S., Nava, L. F., Wada, Y., Eisner, S., Flörke, M., Hanasaki, N., Magnuszewski, P., Cosgrove, B. and Wiberg, D. (2016) International Institute for Applied Systems Analysis (IIASA) Working Paper, retrieved 2018-10-06
[pure.iiasa.ac.at/id/eprint/13008/](https://doi.org/10.1016/j.watres.2016.08.008)
- [11] "[Water for People, Water for Life](http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/wwdr1-2003/)" (2003) United Nations World Water Assessment Programme (WWAP)
www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/wwdr1-2003/
- [12] "[Sustainable, efficient and equitable water use: The three pillars under wise freshwater allocation](https://doi.org/10.1002/wie.20000)" Hoekstra, A.Y. (2014) *WIREs Water* 1: 31-40
[wires.wiley.com/WileyCDA/WiresArticle/wisId-WAT21000.html](https://doi.org/10.1002/wie.20000)