

# Historian unearths origins of Mexico's water crisis

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An advertisement claims that "rain or no rain, farmer friend, your crops are safe with a proper Worthington pump." Credit: Mikael Wolfe

A historic three-year drought has left California bone dry. But the state, along with much of the Southwest, is not alone in its water crisis. Mexico, too, is facing a severe water shortage, and Stanford scholar Mikael Wolfe says the Mexican version was decades in the making, and probably preventable.

Wolfe, an assistant professor of Latin American and environmental history, has brought to light the shady story of [groundwater](#) pumping in 20th-century Mexico. As Mexico's water problem is now described as a matter of national security, Wolfe's research is especially timely. He found that today's groundwater crisis can be traced back to the 1920s, in the aftermath of the Mexican Revolution (1910-20), much earlier than most water scholars and policymakers have assumed. His research draws heavily from the Historical Water Archive in Mexico City. The only collection of its kind in Latin America, the archive contains tens of thousands of documents produced by hydraulic engineers, landowners and peasants, from the 19th century to the present.

"Although the Revolution happened a century ago," Wolfe says, "decisions about groundwater extraction continue to impact water quality and supply issues in Mexico today."

Even more surprising, Wolfe found evidence that the Mexican government was warned about the overuse of groundwater resources in the 1930s. Mexican agriculturalists – by far the biggest groundwater users – were paving the way toward environmental disaster.

Within a decade after the Revolution, Mexico already showed signs of groundwater shortage. As Wolfe's research demonstrates, the engineering elite was responsible for building canal networks, dam projects and groundwater pumps to distribute and maximize access to water. Wolfe found a confidential 1944 U.S. consular report predicting that ecological "disaster lies ahead" for Mexico – despite, or perhaps

because of, the burgeoning water infrastructure.

Unfortunately, the insatiable demand for water, fueled by developmental imperatives, "persistently trumped concerns for conservation," Wolfe said, adding, "it's a pattern that persists to this day."

In his forthcoming book, *Watering the Revolution: An Environmental and Technological History of Agrarian Reform in La Laguna, Mexico*, Wolfe reveals how conflicts of interest weakened the case for early water conservation and allowed the lucrative demand for water to carry the day.

Wolfe describes his research as the first of its kind to integrate environmental and technological history as "keys to understanding how and why the Mexican Revolution's developmental cause par excellence – agrarian reform – became unsustainable over the 75 years it was implemented in its most emblematic region."

## **Water apartheid**

In the 1930s, Mexican President Lázaro Cárdenas implemented a radical agrarian reform that expropriated many haciendas, or landed estates. The reformist politician created thousands of ejidos, or state-granted communal farms, in their place, which today hold nearly half of Mexico's arable land.



Credit: AI-generated image ([disclaimer](#))

Wolfe's research centers on "La Laguna," a region of arid north-central Mexico that proportionately received the most ejidos from Cárdenas. With its prosperous cotton, and later dairy, industries, the Laguna's demand for water to maintain its water-intensive commercial agriculture came at a high price.

In 1930, geohydrologist Paul Waitz, a naturalized Mexican originally from Austria, expressed concern about unregulated pumping in the Laguna during the 1920s. He noticed a decline of the water table caused by deep pumping. In 1937, he proposed government regulation of pumping along with chemical analysis of groundwater, since deeper extraction could enable noxious substances – including arsenic – to mix with the water.

From a revolutionary perspective, Wolfe said, the ejido system genuinely tried to improve the social conditions of poor rural families. Mexican engineers (técnicos), Wolfe explains, "warned of the dangers of aquifer depletion, yet some técnicos continued to profit from business opportunities dependent on profligate groundwater pumping."

Aware of this reality, Mexican engineers obtained federal jurisdiction over groundwater under President Manuel Ávila Camacho in 1945. Restrictions were implemented in 1947, when the government imposed pumping prohibitions called vedas in overpumped zones.

But with Mexico's 1940s economy flourishing, few in power tried to curtail pumping or had the patience to investigate ecologically responsible alternatives. By the mid-20th century, Wolfe observes, the estimated national supply of groundwater could not keep pace with rapidly growing demand as Mexico's population boomed. And with lots of money to be made, the water problem was left unresolved.

By the 1970s, the Revolution's program for social justice tragically turned into what Wolfe calls "water apartheid" in the Laguna. "In other words," he said, "the region's commercial agricultural economy created a big disparity between so-called 'small' private landholders and ejidos regarding access to water."

When water became scarcer during frequent droughts, the wealthier private landholders could afford far more motorized groundwater pumps than the ejido farmers. When wells dried up and pumping-related problems could no longer be ignored, the Laguna reached a state of groundwater crisis.

As a result, many water-deprived citizens gave up farming for more secure livelihoods. Many, as is still the case today, migrated to the cities and to the United States in order to do so.

## **'Mexicanized' water**

Wolfe identifies one key player in the conflict of interest as Marte R. Gómez, the secretary of agriculture from 1940 to 1946. A self-styled agrarian revolutionary and professional agronomist, Gómez used his technical knowledge to modernize Mexican agriculture.

"Through his story," Wolfe said, "we can better understand the contradictory historical dynamics of Mexico's groundwater crisis, as Gómez combined a kind of 'revolutionary' technical expertise and business acumen."

In documents Wolfe uncovered, Gómez's subordinates cautioned him about the agriculturally caused depletion and contamination in the Laguna. But Gómez, Wolfe says, seems not to have heeded the engineers' warnings very seriously, as the regulations he helped to pass were poorly enforced.

Moreover, water conservation seemed to conflict with Gómez's vision of a new Mexico. He supported the ISI (Import Substitution Industrialization), a post-revolutionary industrial policy aimed to minimize Mexico's dependency on foreign economies. In Gómez's view, a truly successful Mexican economy must master domestic production to become "Mexicanized."

Wolfe's study documents how Gómez found inspiration for Mexicanization from successful capitalists in the United States. With his political connections, he was able to persuade both the Worthington Pump and Machinery Corp. and the Mexican government to found a Mexican subsidiary. This U.S.-based manufacturer, named after the American engineer Henry R. Worthington, fashioned high-quality [water](#) pumps that worked efficiently, required less manual labor and could pump deeper.



Wolfe stresses the role of propaganda and deceptive advertising in disseminating the use of Worthington pumps. For example, a 1961 newspaper advertisement for the product made the promise that "rain or no rain, farmer friend, your crops are safe with a proper Worthington pump."

In Wolfe's analysis, advertising the pump as a drought-defying, ever-flowing device "underscored the pumps' utility while masking the ecological vulnerability of Mexico's groundwater resources which government vedas tried to address."

The tragic irony of Mexico's groundwater lies in the awareness of and failure to address overconsumption. Wolfe stresses that this is a global problem not unique to Mexico. By telling this story, he hopes to "show us how we can, and must, learn from the past."

Provided by Stanford University

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