

# FEATURE

## Drought Management Lessons from Around the Globe

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Australia's Millennium Drought, perhaps the worst since European settlement, had profound impacts on the environment, urban centers, and agricultural sectors such as this drought-struck paddock in the Mallee region of Victoria. But crisis also breeds collaboration and innovation. Source: Adobe Stock

### **DROUGHT IS NOT UNIQUE TO THE AMERICAN WEST.**

It is experienced worldwide, but the impacts and responses vary significantly across countries and continents. Accordingly, the [California Water Commission](#) turned to leading experts in countries that have experienced major drought to better understand what management approaches lay on the table for California.

These conversations shed light on drought response in three specific countries—Australia, Israel, and Chile—and yielded relevant, valuable lessons about managing drought conditions. Importantly, these lessons also revealed that each country's unique context—including the physical geography and hydrology, and political and social structures—largely determine what is possible. The transferability of drought lessons and responses is based on similarities in context.

### **Global Phenomenon, Local Lessons**

Because climate change is a global phenomenon,

droughts are intensifying and touching areas that have not historically been drought prone. For instance, drought in the Mississippi Basin has shrank flows in the mighty Mississippi River. In turn, shipping barges were grounded and saltwater inflows from the Gulf of Mexico impacted local drinking water supplies.

In Europe, drought conditions are likely the worst seen in 500 years. Major rivers in Italy and Germany are drying up; France has experienced drought-induced seawater intrusion, and portions of Hungary and Romania are facing concerning levels of soil moisture loss and plant stress. In Spain, reservoirs are dwindling, revealing long-submerged towns and churches, and dry conditions are leading to formidable wildfires.

In the Horn of Africa, drought led to a humanitarian crisis of looming famine. Drought in China caused challenges for both the agricultural industry and their electric grid—leading to international economic

ramifications. Recent floods in Pakistan have killed over 1,100 people and revealed the other side of the “extreme weather” coin of climate change: soil compaction caused by drought means that, as the wets get wetter, the ground has less capacity to absorb flood conditions.

While these cases provide examples of the physical and economic ramifications of water shortage, they are certainly not the only such instances. There are countless other drought impacts across the globe. There is no single “template” approach to drought management. Still, the exchange of strategies across barriers of nationality and language is crucial. Conversations with international decision makers and experts from Israel, Australia, and Chile provided the [California Water Commission](#) insight into the ways that other countries have reacted to extended drought conditions—through both supply and demand management efforts—demonstrating how a portfolio approach is necessary to address drought impacts effectively. These conversations highlighted an important theme: drought crisis can be a catalyst for spurring meaningful and lasting change.

#### **Collaborative Basin Management in Australia**

Australia’s Millennium Drought started with low rainfall in 1996 and 1997, was at its worst in 2006 and 2007, and lasted through the end of the decade. The duration and magnitude of the drought was much worse than urban areas had anticipated. This led to a series of responses. Curtailments were used as a stopgap while other measures were enacted: demand management in urban areas, development of alternative water supply through water recycling and reuse and construction of desalination plants, and new conveyance pipelines to facilitate water transfers between catchments, complementing Australia’s robust water market. To augment public understanding and spur behavior change, the government created clear triggers for public water use restrictions based on drought impacts rather than precipitation levels.

The Millennium Drought was most severe in Southern Australia, particularly in the Murray-Darling Basin, Australia’s primary agricultural region. The Murray-Darling Basin faced serious environmental decline, which prompted the passage of Water Act 2007, establishing an independent entity, the Murray-Darling Basin Authority. This authority was tasked with planning and decision-making at the basin scale. The basin plan aims to sustainably manage the Murray-Darling Basin’s water resources while supporting farming and other industries.

The severity of the situation required that national and state governments, as well as relevant industries and communities, come together to address impacts of the Millennium Drought on the Murray-Darling Basin. No one entity could solve the drought issues alone. Through collaborative basin management, water is managed adaptively, allowing for the flexibility to respond to a dynamic system. Coming out of the Millennium Drought, entities tasked with managing the Murray-Darling Basin have prioritized securing environmental water entitlements

to maintain ecological integrity.

Holding the environment as an equal user of water has improved drought and broader climate change resilience for the region. Planning prior to drought conditions has improved drought resilience of native species and reduced conflicts. Strong partnerships and planning at multiple spatial scales have proven vital to an integrated water management approach.

#### **Innovation in Israel**

Israel is an arid country. Naturally water-constrained and with limited access to freshwater, it suffers from periodic drought. Israel’s proactive water management has secured its water supplies in the face of significant population growth, allowing the country to weather droughts of varying lengths. The country has made gradual shifts in both demand and supply management that have provided it water security, while at the same time utilizing crisis moments to make less palatable changes in water management, such as charging all consumers the full cost of water.

A key component of Israel’s streamlined water management is the [Israeli Water Authority](#). This agency centrally manages and controls all water in the country for the benefit of all sectors and people. This allows for integrated decision-making.

Recognizing the natural water limitations within the country, Israel has long emphasized the value of water, embedding this priority in its national culture and promoting water awareness in its constituencies. Israel has invested in water monitoring to better understand its natural water sources and how water is being used within the country.

With the backing of sound data, Israel began to implement water efficiency measures in both the urban and agricultural sector. In the agricultural sector, the government promoted investments in innovative technologies to spur water efficiency and has encouraged farmers to partner with water technology start-ups to push the limits of innovation further. This led to widespread adoption of drip irrigation and water-wise crop selection and breeding.

In addition, Israel has been at the forefront of water recycling and desalination. Over 80% of wastewater in Israel is reclaimed and reused for agriculture. This reduces agricultural demand for groundwater which, in turn, can be used for human consumption. The water conveyance system includes a separate system for moving adequate-quality recycled water to agricultural regions. Since the 1990s, Israel has advanced desalination as an integral component of its water supply system. Currently, the country has five operating desalination plants with more under construction. Israel has prioritized food security and ensures that clean water is affordable and accessible for all. Historically, Israel has neglected the flows and ecology of its rivers and streams; recent efforts have elevated environmental protection to address the health of rivers and watersheds in a holistic manner.



The megadrought in South America—now in its 13th year—has pressed Chile’s privatized water market to its limit and raises serious concerns regarding equity, especially in rural areas where little water is available for domestic use. Recent constitutional reform efforts failed to establish water as a human right in Chile . Source: Adobe Stock

### **Policy Reform Efforts in Chile**

Currently in a 13-year megadrought, Chile is facing major water security challenges and uncertainties. Their existing institutional framework involves a privatized water market and rising social concerns over equity in the face of water scarcity. Although water is considered a public good in Chile, it is managed by private utilities that are seen as exploitative—particularly in rural areas, which lack water for domestic use.

A recent water law, passed in 2022, prioritized water distribution for human consumption and ecological purposes and required basin level management. However, the implementation of the new water law is yet to be determined. A recently proposed and ultimately rejected constitutional reform sought to modernize water governance and declare water as an inalienable human right. The rejection of this reform shows how difficult overhauling existing governance systems can be and underlines the necessity of taking swift action at the right time.

### **A Hotter, Drier American West**

In each of the case studies above, drought-prone countries were able to utilize drought crises to advance major water management improvements through

planning, governance, pricing, and policy reform. Australia and Israel demonstrate the power of a portfolio approach, which can deliver whole-system solutions. These countries have shown success by starting with the easiest solutions that will give the biggest return on investment. Ensuring good governance and sound planning, shaping cultural views of water, and investing in innovative technology should not be underestimated as key considerations for drought management and response. Combining the methods and lessons learned from international cases can serve the American West as it seeks to endure periodic droughts—while also adapting to the hotter and drier conditions caused by climate change. ■

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