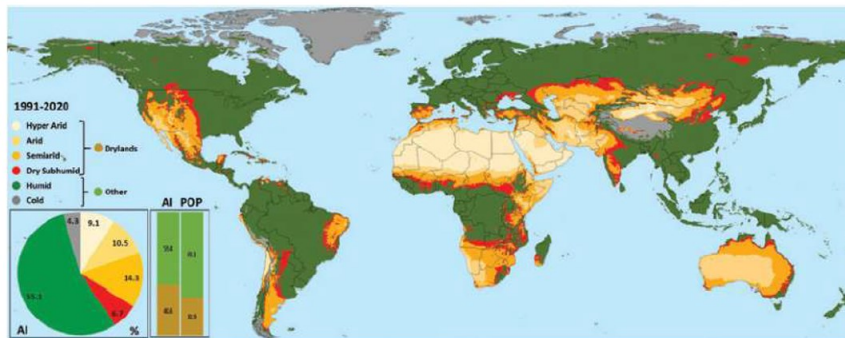


Rising Aridity, Drought and International Security



— and arid areas of southern Europe, the Middle East and North Africa and southern Asia.”

Drought and aridity are increasingly recognized as significant drivers of international security challenges. As climate change continues to intensify, these phenomena lead to severe environmental stress, impacting water availability, agricultural productivity, and overall ecosystem health. The implications of such stress are profound, as they can destabilize nations and regions, particularly those already facing economic or political fragility.

The Global Threat of Drying Lands report by UNCCD Science-Policy Interface (SPI) — the UN body for assessing the science of land degradation and drought — points to human-caused climate change effects on rising aridity and its consequences

“More than two thirds of all land on the planet (excluding Greenland and Antarctica) is projected to store less water by the end of the century, if greenhouse gas emissions continue to rise even modestly. Aridity is considered the world’s largest single driver behind the degradation of agricultural systems, affecting 40 per cent of Earth’s arable lands. Rising aridity has been blamed for a 12 per cent decline in gross domestic product (GDP) recorded for African countries between 1990–2015.

Rising aridity and drought play a key role in increasing human migration around the world particularly in the hyperarid

In many parts of the world, rivers and aquifers cross national boundaries, making access to water a potential source of conflict. Moreover, drought and aridity severely affect agricultural systems, which are vital for food security. Crop failures and livestock losses can result in increased food prices, malnutrition, and social unrest. Historically, we have seen examples where food shortages have contributed to civil unrest and even revolutions, as populations become desperate and disillusioned.

In conclusion, as drought and aridity continue to pose significant challenges globally, their implications for international security cannot be overlooked. Recognizing these challenges and implementing effective strategies will be crucial for promoting stability and peace in affected regions. It is imperative that nations work together to confront these environmental pressures, safeguarding not only their own interests but also contributing to global security and sustainability.

Dursun Yıldız

Director

The megadroughts are upon us



Forty-year study: Extreme droughts will become more frequent, severe, and extensive

Increasingly common since 1980, persistent multi-year droughts will continue to advance with the warming climate, warns a study from the Swiss Federal Institute for Forest, Snow, and Landscape Research (WSL), with Professor Francesca Pellicciotti from the Institute of Science and Technology Austria (ISTA) participating. This publicly available forty-year global quantitative inventory, now published in *Science*, seeks to inform policy regarding the environmental impact of human-induced climate change. It also detected previously 'overlooked' events.

Fifteen years of a persistent, devastating megadrought -- the longest lasting in a thousand years -- have nearly dried out Chile's water reserves, even affecting the country's vital mining output. This is but one blatant example of how the warming climate is causing multi-year droughts and acute water crises in vulnerable regions around the globe. However, droughts tend only to be noticed when they damage agriculture or visibly affect forests. Thus, some pressing questions arise: Can we consistently identify extreme multi-year droughts and examine their impacts on ecosystems? And what can we learn from the drought patterns of the past forty years?

To answer these questions, researchers from the Swiss Federal Institute for Forest, Snow, and Landscape Research (WSL) and the Institute of Science and Technology Austria (ISTA) have analyzed global meteorological data and modeled droughts between 1980 and 2018. They demonstrated a worrying increase in multi-year droughts that became longer, more frequent, and more extreme, covering more land. "Each year since 1980, drought-stricken areas have spread by an additional fifty thousand square kilometers on average -- that's roughly the area of Slovakia, or the US states of Vermont and New Hampshire put together -- , causing enormous damage to ecosystems, agriculture, and energy production," says ISTA Professor

Francesca Pellicciotti, the Principal Investigator of the WSL-funded EMERGE Project, under which the present study was conducted. The team aims to unveil the possible long-lasting effects of persistent droughts around the globe and help inform policy preparing for more frequent and severe future megadroughts.





Contrasting impacts on ecosystems

The persistently rising temperatures, extended droughts, and higher evapotranspiration ultimately lead to dryer and browner ecosystems, despite also causing heavier precipitation episodes. Thus, scientists can use satellite images to monitor the effect of drought by tracking changes in vegetation greenness over time. While this analysis works well for temperate grasslands, the changes in greenness cannot be tracked as easily over dense tropical forest canopies, leading to underestimated effects of drought in such areas.

Thus, to ensure consistent results worldwide, the team developed a multistep analysis that better resolves the changes in high-leaf regions and ranked the droughts by their severity since 1980. Unsurprisingly, they showed that megadroughts had the highest immediate impact on temperate grasslands. 'Hotspot' regions included the western USA, central and eastern Mongolia, and particularly southeastern Australia, where the data overlapped with two well-documented multi-year ecological droughts.



On the other hand, the team shed additional light on the paradoxical effects observed in the tropical and boreal forests. While tropical forests can offset the expected effects of drought as long as they have enough water reserves to buffer the decrease in rainfall, boreal forests and tundra react in their distinct way.

It turns out that the warming climate extends the boreal growth season since vegetation growth in these regions is limited by lower temperatures rather than water availability.

Droughts evolve in time and space

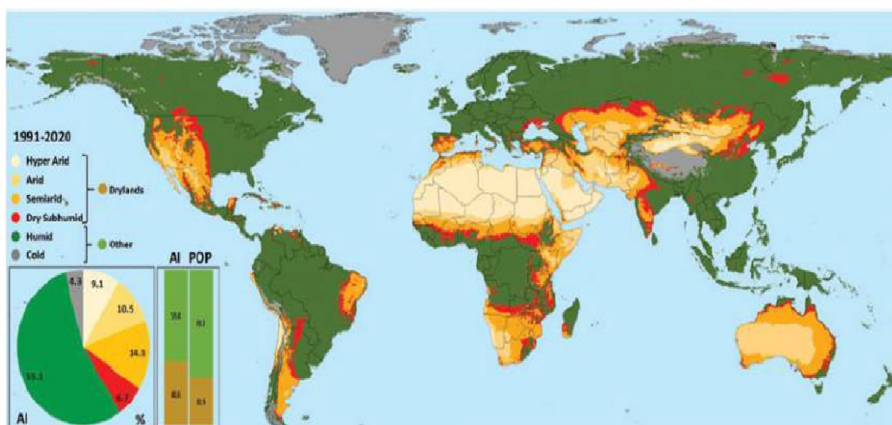
The results show that the trend of intensifying megadroughts is clear: The team generated the first global -- and globally consistent -- picture of megadroughts and their impact on vegetation at high resolution. However, the long-term effects on the planet and its ecosystems remain largely unknown. Meanwhile, the data already agrees with the observed widely greening pan-Arctic. "But in the event of long-term extreme water shortages, trees in tropical and boreal regions can die, leading to long-lasting damage to these ecosystems. Especially, the boreal vegetation will likely take the longest to recover from such a climate disaster," says Karger. Pellicciotti hopes the team's result will help change our perception of droughts and how to prepare for them:

"Currently, mitigation strategies largely consider droughts as yearly or seasonal events, which stands in stark contrast to the longer and more severe megadroughts we will face in the future," she says. "We hope that the publicly available inventory of droughts we are putting out will help orient policymakers toward more realistic preparation and prevention measures." As a glaciologist, Pellicciotti also seeks to examine the effects of megadroughts in the mountains and how glaciers can buffer them. She leads a collaborative project titled "MegaWat -- Megadroughts in the Water



Towers of Europe -- From Process Understanding to Strategies for Management and Adaptation."

Source :Institute of Science and Technology Austria. "The megadroughts are upon us." ScienceDaily. ScienceDaily, 16 January 2025. <www.sciencedaily.com/releases/2025/01/250116161248.htm>.



The Global Threat of Drying Lands

Key Messages

More than three-quarters of all land on Earth experienced a drier climate during the three decades leading up to 2020, compared to the previous 30-year period. Global drylands—areas in which precipitation is less than 65 per cent of atmospheric evaporative demand—expanded by about 4.3 million km², an area equal to about half the size of the continent of Australia/Oceania. Drylands now cover almost 41 per cent of global lands (excluding Antarctica).

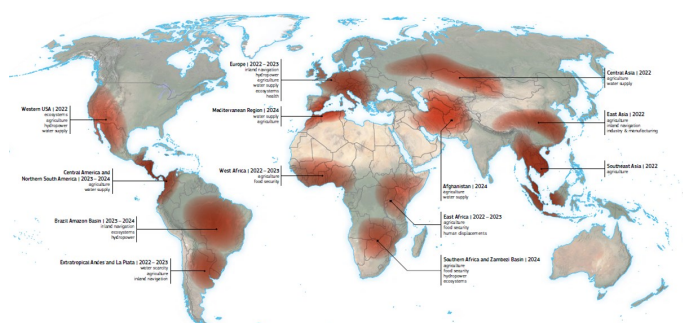
Much of aridity's recent rise can be attributed to human-caused climate change. If the world fails in efforts to curb greenhouse gas emissions into the future, another 3 per cent of the world's humid areas are projected to transform into drylands by the end of this century. People living in drylands have doubled in number in recent decades to 2.3 billion in 2020, up from 1.2 billion 30 years earlier. That is, those living in drylands comprised almost a third of all people on Earth (30.9 per cent) in 2020, compared to just over a fifth (22.5 per cent) in 1990.

About half of the world's dryland inhabitants are found in Asia and Africa. The most densely populated drylands are in California, Egypt, eastern and northern Pakistan, large parts of India and north-eastern China.

Climate models suggest as many as 5 billion people could inhabit drylands by 2100 in a worstcase climate change scenario characterized by regional rivalries. Dryland inhabitants in this scenario would more than double the current number and would mean two in every five people on the planet live in drylands.

Hotspots showing significant dryland expansion include the western United States, the Yucatan Peninsula, north-eastern Brazil, north-western Argentina, the entire Mediterranean region, the northern side of the Black Sea, the Sahel, the Rift Valley, north-eastern South Africa, the bordering area between Russia and Kazakhstan, large parts of Mongolia and north-eastern China and south-eastern Australia.

Human-made greenhouse gas emissions have played a key role in the expansion of drylands, especially over the past three decades, according to climate simulations that show a pronounced global drying trend beginning in the 1950s and accelerating from the 1990s. Impacts from increasing aridification coupled with anthropogenic processes, lead to land degradation (and desertification) and water scarcity. These, in turn, can trigger cascading effects among many associated negative environmental and socioeconomic consequences, including food and water insecurity, poor soil fertility, losses in crop and plant productivity, biodiversity declines, .



ecosystem degradation, intense sand and dust storms, wildfires, poor health and large-scale human migration. More than a fifth of all land could experience abrupt ecosystem transformations in response to rising aridity by the end of the century, according to recent projections. Increasing aridity is expected to play a role in larger and more intense wildfires in the climate-altered future—not least because of its impacts on tree deaths in semi-arid forests and the consequent growing availability of dry biomass for burning. Europe is likely to be especially affected.

More than two thirds of all land on the planet (excluding Greenland and Antarctica) is projected to store less water by the end of the century, if greenhouse gas emissions continue to rise even modestly. Aridity is considered the world's largest single driver behind the degradation of agricultural systems, affecting 40 per cent of Earth's



arable lands. Rising aridity has been blamed for a 12 per cent decline in gross domestic product (GDP) recorded for African countries between 1990–2015. Rising aridity's impacts on poverty, water scarcity, land degradation and insufficient food production have been linked to increasing rates of sickness and death—especially among children and women around the world.

Rising aridity and drought play a key role in increasing human migration around the world—particularly in the hyperarid and arid areas of southern Europe, the Middle East and North Africa and southern Asia.

Quantifying future socioeconomic impacts can enhance equitable societal resilience. While some successful local and regional adaptation measures exist, transformational approaches are needed that blend traditional and local knowledge with evolving, up-to-date scientific understanding. Stakeholder engagement is crucial to enhance resilience to aridity, requiring sufficient financial resources, governance structures, partnerships, capacity-building initiatives, evaluation and learning, along with robust monitoring mechanisms.

Aridity-driven desertification—the degradation of land and terrestrial ecosystems in non-desert drylands—can result in a cascade of potentially devastating environmental and socioeconomic consequences.

While many aridification impacts in the world's drylands are expected to intensify and expand to new areas in the climate-altered future, a better quantification of future socioeconomic impacts is needed to plan and implement adaptation measures that increase the resilience of vulnerable people.

Access to aridity information is essential for governments and institutions to address aridity's impacts and to develop better adaptation tools. Information generated for this report has been included in an Aridity Visual Information Tool, available at <https://global-aridity-monitoring-system.csic.es>. The tool features the global spatial distribution of the average aridity index (AI)—the aridity indicator used in this report based on the ratio of precipitation to potential evapotranspiration over the medium to long term—and various aridity classes across two time periods (1961–1990 and 1991–2020).

The tool also includes aridity projections for 2100 based on two different emissions scenarios (SSP1-2.6 and SSP5-8.5) and highlights the uncertainties in these projections. It provides a monitoring feature that updates the AI annually, using data from the past five years.

The tool helps assess long-term changes in aridity by filtering out high-frequency climate variability, which is more closely related to drought events. All data within the system can be downloaded in various gridded formats or as time series.

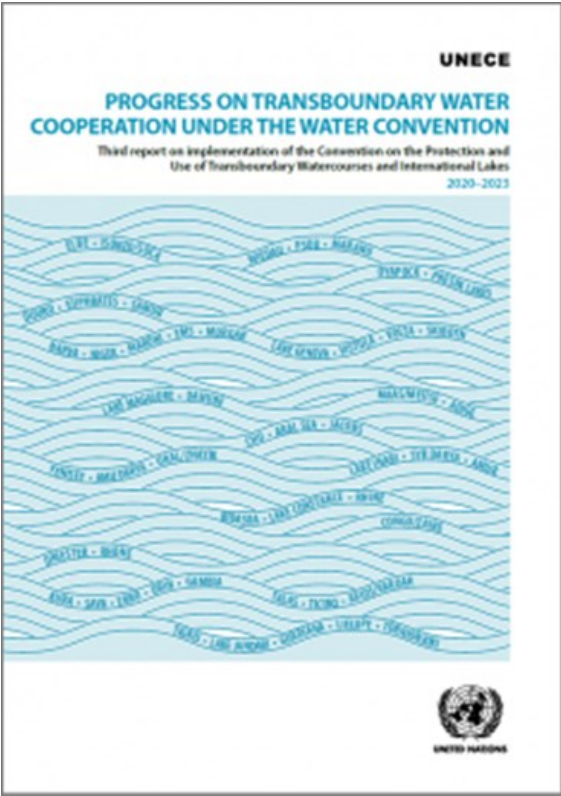
The Aridity Visual Information Tool is also linked to the UNCCD Knowledge-Sharing Systems search tool (<https://www.unccd.int/resources/knowledge-sharing-systems>), which provides highly relevant information for assessing aridity at local to global scales and for developing socioeconomic and environmental aridity mitigation and adaptation efforts.

Source : Vicente-Serrano, S. M., N. G. Pricope, A. Toreti, E. Morán-Tejeda, J. Spinoni, A. Ocampo-Melgar, E. Archer, A. Diedhiou, T. Mesbahzadeh, N. H. Ravindranath, R. S. Pulwarty and S. Alibakhshi (2024). *The Global Threat of Drying Lands: Regional and global aridity trends and future projections. A Report of the Science-Policy Interface.* United Nations Convention to Combat Desertification (UNCCD). Bonn, Germany. Published in 2024 by United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany

Progress on Transboundary Water Cooperation under the Water Convention:

Third report on implementation of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (2020-2023)

December 2024

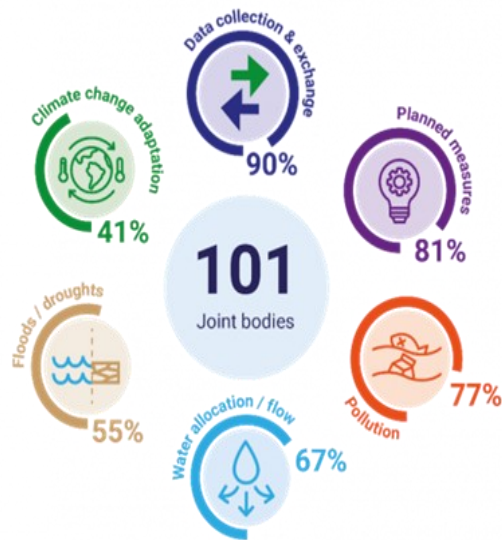


The

The report details the significant results achieved by the Parties to the Convention in implementing transboundary water cooperation, but also identifies challenges in implementation and provides strategic recommendations on possible actions to strengthen implementation of the Convention and transboundary water cooperation. The report aims to contribute to effective implementation of the Convention and to improved transboundary water cooperation worldwide.

Parties to the UN Water Convention work together through 101 joint bodies for transbound-

Tasks and activities of joint bodies for transboundary water cooperation under the Water Convention (2023)



Note: Percentages are based on consolidated basin-level responses and indicate the share of river and lake basins where joint bodies are vested with certain tasks/activities. Number 101 includes joint bodies with the participation of at least one Party.

Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), hosted by the United Nations Economic Commission for Europe (UNECE), requires Parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way, and cooperate to ensure their sustainable management. Parties bordering the same transboundary waters have to cooperate by entering into specific agreements and establishing joint bodies. As a global framework agreement, the Convention does not replace bilateral and multilateral agreements for specific basins or aquifers; instead, it fosters their establishment and implementation, as well as their further development.

In 2015, Parties introduced a reporting mechanism to monitor and assess progress in the implementation of the Convention. The outcomes of the third reporting exercise, which took place in 2023–2024, are presented in this synthesis report.

ary water cooperation, including 58 bilateral and 25 basin commissions. These joint institutions drive cooperation and strengthen resilience in shared basins by working on data exchange (in 90% of transboundary river and lake basins), pollution (77%), water allocation (67%) and floods and droughts (55%). These are some of the findings of the third report on implementation of the Water Convention, published by UNECE.

Source: Progress on Transboundary Water Cooperation under the Water Convention: Third report on implementation of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (2020-2023) | UNECE

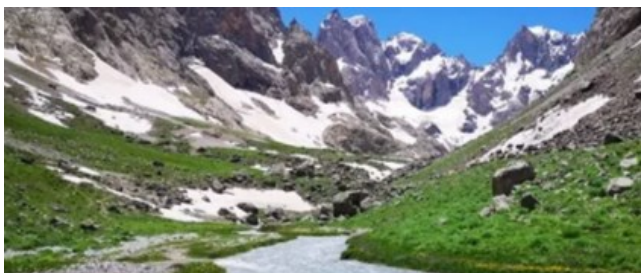
Theme World Water Day 2025 is 'Glacier Preservation'

9 December 2024



In 2025, the theme of World Water Day is 'Glacier Preservation'. On the 22nd of March, the focus will be on the critical role glaciers play in global water systems and the urgent need to address their rapid decline due to climate change. World Water Day is organised every year on the 22nd of March by UN Water.

During World Water Day many events are taking place globally to create awareness. Last year the theme was Leveraging water for peace to highlight that water governance is key for peace. More information about this year's theme will be made available on the website of UN-Water shortly.



World Day of Glaciers

The United Nations has designated 2025 as the International Year of Glacier Preservation, with March 21 recognized as the World Day for Glaciers. These observances aim to raise global awareness about the essential functions of glaciers in the climate system and hydrological cycle, and to highlight the economic, social, and environmental impacts resulting from their accelerated melting.

WORLD WATER DAY
2025



The International Year of Glacier Preservation seeks to promote sustainable measures for glacier conservation, encourage transboundary cooperation, and enhance scientific understanding of glacier dynamics.

Developing access to data on glaciers

The United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Meteorological Organization (WMO) are collaborating to organize activities throughout 2025. These initiatives include establishing an information system on all frozen water on earth (cryosphere) and developing strategies to facilitate access to accurate and timely data on glaciers.

Climate effects



The cryosphere plays a critical role in Earth's climate system by reflecting sunlight (albedo effect), regulating temperatures, and contributing to global sea levels when ice melts. Changes in the cryosphere, particularly due to climate change, have significant implications for ecosystems, sea level rise, and human societies.

Source :<https://www.waternewseurope.com/theme-world-water-day-2025-is-glacier-preservation/>
mc_cid=e431d91b7a&mc_eid=ce5008a25a

Gaza:

"No electricity, no food, no water, no gas."



**GAZA NEEDS
HELP**

January 2025

News Coordinator: Dr. Nuran YILDIZ
Dr. Doğan YILDIZ
Content : HPA Technical Unit – www.hidropolitikakademi.org
Editor: Dursun Yıldız
Design : ada Strateji Türkiye

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Where people live in harmony with nature

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