

Global water cycle off balance for ‘first time in human history,’ threatening half the planet’s food production

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Cracks run through the partially dried-up river bed of the Gan River, during a drought in Nanchang, Jiangxi province, China, August 28, 2022. Thomas Peter/Reuters

CNN —

Humanity has thrown the global water cycle off balance “for the first time in human history,” fueling a growing water disaster that will wreak havoc on economies, food production and lives, according to a landmark new report.

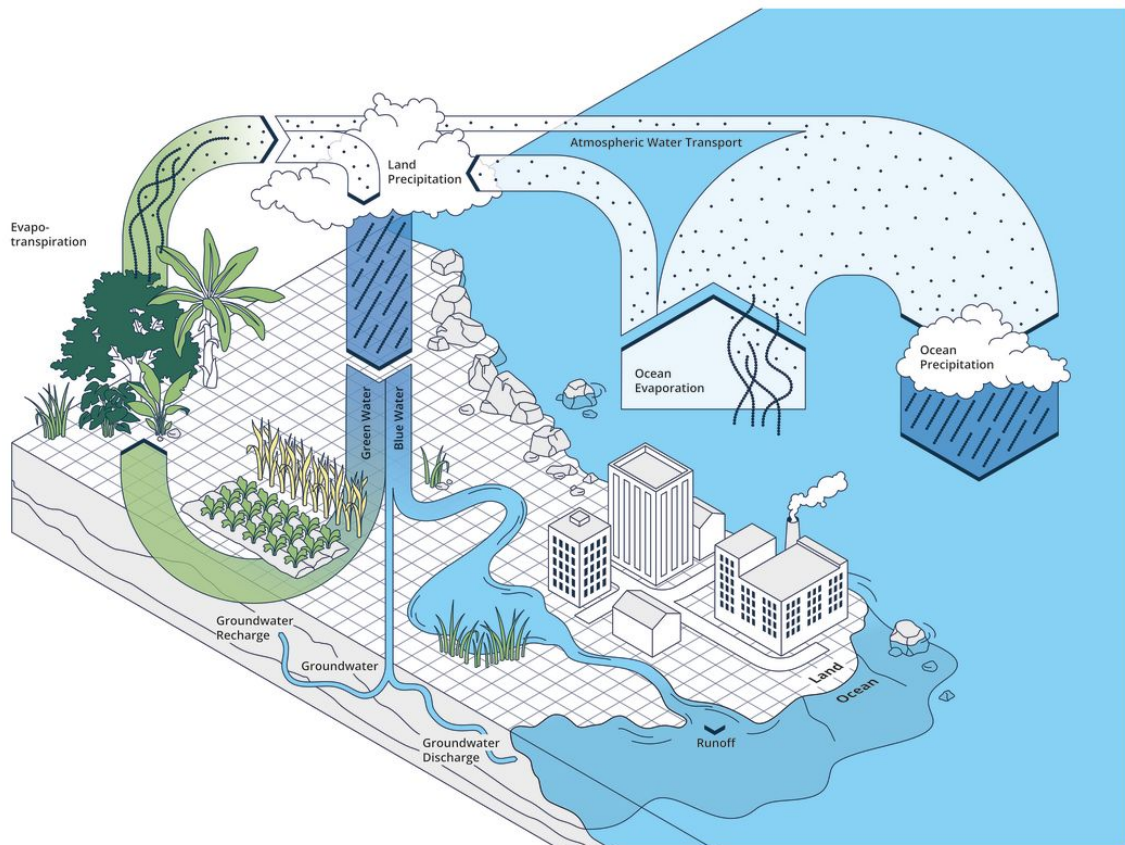
Decades of destructive land use and water mismanagement have collided with the human-caused climate crisis to put “unprecedented stress” on the global water cycle, said the report published Wednesday by the Global Commission on the Economics of Water, a group of international leaders and experts.

The water cycle refers to the complex system by which water moves around the Earth. Water evaporates from the ground — including from lakes, rivers and plants — and rises into the atmosphere, forming large rivers of water vapor able to travel long distances, before cooling, condensing and eventually falling back to the ground as rain or snow.

Disruptions to the water cycle are already causing suffering. Nearly 3 billion people face water scarcity. Crops are shriveling and cities are sinking as the groundwater beneath them dries out.

The consequences will be even more catastrophic without urgent action. The water crisis threatens more than 50% of global food production and risks shaving an average of 8% off countries' GDPs by 2050, with much higher losses of up to 15% projected in low-income countries, the report found.

“For the first time in human history, we are pushing the global water cycle out of balance,” said Johan Rockström, co-chair of the Global Commission on the Economics of Water and a report author. “Precipitation, the source of all freshwater, can no longer be relied upon.”



Graphic showing the movement of "green water" and "blue water" in the global water cycle. Global Commission on the Economics of Water

The report differentiates between “blue water,” the liquid water in lakes, rivers and aquifers, and “green water,” the moisture stored in soils and plants. While the supply of green water has long been overlooked, it is just as important to the water cycle, the report says, as it returns to the atmosphere when plants release water vapor, generating about half of all rainfall over land. Disruptions to the water cycle are “deeply intertwined” with climate change, the report found.

A stable supply of green water is vital for supporting vegetation that can store planet-heating carbon. But the damage humans inflict, including destroying wetlands and tearing down forests, is depleting these carbon sinks and accelerating

global warming. In turn, climate change-fueled heat is drying out landscapes, reducing moisture and increasing fire risk.

The crisis is made more urgent by the huge need for water. The report calculates that, on average, people need a minimum of about 4,000 liters (just over 1,000 gallons) a day to lead a “dignified life,” far above the 50 to 100 liters the United Nations says is needed for basic needs, and more than most regions will be able to provide from local sources.



A boat on the Rio Negro in Manaus, Brazil, on October 9, 2024, as the river reached its lowest level on record during the most intense and widespread drought the country has experienced since 1950. Bruno Kelly/Reuters

Richard Allan, a climate science professor at Reading University, England, said the report “paints a grim picture of human-caused disruption to the global water cycle, the most precious natural resource that ultimately sustains our livelihoods.” Human activities “are altering the fabric of our land and the air above which is warming the climate, intensifying both wet and dry extremes, and sending wind and rainfall patterns out of kilter,” added Allan, who was not involved in the report.

The crisis can only be addressed through better management of natural resources and massive cuts in planet-heating pollution, he told CNN.

The report's authors say world governments must recognize the water cycle as a "common good" and address it collectively. Countries are dependent on each other, not only through lakes and rivers that span borders, but also because of water in the atmosphere, which can travel huge distances — meaning decisions made in one country can disrupt rainfall in another.



Dead almond trees removed by a farmer because of a lack of water to irrigate them, in drought-stricken Huron, California, on July 23, 2021. Robyn Beck/AFP/Getty Images

The report calls for a "fundamental regearing of where water sits in economies," including better pricing to discourage wastefulness and the tendency to plant water-thirsty crops and facilities, such as data centers, in water-stressed regions.

"The global water crisis is a tragedy but is also an opportunity to transform the economics of water," said Ngozi Okonjo-Iweala, director general of the World Trade Organization and a co-chair of the commission that published the report. Valuing water properly is essential, she added, "so as to recognize its scarcity and the many benefits it delivers."