Is Water Weird or Just a Common Commodity?

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Water is H_2O, hydrogen two parts, oxygen one, but there is also a third thing, that makes it water, and nobody knows what that is.

- D. H. Lawrence, Pansies, 1929

Why is water different? What is that "third thing" that fascinates poets, sparks heated political debate, and exempts users from normal rules of economics amid claims that it's "too precious to price"? Is it all just superstition and ancient history? Would we be better off ditching water's baffling array of special ownership types, subsidies, and restrictions, and treating it like an ordinary commodity? These are some of the issues addressed in our six feature stories.

Water *is* special. All known life depends on water-based biological processes. Chemically, water is the "ideal solvent," dissolving to some extent a staggering array of minerals, organic compounds, and virtually everything it touches. Major religions even use water to ritualistically wash away moral impurities. It possesses unique physical properties, too. Water transmits, reflects, refracts, *and* absorbs light. It's less dense as a solid than a liquid, expanding when it freezes with enough force to split rock, and blanketing polar seas with ice sheets.

Only water exists on earth in all three states - solid, liquid, and gas. Evaporation, condensation, and gravity drive vast quantities of water through the hydrologic cycle. It is incredibly abundant, covering approximately 70 percent of the earth's surface to an average depth of 12,700 feet. Even "dry" land receives on average around 34 inches of precipitation per year. All but the driest deserts receive at least 4 inches – equivalent to nearly a million pounds per acre.

Water is literally more common than dirt, and dropped onto our heads for free. This is fortunate, because we use it in prodigious quantities. Producing a pound of copper takes 150 pounds of water; a pound of irrigated cotton consumes four tons; generating a megawatt-hour of thermal electric power in the Southwest consumes two to four tons. Altogether, irrigated agriculture, power generation and mining use over 80 percent of the water in the United States.

From this perspective, water appears to be a commodity, and our market economy relies on Adam Smith's "invisible hand" to allocate even essential commodities like food and shelter. Our legal system defines and protects property rights, and sets rules whereby property can be bought and sold. Those "public goods" that markets don't efficiently produce and allocate are generally provided by governments. But the law, economics, and politics of water are decidedly different. Water is not consistently treated as either a market commodity or a public good. In this issue, Larry MacDonnell (page 16) explores how this has changed over time, and makes a modest proposal for determining when water should be treated as a commodity, and when it merits special treatment.

Many legal systems recognize a right to use water, but not own it. Historically, in the humid eastern United States, uses included floating a boat, powering a mill, fishing, and disposing of waste, with access a critical issue and congestion a concern. These essentially nonconsumptive uses resulted in less competition, a lesser role for markets, and a greater role for government. In contrast, mining and irrigated agriculture in the semi-arid West demanded diversions and consumptive uses, spurring development of different laws and customs. Ownership of water still resided in the state, so wasting it, contaminating it, or not using it had legal consequences.

Legal rights are often tied to a particular use (such as mineral extraction) or to a piece of land where a particular use, often crop irrigation, occurs. Often, the right to use water is not strictly quantified, but rather is expressed in terms of meeting a need. Irrigation districts may charge a flat annual fee, and in many other countries, including semi-arid Italy, Portugal, and Spain, farmers do not pay for the amount of water used to irrigate their fields. Even today, municipal water in many U.S. cities is unmetered.

Because water rights are based on historical uses, moving water to new uses can be difficult, and can complicate creating markets. This is true even for new nonconsumptive uses, such as supporting recreational water activities or ensuring sufficient streamflow for continued ecosystem diversity. David Brookshire and colleagues (page 14) discuss how markets appear and the roles they play in allocating scarce water resources in the Southwest. Andrea Larsen (page 18) gives nuts-and-bolts advice for those contemplating entering a water market.

Both water rights (often referred to as "paper water") and real ("wet") water are needed to actually put water to use. Some years the quantity of wet water exceeds water rights, or at least what is needed for consumptive use. This surplus water can be "banked" or stored, often underground, for subsequent use in dry years or by other parties. Water banks can serve to reallocate water to higher-valued uses in the absence of active water markets, or can enhance the efficiency of existing markets. Woodhouse and Wildeman (page 20) describe how Arizona's nonprofit water bank functions.

For most potential water users, having

paper water and wet water are not enough. Infrastructure to convey, store, treat, and deliver water is critical. Nothing comes close to water in terms of the mass and volume delivered and used. Costs of moving it, particularly uphill, often dominate the economics of water. In fact, when most of us pay for water, we generally are paying for the cost of capture, treatment, and delivery, not for the water itself.

Few areas are as well plumbed as California, where legal restrictions often are more of a barrier to efficient water use than lack of conveyance facilities. Jay Lund (page 24) explains how an economic-engineering model can be used to examine the potential impacts of allowing water markets there to operate in a more flexible environment.

Photo: The Salto Grande Falls, a 60-ft drop, near Guachochi, in the Copper Canyons of Chihuahua, Mexico. ©2004 Rodney James

Minimizing water waste is a laudable goal, and there is more than one definition of "waste." To waste water in the arid West is to not put it to use. But "Use it or lose it" isn't just a legal principal. If stored above ground, water evaporates and dissolved solids concentrate. When stored below ground, it behaves like the fugitive minerals, oil and gas, and may disappear through the forces of gravity, possibly influenced by a cone of depression created by a neighbor's pumping. Texas oilman T. Boone Pickens (page 22) discusses plans to pump "surplus" groundwater from beneath the Texas panhandle and deliver it to a metropolitan area hundreds of miles away. He makes the case that a well-planned project can provide economic and environmental benefits to all parties.