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Water Markets: A New Tool for Securing Urban Water Supplies?

City water planners are finding it increasingly difficult to secure additional water supplies in many water-short regions. Although overall water use in the United States has been relatively stable since the 1980s, urban water demands—driven by population growth and expanding economic production—continue to rise in many cities, outstripping gains in water use efficiency and other demand-management strategies. The ability to acquire new water supplies by purchasing permanent water rights or leasing water on a temporary basis is providing new options for city water planners in some parts of the world, including the western United States. By purchasing or leasing water rights, many cities have been able to avoid or postpone investments in more expensive or complicated water supply options such as long-distance water importation, water reuse, or desalination.

The ability to buy or sell water rights does not exist everywhere, but as water becomes increasingly scarce around the globe, many governments are moving toward water-rights systems that may provide opportunities for water trading in the future—i.e., the establishment of a water market. This article presents a brief overview of the regulatory systems and policies that generally help to facilitate water trading and highlights some of the potential benefits and pitfalls of water markets.

WHAT IS A WATER MARKET?

As with most other markets, a water market involves the sale or purchase of a commodity; in this case, the commodity being traded is the right to use a specified volume of water. This does not mean that the actual water itself is being bought or sold; instead, what is being traded is a right, permit, or entitlement to use a specified volume of water. Those rights to use water are issued by government entities, such as a state government; the government retains ownership of the water, held in the public interest. The right to use water takes on many of the characteristics of a property right, but it is a right to use, not an ownership of, the water.

This is a subtle but important distinction because many critics of water markets erroneously assume that purchased water can be used without restriction, in any way that the purchaser cares to use it, such as by hoarding it, shipping it around the world, or drying up the water source. The government entities issuing

rights to use water will almost always place conditions or restrictions on the use of the water (see the sidebar on page 28), and can revoke a water right if those conditions are violated. This provides governments with the means to protect their citizens or the environment against adverse consequences, such as by prohibiting the export of purchased water out of the basin of origin or limiting how much water can be consumptively used from a water source. In this manner, some portion of the available water can be reserved or allocated for social priorities such as ensuring that every citizen has reasonable access to water for basic needs, supplying schools or hospitals or parks with water, or protecting the ecologic health of freshwater ecosystems.

A water market brings together willing buyers and sellers of water rights. Buyers are looking for the right to use more water, and sellers are willing to trade some of their water rights for monetary compensation. In some places, such as Australia, water markets function much like a stock exchange: willing sellers advertise their water for sale or lease on an Internet bulletin board at a specified price. The parties involved in water trading typically include representatives from city water utilities, energy-generating facilities, irrigation districts or individual farmers, manufacturers, or conservation organizations.

There is no real need or benefit to be gained from the establishment of a water market in many parts of the world where water is still plentiful and users can readily access what they need. In fact, in many places the use of water does not even require a permit or right because there is no need to regulate its use. However, when water is scarce and many individuals or entities are competing for the use of a limited supply, a water market can provide some significant benefits. Before further discussing those benefits as well as some potential pitfalls, a couple of important prerequisites need to be clarified.

Essential prerequisites for water markets. First and most important, the rights to use water must be clearly defined and quantified so that each water user understands how much water he or she is entitled to use. When the volume of the use rights held by each water user is quantified, it creates the possibility of trading—i.e., a water right can be bought, sold, or leased in whole or in part.

Additionally, some type of limit must be placed on the total volume of water that can be extracted from the water source by all users. Without such a limit or cap on water consumption, the water source can eventually be depleted to the extent that the certainty or reliability of all water rights is jeopardized, thereby compromising their value and discouraging trade. When water extraction is capped, a water market can function in a manner akin to cap-and-trade systems.

To illustrate this point, consider the fact that in the United States most states require some type of permit for drilling a groundwater well. Those permits—if they specify how much water each pumper is allowed to extract—might form the basis of a groundwater market in which individual permit holders could sell or lease their groundwater permit. However, if the total volume of groundwater extraction from the source aquifer is not limited or capped and aggregate groundwater pumping exceeds the aquifer's natural recharge rate, the groundwater level will be lowered to the point that it is no longer economically feasible for groundwater users to extract it (consider the Ogallala Aquifer, for example). Their groundwater permits would at that point become essentially useless and without value.

If, on the other hand, the total volume of pumping were to be capped at a level that prevents declines in groundwater levels, all groundwater permits would be secured, and potential buyers of the permits would feel secure in knowing that the volume of water being purchased would continue to be available in the future. Those potential buyers might be new parties coming into the area and seeking to use groundwater, or they may be existing users wanting to expand the volume of their pumping. The buyers are willing to pay other pumpers to sell a portion of or their entire groundwater permit. This situation gives rise to a water market: some parties need water and are willing to pay for it, and other parties are willing to take monetary compensation for using less water.

BENEFITS OF WATER MARKETS

One of the obvious benefits of water markets for city water planners is the fact that they may provide a new source of water supply that can be attractive both in terms of cost and ease of access. For example, in the late 1990s the total volume of water extraction from the Edwards Aquifer in Texas was capped as a result of a lawsuit filed to protect endangered species inhabiting the aquifer and its related springs. Groundwater permits were issued to each user, including the city of San Antonio, which relied on the aquifer as its sole source of water supply at the time. A water market quickly developed and the San Antonio Water System, a public water utility, became the biggest buyer of water rights in the Edwards Aquifer. The city invested heavily in purchasing groundwater rights from farmers in the area because purchasing water rights—combined with an aggressive urban water conservation program to limit water demand—was the most cost-effective means for the city to acquire additional water to enable its growth. Within a decade, the utility had acquired more than 84 million cubic metres (68,000 acre-feet) of water from water-rights purchases and leases, amounting to more than 10% of its water supply. These purchases enabled the city to avoid or delay more expensive supply options such as water importation or desalination.

The San Antonio story highlights yet another benefit of water markets: they can create a powerful stimulus for

Examples of Typical Attributes of a Water Right

Quantity	The amount of water the holder of the water right may withdraw or consumptively use, or the area of land and crops that can be irrigated.
Source	The specific source and location from which the water right is granted.
Timing	Restrictions on the time that the water right applies—i.e., times that the volume may be withdrawn or consumptively used.
Assurance	Some water rights are absolute, meaning their volume is always fulfilled, whereas other rights have variable assurance of supply depending on how much water is available each year.
Type of Use	The specific use for which the water is to be withdrawn or consumptively used (e.g., irrigation, mining).
Duration	The duration for which the holder is entitled to the water right. Some water rights are permanent, whereas other rights are authorized only for a specified period of time.
Transfer	Whether the water right can be sold, transferred to another person or location, or inherited.

Adapted from LeQuesne et al, 2007

water conservation. The farmers using the Edwards Aquifer were allowed to sell up to half of their groundwater permits if they could save water by investing in improved irrigation efficiencies. With the enticement of being able to sell their saved water, hundreds of farmers quickly tightened up their irrigation systems and sold the rights to their water savings. At the same time, the city invested heavily in demand-management strategies. These investments in both urban and agricultural water conservation, along with water trading, enabled San Antonio to grow by 16% from 2000 to 2010 while total aquifer extractions remained flat and within the court-imposed cap.

MANAGING THE PITFALLS

Water markets can generate some undesirable, unintended consequences, however. Governments will need to be proactive in minimizing or avoiding social or environmental impacts. Of particular concern are potential effects on agricultural production and rural communities. One direct effect of trading water rights from agricultural to urban use can be a reduced capacity for food production, with possible consequences for local food prices. Diversion of water away from agriculture can also affect rural employment, which can be particularly undesirable in poorer farm communities. If the farmers selling their water rights are members of a communal water supply system such as an irrigation district that maintains shared water infrastructure, the loss of too many irrigators because of water sales can place a heavy burden on the fewer irrigators that remain, because they must bear the ongoing maintenance costs for the infrastructure. These undesirable effects can be addressed in various ways such as by limiting the rate at which water rights can be traded out of certain agricultural sectors, taxing those transactions to compensate affected parties such as irrigation districts, or providing subsidies to encourage improvements in irrigation efficiency instead of drying up farms entirely.

When undesirable impacts are properly addressed and managed well, the ability to trade water rights can be quite beneficial. In places like the Murray-Darling watershed of Australia, water markets have proved quite useful in enabling water rights to be exchanged among farmers, cities, and environmental interests, using both permanent sales and temporary leases. The benefits have been well documented. Farmers have been able to access additional water when they need it, such as at the end of an irrigation season, or gain a new source of income by selling or leasing their water rights. By buying or leasing water from willing sellers, cities have been able to access additional water supplies in a way that is cost-effective and avoids having to further deplete local water sources. Environmental interests have been able to buy entitlements from water users and leave the water in freshwater ecosystems for ecological benefits.

Anyone interested in learning more about water markets might enjoy reading *Tapping Water Markets* by Terry Anderson et al, RFF Press, 2012; or *Chasing Water: A Guide for Moving from Scarcity to Sustainability* by Brian Richter, Island Press, forthcoming in 2014.

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REFERENCE

LeQuesne, T.; Pegram, G.; & Von Der Heyden, C., 2007. Allocating Scarce Water: A Primer on Water Allocation, Water Rights and Water Markets. World Wildlife Fund For Nature and HSBC Climate Partnership, Surrey, U.K.