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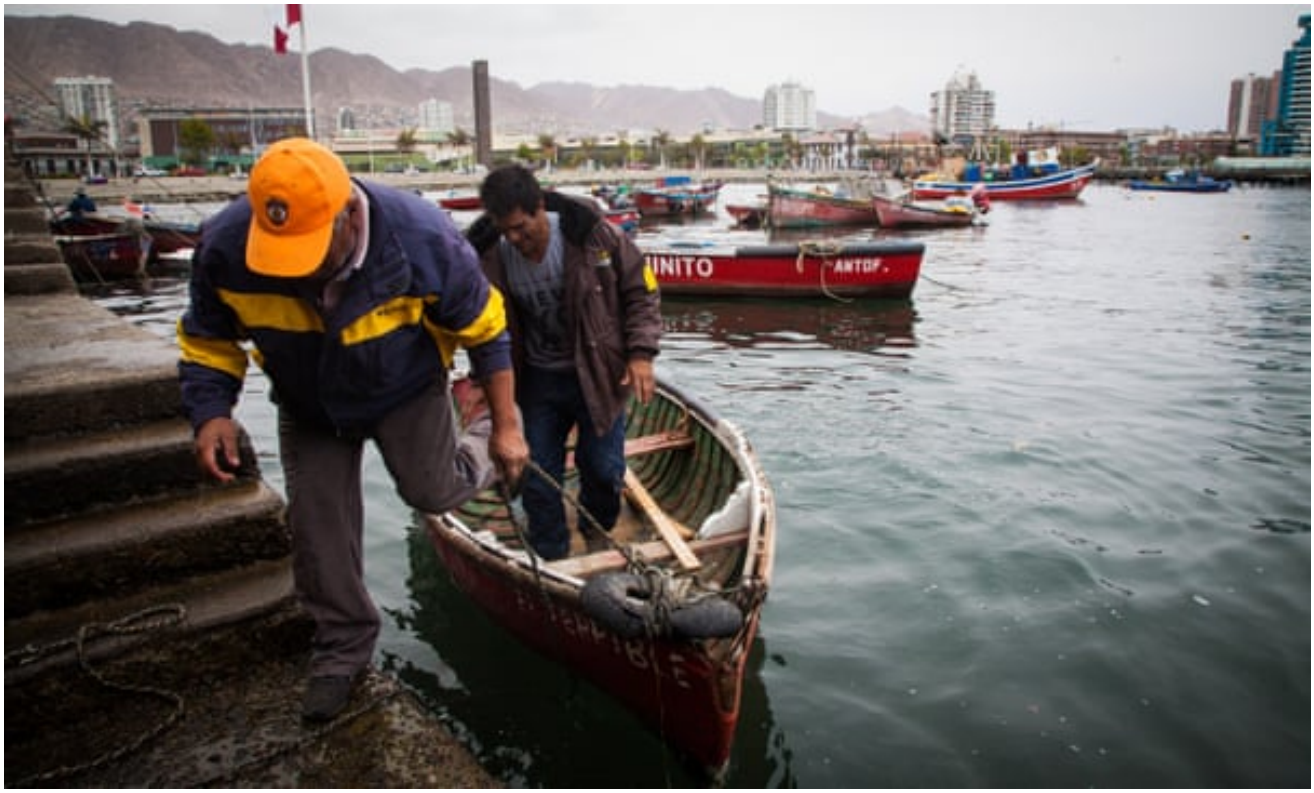


Fisherman Eduardo Muñoz says the water desalination plant has cut his catch by half. Photograph: Glenn Arcos

‘The salt they pump back in kills everything’: is the cost of Chile’s fresh water too high?

Antofagasta, situated on the edge of the Atacama Desert, relies on a vast desalination plant which provides the city with drinking water – but the waste brine is killing wildlife, say fishermen

John Bartlett in Antofagasta Thu 2 Jan 2020 02.00 EST

As Eduardo Muñoz drifts his ageing skiff into Antofagasta’s harbour, flecks of paint peeling from its prow, he looks disconsolate.

“I used to get twice as many clams from every dive,” he mutters bitterly, hauling two large sacks of shellfish on to the dock and ruffling the salt from his hair.

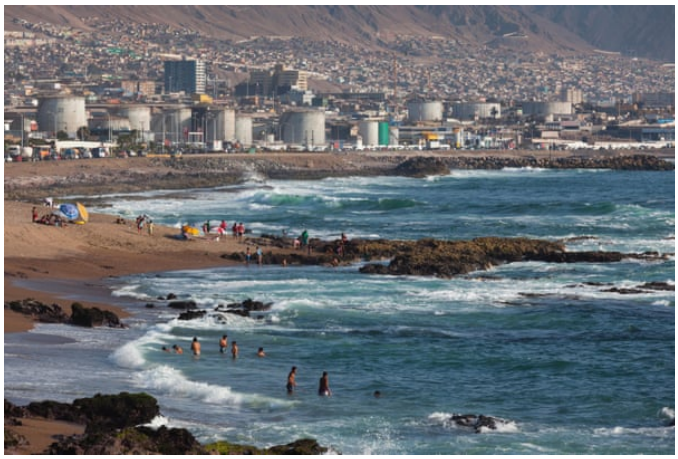
“Since desalination began a few years back I’ve hardly had any luck,” he says. “The salt they pump back into the sea kills everything, and there’s just a thick layer of sludge on the sea bed now.”

The salt they pump back into the sea kills everything

Muñoz lives and dives in La Chimba, a dilapidated seaside suburb of Antofagasta, a city of 360,000 people on Chile’s arid northern plains and the largest settlement in the Atacama Desert – the driest place on Earth.

Desalination is a common solution to water scarcity around the world, and is used extensively in the Mediterranean and the Middle

East. The UK's first plant was opened in London in 2010.



Antofagasta viewed from La Chimba beachfront. Photograph: Danita Delimont/Alamy

In 2003, Chile's first desalination plant began operating in Muñoz's neighbourhood, pumping 150 litres of drinking water a second towards Antofagasta to relieve the city of its dire need for fresh water.

The facility has steadily increased its output, and is now the largest drinking water desalination plant in Latin America, operating at 1,056 litres per second. It provides 82.5% of Antofagasta's potable water, with the remainder fed by the city's scarce surface water reserves.

Across the region of Antofagasta, accounting for 600,000 people, 56.3% of the drinking water consumed is now desalinised sea water.

The constant struggle for water

Finding water in the desert has never been easy.

"Across Antofagasta's history, the struggle for access to water is the one constant," says 92-year-old historian Floreal Recabarren at a city centre café, rapping his cane impatiently on the cobbles.

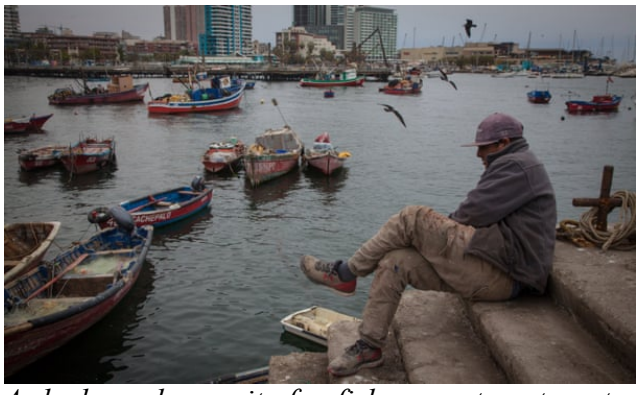
Born in 1927, Recabarren served as the city's mayor across two stints in the 1960s and 1990s. He remembers how Antofagasta endured an entire year without water in the 1950s, during which chlorinated water would be delivered sporadically in trucks. Many older houses in the city's suburbs still have the large riveted water tanks on their rooftops that would receive the supply.

The region itself has long served as the industrial powerhouse for the Chilean economy, and the area is dotted with deep mining pits carved into the desert. The Escondida mine near the city is the largest-output copper mine in the world.

With mining processes requiring large quantities of water, Antofagasta's watersheds were steadily drained, and in the year 2000 it was declared that the Loa River in the north of the region – its main surface water source – had run dry. Eventually, industrial desalination technology arrived in the area, with mining companies setting up their own facilities, and pumping effluent back into the sea.

"The high concentration of arsenic in the soil used to be our biggest problem as it seeped into the water," says Recabarren, pulling up his sleeve to reveal white blotches on his skin indicating heavy metal poisoning.

"A woman arrived from Spain in the 1950s and died not long after. The autopsy concluded that she had been poisoned – which was quite the scandal – but it turned out to just be the arsenic," he recalls. "We don't have that problem anymore; the water quality is very good now because of desalination."



A dock worker waits for fishermen to return to Antofagasta harbour. Photograph: Glenn Arcos

Despite the clear necessity for a reliable water source, concerns over the ecological impacts of

desalination observed by Muñoz have followed quickly behind the implementation of the technology.

A suction tower on the sea floor sitting just over 300m from the shore and 20m below the surface draws water slowly into a pipeline, pumping it towards the plant. Its operators say that the intake speed is too low to be hazardous to marine life.

Large tanks containing layers of anthracite and sand first remove larger particles, before the water is forced through tightly rolled semi-permeable membranes under high pressure contained within cylinders, separating the filtered water into thick brine and purified water – which is remineralised with calcium compounds before being pumped towards Antofagasta.

When you dive around the outlet it is totally white – it looks like it has been snowing

It takes one litre of sea water about 40 minutes to be sucked from the sea bed, processed by the plant and pumped towards Antofagasta as potable water. The highly concentrated waste brine is pumped back into the sea via diffusers 200m from the shore, which Muñoz says are killing wildlife.

"When you dive around the outlet it is totally white – it looks like it has been snowing," says Rodrigo Orrego, a marine biologist at the University of Antofagasta who has been conducting fieldwork around the effluent pipes. "Some species of anemone and clam disappear the closer you get to the discharge point, whereas some others start to appear."

However, accounts differ as to the environmental impact of the concentrated salt solution.

"There are lots of myths and misinformation surrounding desalination," says Mario Corvalán at the headquarters of Aguas Antofagasta, the private enterprise that operates the plant at La Chimba and holds a monopoly on the region's sanitary services until 2033.

"In fact, our studies have shown that the effluent we pump back into the sea contains such a high concentration of nutrients that life actually thrives around the outlet," adds Corvalán.

Victor Gutiérrez, head of desalination projects at Aguas Antofagasta. Photograph: Glenn Arcos

"We get people call us up to say that they've turned on the tap and now their house smells like the sea, but that can't be our fault," says engineer Carlos Jorquera smiling, as he inspects an array of valves at the plant.

"The water that leaves the plant contains imperceptible quantities of impurities besides what is added in the remineralisation process," he explains.

However, concerns remain as to the long-term viability of relying so heavily on desalination.

"The process isn't regulated whatsoever," says Orrego. "There is no specific legislation for desalination in Chile, and that's our greatest problem."

The process technically falls under marine rather than land law, meaning that the country's neoliberal dictatorship-era water code – which commodifies and privatises water use – does not apply to desalinised water.

The desalination process also requires huge quantities of energy. For every litre of drinking water produced at La Chimba, 69% of the cost incurred is to power the plant, compared to just 9% for conventional water treatment procedures.

[A city suffocating: most polluted city in Americas struggles to change]

With Chile's water crisis set to intensify over the coming years in the central and northern parts of the country, it is likely that desalination will form an important part of national plans to mitigate issues related to scarcity.

As such, local politicians have been keen to redirect the conversation towards cleaning up Chile's energy mix, with the country committed to becoming carbon neutral by 2030.

However, Muñoz can ill afford to look too far into the future with his livelihood under immediate threat. Fishing zones are strictly regulated, meaning that he cannot simply move along the coast in search of new clusters of shellfish.

"They've cut my earnings in half by contaminating the area," he says. "There's nothing I can do – somebody needs to help us, because they never listen to the fishermen."

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