

The Crisis: Rising Thirst, Shrinking Supply

In 2018 Morocco [woke up](#) to the reality that its cities faced severe risks of ‘day zero’ water crises. Despite brief rainfalls that held reservoir storage up to [58.8 percent](#) of dam capacity, the [World Resources Institute](#) declared that Morocco might still face a water shortage in the coming summer months and beyond.



In the country’s driest region, the city of Marrakesh (population: 1 million), has escalated demand for water from dams that have already shrunk by 63 percent. In addition to further runoff and storage reductions due to climate change, the World Bank projects Morocco’s urban water demand will escalate by 60 to 100 percent by 2030. The government has begun crafting a [national water plan](#) through 2050, but thirsty cities will struggle to reconcile the growing supply/demand imbalance. Secretary of state for water Charafat Afailal says scarcity has become a threat to the kingdom’s national stability, unless a new urban demand response solution emerges, fast.



“For Marrakesh, AquaShares offers a very good solution that raises awareness among consumers about the real value of water.”

– *Hssaine Oudnoun,*
RADEEMA water agency,
Marrakesh, Morocco



Economic Paradox: High Cost of Cheap Water

Every crisis holds opportunity. For Morocco, potential lies in economics. Cities like Marrakesh face the end of *free or cheap* water. For years, the country’s officials prioritized a supply-side policy of physical water production, ensuring that universal access to a potable resource is universally affordable through below-cost rates. These extremely popular subsidies and policies made sense – only as long as water was plentiful.

That’s no longer true. As ample and easily accessible surface water supplies have grown scarce, the country has resorted to increasingly complex and energy-intensive technologies. New, unconventional supplies include deep aquifer mining, wastewater treatment and reuse, and seawater desalination.

These sources escalated the marginal costs of clean water provision, often above \$1.50-\$3.00 per cubic meter, even while most end users were still charged 1/10th to 1/6th of that amount in consumer tariffs. This widening gap between cost and price opened a potential new market path toward resilience.

For AquaShares, and its partners, the gap raised an exciting question about reversing incentives, a way to replace the punitive ‘stick’ for the ‘carrot’ of incentives: What if, instead of punishing thirsty Moroccans for taking too much, the government rewarded families and firms for using much *less*?



“The government itself could be one of the primary purchasers of AquaShares, as it is more cost-effective to buy water saving credits, rather than build a desalination plant.”

– *Dr. Zachary Burt, Columbia University School of Public Health*



Crowd-Source: Ancient System, Modern Platform

To test this vision, AquaShares had in California built an online system to buy back water savings from users. Its platform combines new technology with centuries-old lessons from traditional self-organizing water systems – like Kalahari *Ixaro*, Arabian *aflaj*, Persian *qanat*, and Moroccan *khettara*. These ancient forms of governance link human self-interest with equitable and efficient social outcomes.

Similarly, AquaShares’ adaptive, bottom-up approach customizes allocation to each local water system, empowering metered accounts (including the utility itself) to ‘earn, own and trade the water you save.’ Now, just as Uber or Airbnb platforms empower drivers or residents to lease access to spare space in their cars or homes to relieve scarcity in transport and lodging, so AquaShares enables the city to ‘crowd-source’ space water saved by metered accounts across the service area to relieve urban thirst. Trading aligns the interests of supply-side providers with demand-side users through voluntary incentives, building the utility’s strength and resilience.

The Intervention: Unlocking a New Water Supply

Under a grant from the [Belfer Center’s Middle East Initiative](#), and working in partnership with researchers from Harvard University, Columbia University, and Global Nexus, AquaShares helped the Marrakesh utility concessionaire, RADEEMA, to

design and operate the MENA region’s first urban water trading program.

Participation among a randomly selected but representative microcosm of customers was voluntary. To maximize savings potential, allocations are established based on past use. Using AquaShares technology, participants earned ‘water savings credits’ when they use less water than their fair share and can then sell credits back to the utility for profit. The utility sets a price for these credits at ~50% of their cost to produce, treat and deliver new water, earning a healthy return on investment.

The pilot retained high interest and customer satisfaction from an astonishing half of the 514 customers who enrolled. To ensure and define the U.N. human right to water, we set a minimum limit of how much they can save or earn. Outreach and information were conveyed through regular text (SMS) messages, alerting each user to their usage and gains, and asking if they wished to benefit financially. Morocco is now weighing how to scale up.



“AquaShares offers an elegant and equitable approach to urban water stress in Morocco.”

– *Yasser Biaz, Policy Center for the New South, King Mohammed IV Polytechnic University, Morocco*





“AquaShares takes an adaptive approach to designing water conservation markets in a way that led to ultimate success. I have worked with and strongly recommend their creative services to advance the cause of water security across the thirsty Arab world, and beyond.”

— *Hynd Bouhia, Chairman and CEO, Global Nexus, Rabat, Morocco*



The Outcome: Eightfold Increase in Savings

RADEEMA, Harvard and AquaShares overcame conceptual, logistical, technical, legal and financial challenges in a way that led to ultimate success. A preliminary review reports that even with social equity constraints, participants still saved eight times the amount of water as a control group, with extremely low upfront investment, and in so doing reduced demand for water and increased profits for the government and utility.

AquaShares took a deliberative and iterative approach to designing a water conservation market that adapted a novel vision to local conditions and institutional realities. It adjusted the software platform from hourly ‘smart’ or advanced metering infrastructure (AMI) to monthly readings; from an existing online web portal to a series of text messages; while translating materials from English into French and Arabic. For a country with widespread below-cost sales, AquaShares offered an affordable alternative for all, forever.



“In a country where water is delivered below cost, it [Marrakesh pilot] therefore established a system that saves both water and money. We are sharing the lessons learned with water utilities throughout the North Africa/Middle East region. And we are always grateful for the contribution of AquaShares.”

— *Susan Leal, Harvard University, School of Engineering and Applied Sciences
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Crowd-Sourced Supply: Access to Affordable Water

Formerly resistant stakeholders now see meters in a positive light. They are motivated to find and fix leaks, reduce waste, and invest in efficient toilets, taps, and rainwater harvesting that lower their water footprint. In Marrakesh, AquaShares transactions record how some residents and businesses slashed usage 1,000 liters per meter week, selling their savings at a value above the highest retail rate, yet half the utility’s cost.

That outcomes-driven price may be lower not only than desalination but also the energy costs to pump the same amount. It’s also less than costs of administering top-down conservation programs, which can be slow, clunky, and cumbersome to implement. And the voluntary online platform meets private needs, planning and investing to restore public trust.

Rather than escalate the ‘us versus them’ dichotomy that makes districts unilaterally ration, restrict, and raise rates on others (leading to a volatile death spiral of pain or lost revenues), AquaShares’ incentives encourage gradual transparent negotiations where parties plan from a secure baseline, then innovate in a competitive race to conserve.