

How Fog is Saving Communities Facing Water Shortages



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Collecting fog?

In southwest Morocco at the edge of the Sahara desert, fog is captured to supply water for drinking and cooking directly to homes in rural villages, thanks to an ingenious project that catches fog in this mountainous region near the coast.

Called the world's biggest fog collection project, it uses mesh nets installed atop a mountain about 20 miles from the Atlantic Ocean to trap abundant fog that drapes the region six months out of the year. The fog condenses into water droplets that fall into troughs, and the water is carried by a pipeline straight to people's homes.

The impact of fog collection

Before, the 16 villages relied on wells fed by rainwater, which women harvested as per local custom. But as the rain grew scarcer due to climate change, women spent up to 3 ½ hours a day walking to the wells: a major dent in their day that either interrupted, or totally prevented, education for girls. Desperate villagers, who are Berbers (Morocco's indigenous people, known as the Amazigh) were selling their livestock and moving to cities.

Opened in 2015, the project supplies about 8,982 gallons (34,000 liters) of water daily to villages in the Ait Baamrane region.

How does CloudFisher work?

The fog collection project was spearheaded by [Dar Si Hmad](#), a local nonprofit co-founded and led by Jamila Bargach, a Moroccan anthropologist who's devoted her life to sustainable efforts in underserved communities in southwest Morocco, with the help of partners and donors worldwide.

A 2019 fellow at the Oak Institute for Human Rights at Colby College in Maine, she's a former Ford Foundation research fellow whose doctorate is from Rice University in Houston. A winner of the 2016 UN Global Climate Action award, Dar Si Hmad also won the 2019 Energy Globe Award in the water category, a sustainability prize from the Austria-based Energy Globe Foundation.

→ “The technology is a million times better [than when we started] and we have tripled the surface area to 1,700 square meters of nets from when we began.”

JAMILA BARGACH

Called CloudFisher, the 21 nets, made of polyester mesh with metal frames, atop Mt. Boutmezguida were designed by [WasserStiftung](#), a German nonprofit (its name means “water foundation”), in collaboration with Peter Trautwein, an industrial designer in Munich who's CEO of Aqualonis, which manufactures and sells the fog nets. It's considered revolutionary since it's the first fog-collection technology that can withstand winds of up to 75 miles an hour (120 km).

Dar Si Hmad also opened a Water School offering an environment-focused curriculum for kids age 6-14, whose hands-on classes in biology, geography, physics, chemistry, math, art, and technology teach local girls (now free from water-collecting chores) and boys about ecology and environmental stewardship. Its [lesson plans](#) for 10 half-day sessions were created with the help of the Tifawin Institute, a Boulder, Colorado-based nonprofit that focuses on gender equity and participatory development, and the University of Colorado at Boulder's Mortenson Center in Global Engineering.

Major donors were USAID (US Development Agency) and German insurance company Munich Re. Advisors included Leslie Dodson, Tifawin's executive director, and two universities in Spain's Canary Islands in Tenerife, located off the Morocco coast.



A closer view of CloudFisher's fog nets

In a high-tech world, fog collection is a brilliant low-tech solution that's simplicity itself, uses no energy to operate, is easy to assemble, and mimics Mother Nature herself. In southern Africa, [Namib beetles](#) collect fog on their hardened wings, which coalesces into droplets that roll into their mouths. In California, redwood trees draw moisture from fog, which accumulates on their needles, so they can survive amid little rain, scientists found in the 19th century.

Fog collection efforts around the world

But Morocco is by no means the only country to create water out of thin air. Latin American countries like Peru, Chile, Bolivia, and Guatemala and other African countries like Ethiopia and Tanzania also have fog collection projects.

[FogQuest](#), a Canadian nonprofit, worked on fog collection in Chile's Atacama desert, called the driest desert on earth, and Ethiopia from 2006-16, and completed its Guatemala project in 2020. In the Bay Area, vodka is even made from fog by distillery Hangar 1 on Alameda island that uses fog harvested by CloudFisher nets.

Other types of fog catchers are being developed. A [fog harp](#) that uses tightly-placed vertical wires has proven to be much more efficient than the criss-crossed mesh generally used in fog collection. Developed at Virginia Tech in 2018 by Jonathan Boreyko, assistant professor of mechanical engineering, and Brook Kennedy, associate professor of industrial design, the fog harps were placed next to traditional fog catchers on the university's Kentland Farm, which has light fog, following lab tests where heavy fog was simulated.



A fog harp arrangement. Source: [Peter Means for Virginia Tech](#)

Fog didn't get stuck if the mesh holes were too small, or get lost by passing through mesh holes that were too big as it did in criss-crossed mesh, and worked even in lighter fog. The fog harps were up to 20 times more efficient in field tests than standard fog collectors, which need much bigger water droplets before they fall into the trough.

Meanwhile, MIT scientists discovered that blasting fog with a beam of electrically-charged particles propels droplets toward the mesh, greatly increasing its ability to

capture fog. India-born Mechanical engineering professor Kripa Varansai worked on the project. His home country, listed #13 in a list of 17 nations facing “extremely high water stress” due to water scarcity compiled by the World Resources Institute in 2019, has 1.3 billion people, over three times more people than the other 16 countries combined.

The ninth conference that studies fog collection, held by the International Fog and Dew Association, will be in 2022 in Fort Collins, Colorado. Initiated by FogQuest executive director Robert Schemenauer, the conferences, first took place in 1998 in Vancouver, Canada.



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