Climate Adaptation: A Warning from Australia

The death of Bottle Bend lagoon, Murray River: mismanagement and climate change is contributing to dessication, floodplain forest death, extreme salinity an

"In its dryness, Australia suggests the planet's future, as the vast human population and the demands of its industries intensify competition for an unchanging quantity of freshwater; in water terms, Australia is a warning…" *Jacques Leslie*

Every quarter the Murray-Darling Basin Authority, which oversees management of the river catchment that covers a seventh of Australia, releases a depressing document: the "Drought Update". This April's Update continued the litany of bad news on the River Murray since this 'drought' commenced in 1997: record low river inflows in the last quarter, water in surface storage reduced to 11 percent of capacity, and the bunded-off lakes on the lower river are now at a record -0.95 m below sea level (a government contingency plan may see the lakes flooded with sea water later this year). Agricultural production is in drastic decline as an ecological catastrophe unfolds. Tens of thousands of hectares of floodplain forests die, fish and water birds' breeding decline, salinity levels soar in lakes and wetlands and blue-green algal blooms infest hundreds of kilometres of water ways.

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At every level of society choices are being made to adapt to drier conditions. I live in the catchment of the River Murray in Canberra, where the garden-loving citizens have lived under water restrictions since 2002. One of my neighbours has replaced his lawn with plastic grass, but culturally I cannot abide this 'hard' solution. On the other side, the residents fill water storages around their exotic trees when they are allowed, but this will fail if the local government further restricts water use. I have opted for a garden with drought tolerant indigenous plants that require no additional watering, but if a climate threshold is crossed it may become too dry for even this hardy local flora to survive. This local example highlights that there are often many alternatives for adjusting to climate variability and change, but they have different implications and risks.

"Waiting for disaster to strike is too late to adapt."

Avoiding mal-adaptation in the Murray-Darling

In 2008 the Australian Government concluded: "There is growing evidence that lower rainfall and reduced runoff in south-east Australia is linked to climate change." The government commissioned one of the world's most detailed downscale modelling assessments of likely changes in water availability due to both climate change and other risks. The resulting estimates for 2030 in the Basin for average surface water availability range from +7 to -37 percent, with the best (median) estimate for a fall of 12 percent and reduction of 24 percent in end of system flows. The Murray-Darling example illustrates a clear need to accelerate adaptation to climate variability and change now despite the uncertainties as to the likely impacts. If one of the world's best resourced downscale modeling assessments produces results on water availability in a range as imprecise as +7 to -37 percent, then our societies clearly need to assess risks and take considered actions now without more quantitative forecasts.

But adaptation and sectoral policy measures must consider the whole system or risk

Photo: Murray Wetlands Working Group

d formation of sulphuric acid.

detrimental "mal-adaptation". For instance, past government incentives for more farm water storage and reticulation (rainwater and irrigation tail water harvesting) have reduced inflows, as have policies to greatly expand forest plantations.

Water management largely represents adaptation by our societies to climatic and hydrological variability. At the recent World Water Forum it was suggested that climate change adaptation requires a lot more water storage. I am pleased that no-one has seriously proposed new dams in the Murray-Darling Basin during this 'drought'. After all, it would be pointless building a dam when there is no longer the rain available to fill it. There have been some mal-adaptive decisions, however, such as the interbasin transfer pipeline being built to supply Melbourne from one of the River Murray's tributaries that is forecast to suffer most severely from reduced inflows. Although slower than desired, the Australian governments have instead focused on many largely sensible adaptations, such as buying water rights from farmers, water efficiency measures, improved groundwater management, and better targeting of freshwater habitats to receive environmental flows.

Mending the water and energy disconnect

Both the 2008 Stockholm World Water Week and the third WWDR concluded that "The main impacts of climate change on humans and the environment occur through water." Yet, perilous disconnects between the energy and water sectors persist. The energy sector appears to regard water as a cheap input that can be accessed or bought at will. For instance, Australia's government has a policy of supporting carbon capture and storage but has not thought of where these plants would access the large volumes of cooling water they would require. Similarly, with the growth in intermittent renewable energy generation from wind and solar, the retrofitting of hydroelectric schemes for pumped-storage operations has been proposed without assessing implications for the environment and downstream users. Expansion of biofuel production is also being promoted.

"The water sector needs to be prominent in the climate change mitigation debate."

Australia is not unique. In recent years many governments including those of the European Union, Brazil, China and India – among others – have opted in their climate change plans for thirsty energy technologies without considering where to source reliable supplies of water.

The water sector often considers that climate change may be a slower and less severe threat to water security compared to increases in demand from agriculture and growing populations. But climate change, as stressed in the third WWDR, will make achieving solutions more challenging and pressing. These disconnects need to be addressed in the lead up to the COP-15 this December.

Case studies in China, India, Tanzania, Brazil, Mexico and the lower Danube have shown that the most successful reforms in water management are often triggered by a disaster, like a large flood or drought, or severe water pollution. These societies have implemented measures to restore riparian habitats and floodplains to better manage floods, use water more efficiently, change livelihood practices to reduce pollution, and agree on environmental flows. The different societal responses all shared in common ways to implement no and low regret measures, diversify livelihoods, work with nature, and strengthen local institutions. But waiting for disaster to strike is too late to adapt.

The primary barriers to better adaptation are not technical: societal capacities, institutions and governance must improve. Climate mitigation and adaptation policies are linked in their impact on water resources. The water sector needs to be prominent in the climate change mitigation debate to ensure that that sectoral and government decisions on carbon sequestration and energy production truly consider the implications for water security.

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Photo: S&C Grundy

Unexpected impacts of climate change include freshwater tortoises dying from encrustations of invading marine worms. At right, lower Murray lakes and Primary School children freeing tortoises from the encrustations.

Further Reading

2008 World Water Week synthesis report: Progress and prospects on water – for a clean and healthy world with special focus on sanitation. http://www.worldwaterweek.org/documents/Resources/Synthesis/Synthesis_full_version_08.pdf

Leslie, Jacques 2005, Deep water: the epic struggle over dams, displaced people, and the environment. Farrar, Straus and Giroux, New York.