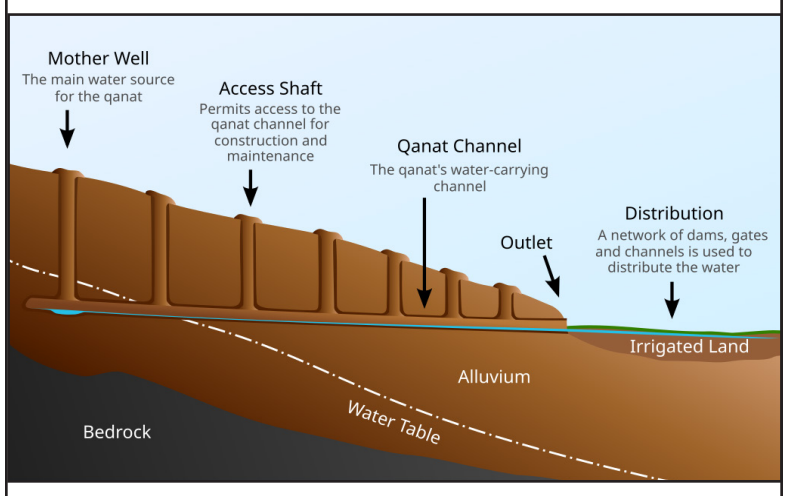
Qanat: 3,000-Year-Old Marvel of Iranian Engineering



TEHRAN (National Geographic) -- **From above, it seems as though a series of holes were pierced in the desert's dry surface. But a hundred feet below the mysterious pits, a narrow tunnel carries water from a distant aquifer to farms and villages that wouldn't exist without it.**

These underground aqueducts, called qanats, are 3,000-year-old marvels of engineering, many of which are still in use throughout Iran. Beginning in the Iron Age, surveyors—having found an elevated source of water, usually at the head of a former river valley or even in a cave lake—would cut long, sloping tunnels from the water source to where it was needed.

The orderly holes still visible aboveground are air shafts, bored to release dust and provide oxygen to the workers who dug the qanats by hand, sometimes as far as forty miles. The tunnels eventually open at ground level to form vivid oases.

Constructing qanats was a painstaking task, made even more so by the need for great precision. The angle of the tunnel's slope had to be steep enough to allow the water to flow freely without stagnating—but too steep and the water would flow with enough force to speed erosion and collapse the tunnel.

Jupar, Bagh-e Shahzadeh in Kerman

Although difficult work—even after completion, qanats require yearly maintenance—the irrigation tunnels allowed agriculture to bloom in the arid desert. The technology spread, through Silk Road trade and Muslim conquest, and qanats can be found as far as Morocco and Spain.

For Komeil Soheili, an Iranian filmmaker, qanats are an integral part of the landscape of his native Khorasan Province.

"The diversity of landscapes and cultures [in Iran] is something that's not well understood by the world," Soheili says. "One of the oldest civilizations in the world came from this amazing creation, [the qanat.]"

Gholamreza Nabipour, 102, is one of the last and almost certainly the oldest mirab, or caretaker of qanats. Recognized by the Iranian government as a national living treasure, Nabipour tries to share his craft with younger generations—including one of his sons, who uses a qanat to irrigate his pistachio farm—but fears for the future of this fragile tradition.

In the 1960s and 1970s, the subdivision of the large estates that relied on qanats caused an administrative tangle, and many qanats fell into disrepair without the traditional communal maintenance. And as modern agriculture takes root, Soheili explains, "people don't depend on qanats anymore, as it was before. It's not possible to feed your family and earn money by working in qanats," which have become less a way of life and more of a "hobby."

In 2016, UNESCO listed the Persian qanats as a world heritage site.

"These qanats have been the source of life for me and all of my ancestors," says Nabipour. "It's my duty to preserve them until the last second of my life."

Evaluation of Preliminary Stage of Qur'an Contest Begins

TEHRAN -- **The process of evaluation of the contestants in the preliminary stage of Iran's 41st International Holy Qur'an Competition has begun.**

The members of the panel of judges, stationed at the Awqaf and Charity Affairs Organization in Tehran, watch the files submitted by 350 contestants from 102 countries.

They judge and score the recorded performances to select the top contenders for the finals.

The evaluation process will continue until Thursday, December 19.

Chaired by veteran Qur'an expert Behrouz Yaigol, the panel also includes Ali Akbar Malekshahi, Saeed Rahmani, Abbas Emamjome, and Amir Aghaei.

The final stage, which will be held in person, will be launched on January 27, 2025, in the holy city of Mashhad.

The contest has two categories for women: memorization of the entire Qur'an and Tarteel recitation, and three categories for men: recitation, memorization and Tarteel.

The International Holy Qur'an Competition of the Islamic Republic of Iran is annually organized by the country's Awqaf and Charity Affairs Organization.

It aims to promote the Qur'anic culture and values among Muslims and showcase the talents of Qur'an reciters and memorizers.

Sudden Surge in Global Heat Puzzles Scientists

PARIS (AFP) – **The world has been getting hotter for decades but a sudden and extraordinary surge in heat has sent the climate deeper into uncharted territory -- and scientists are still trying to figure out why.**

Over the past two years, temperature records have been repeatedly shattered by a streak so persistent and puzzling it has tested the best-available scientific predictions about how the climate functions.

Scientists are unanimous that burning fossil fuels has largely driven long-term global warming, and that natural climate variability can also influence temperatures one year to the next.

But they are still debating what might have contributed to this particularly exceptional heat surge.

Experts think changes in cloud patterns, airborne pollution, and Earth's ability to store carbon could be factors, but it would take another year or two for a clearer picture to emerge.

"Warming in 2023 was head-and-shoulders above any other year, and 2024 will be as well," said Gavin Schmidt, director of the NASA Goddard Institute for Space Studies, in November.

"I wish I knew why, but I don't," he added.

"We're still in the process of assessing what happened and if we are seeing a shift in how the climate system operates."

'Uncharted Territory'

When burned, fossil fuels emit greenhouse gases like carbon dioxide that trap heat near the Earth's surface.

As fossil fuel emissions have risen to record highs in 2023, average sea surface and air temperatures have curved upwards in a consistent, decades-long warming trend.

But in an unprecedented streak between June 2023 and September 2024, global temperatures were unlike anything seen before, said the World Meteorological Organization -- and sometimes by a considerable margin.

The heat was so extreme it was enough to make 2023 -- and then 2024 -- the hottest years in history.

"The record global warmth of the past two years has sent the planet well into uncharted territory," Richard Allan, a climate scientist from the UK's University of Reading, told AFP.

What occurred was "at the limit of what we would expect based on existing climate models", Sonia Seneviratne, a climatologist from ETH Zurich in Switzerland, told AFP.

"But the overall long-term warming tendency is not unexpected" given the amount of fossil fuels being burned, she added.

'Difficult to Explain'

Scientists said that climate variability could go some way to explaining what happened.

2023 was preceded by a rare, three-year La Nina phenomenon that had a strong cooling effect on the planet by pushing excess heat into the deep oceans.

This energy was released back to the surface when an opposite, warming El Nino event took over in mid-2023, boosting global temperatures.

But the heat has lingered even after El Nino peaked in January.

Temperatures have not fallen as fast as they rose, and November was still the second-warmest on record.

"It is difficult to explain this at the moment," said Robert Vautard, a member of the UN's climate expert panel IPCC. "We lack a bit of perspective.

"If temperatures do not drop more sharply in 2025, we will really have to ask ourselves questions about the cause," he told AFP.

Scientists are looking for clues elsewhere.

One theory is that a global shift to cleaner shipping fuels in 2020 accelerated warming by reducing sulphur emissions that make clouds more mirror-like and reflective of sunlight.

In December, another peer-reviewed paper looked at whether a reduction in low-lying clouds had let more heat reach Earth's surface.

At the American Geophysical Union conference this month, Schmidt convened scientists to explore these theories and others, including whether solar cycles or volcanic activity offered any hints.

There are concerns that without a more complete picture, scientists could be missing even more profound and transformational shifts in the climate.

"We cannot exclude that some other factors also further amplified the temperatures... the verdict is still out," said Seneviratne.

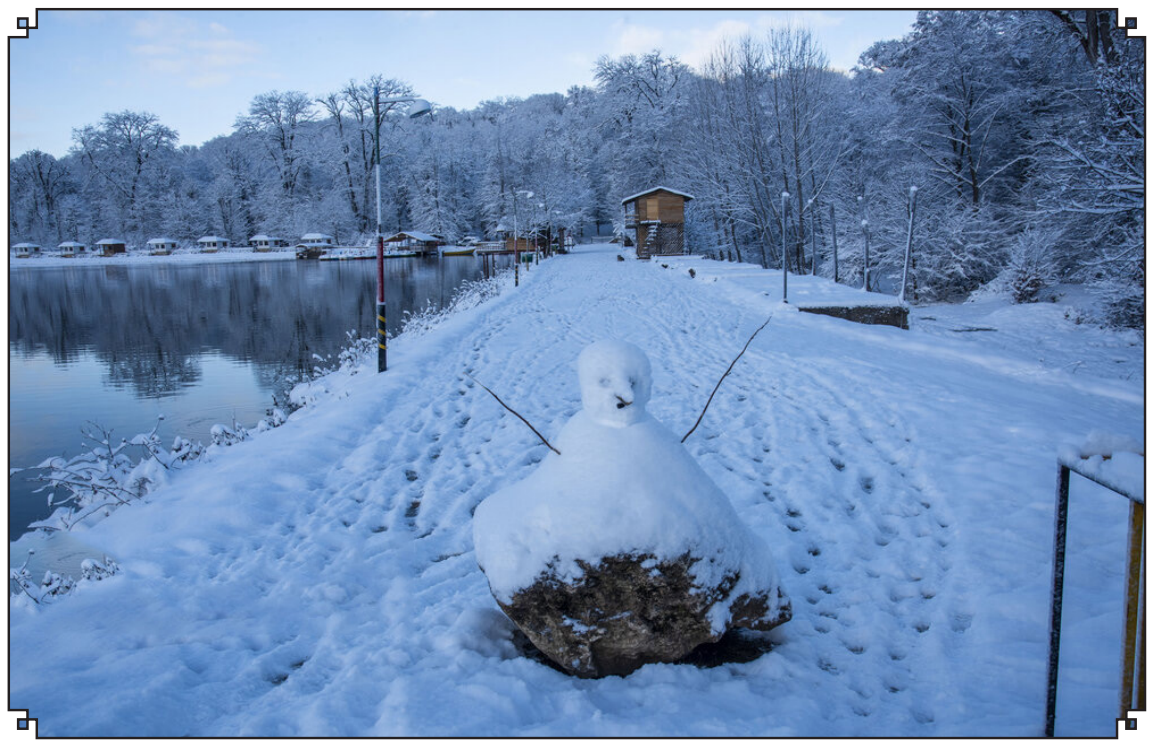
Scientists this year warned that Earth's carbon sinks -- such as the forests and oceans that suck CO2 from the atmosphere -- had suffered an "unprecedented weakening" in 2023.

This month, the U.S. National Oceanic and Atmospheric Administration said the Arctic tundra, after locking away C02 for millennia, was becoming a net source of emissions.

Oceans, which have acted as a massive carbon sink and climate regulator, were warming at a rate scientists "cannot fully explain", said Johan Rockstrom of the Potsdam Institute for Climate Impact Research.

"Could this be a first sign of a planet starting to show a loss of resilience? We cannot exclude it," he said last month.

Picture of the Day



Alendan Lake in Azni village, Mazandaran province.

Photo by ISNA