SAVING FOR NOT-SO-RAINY DAYS

Market pricing, not water restrictions, is the best way of dealing with shortages, says **Richard Tooth**

Imagine a policy that prevents people from improving their lives, at no cost to others; encourages inefficient use of an essential resource; and gives a handout to every household, but reserves the largest ones for those who consume the most. Does this sound like something we would like to have? Unfortunately, this describes the urban water policy in most Australian cities—which couples water use restrictions with chronic underpricing—a policy that need not exist.

Water restrictions appear to have become part of the way of life in most Australian cities. Given they are so popular, there must be something to be said for them. Unfortunately, there is not. Restrictions are a significant imposition to consumers, preventing households from using more water even if they are willing to pay the full cost—the price at which they can give back to society the full value of the water they use. Restrictions also prevent households from choosing how they allocate water between indoor and outdoor uses. They do not allow you to take shorter showers so you can water your garden more.

These impositions are costly compared to a pricing approach. A recent study estimated the net cost (the deadweight loss in welfare) of water restrictions in Sydney to be about $150 per household per year.[1] As the authors of the study note, this amount is almost half of the average household water bill. There is also the social impact of restricting water use in publicly used areas, and of making people feel guilty when they use water.

Restrictions have forced people to make some unfortunate investments. To overcome restrictions, many households have installed rainwater tanks. These are a relatively expensive means of supplying water in urban settings. The cost of purchasing and installing a typical rainwater tank can be several thousands of dollars, but when full it is likely to store less than $10 worth of water.[2] The comparable cost of water from a typical rainwater tank installation will be over twice that of the current market clearing price of water.[3] The welfare loss per household mentioned above includes an annual net loss for Sydney of $3.4 million due to rainwater tanks being installed to offset water restrictions. This estimate of welfare loss does not include the cost of the space that a rainwater tank takes up.

Despite the current irrationality of installing rainwater tanks, government is encouraging investment in them, via rebates. Since the costs and benefits of rainwater tanks vary by house, homeowners are best placed to make the decision about whether to install a tank. They would have an incentive to make the right decision if water were priced correctly.

How does current policy hold up from a social equity viewpoint? Sadly, the policy of underpricing

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and water restrictions is far worse than a simple alternative. Currently, water is underpriced in most Australian cities. If it wasn't, we wouldn't need restrictions. By underpricing water, we are in effect subsidising every household's water usage. The more you use, the bigger the subsidy you receive. Not surprisingly, higher income households tend to use more, and so get a large subsidy.[4] Ironically, through restrictions, we are also forcing households to use their subsidy on indoor applications. It's great—we all get a discount for having longer showers and doing more laundry.

A simple and much more equitable alternative, if we wanted to continue subsidising water, would be to give each household a fixed subsidy.[5] The subsidy could be set to be sufficient to cover a minimum water allowance.[6] For the same cost, the result would be far more equitable. Furthermore, the subsidy could be more easily targeted towards the disadvantaged. Importantly, small users would be financially better off because by using less they would save more. The result would be more efficient, as all users would have an incentive to implement ways of reducing their water bill. Most importantly, by pricing water properly we would no longer need water restrictions.

We might feel better about the policy of restrictions if it were better for the environment. Unfortunately, the policy completely fails in this regard. The current policy encourages us to use too much water for washing and for flushing waste, but too little for maintaining green spaces. Furthermore, without the benefit of flexible pricing, we need to bring forward the building of additional infrastructure such as desalination plants, which can be environmentally damaging.

What, then, are the arguments for restrictions? Water restrictions make sense for managing the water use of households that are not metered. If usage is not metered, then clearly usage-based pricing can not be used. However, in Australia nearly all metropolitan households are metered, so the argument is not applicable.[7] Another argument for restrictions is that meters are only read infrequently (due to the expense of meter reading), so pricing changes wouldn't work in the short term. This argument also doesn't hold water. With a little creativity, billing and water meter reading arrangements could be organised to create appropriate short-term incentives.

Why the current policy?

With so many downsides to water restrictions, why do we use them to manage urban water consumption? We don't have restrictions on other things we consume. So how did we get into this situation with water? The obvious culprit is the drought. We are told that we have been suffering the worst drought in a hundred years. Some have said that what we are experiencing is a one in one thousand year drought.[8] Certainly, the drought has contributed to our acceptance of restrictions. But does that still mean we should have them?

When there is a supply shock to other things we buy, we tend not to have restrictions. Rather, we leave the market to determine how the scarce resource is allocated. When Cyclone Larry devastated the majority of Australia's banana crop, the price of bananas went up several times, but there were no restrictions on banana consumption.

Some may argue that water is different to bananas. It is an essential good. It is price inelastic: people don't use much less when the price goes up. Its availability is affected by drought. These arguments might be convincing, but all these things are as true of bananas (and of food in general) as they are of water. Food is a necessity, is price inelastic, and its availability is drought-affected.[9] The drought is reducing the supply of Australian-produced grain, fruit, and vegetables. But there are no shortages and no restrictions—the problems are being left to the market to sort out.

Should we have food restrictions as well as water restrictions? With food, they would be more difficult to impose. Maybe the same people who monitor our water usage could monitor how much food we consume. We could even encourage every house to have a vegetable garden. Somehow, this just doesn't sound acceptable. So how did it become acceptable with water?

The management of urban water is different to that of food for two important reasons. Firstly, there is no competitive market to speak of, and secondly, due to the uncertainty of supply, water is very difficult to price. This combination is unfortunate. Also, if there were a competitive market for urban water, then, irrespective of the challenges, suppliers would be informing their customers of the benefits of using more water, rather than restricting the customers' use of water. The lack of competitive markets has meant that

state-owned corporations manage urban water. This by itself is not a major issue. Many state-run monopolies do not impose restrictions on how much we use their services.

The problem of uncertainty

It is the uncertainty of supply that poses the most serious issue in urban water management. In many areas of Australia, rainfall patterns are erratic. Large dams that can store significant quantities of water can be used to counter the effects of uncertainty. The more erratic the rainfall, the bigger the dams we need. As a result, in Australia we have a number of very large dams.

The amount of water going into these catchments is very uncertain. Dam levels can steadily fall (as they have tended to do over the last few years), but can increase rapidly after a deluge. There are fears that uncertainty about rainfall might increase.

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Uncertainty of supply causes a challenge for pricing. What price do you put on all the water sitting in catchments? If there is no risk of running out of water, then the answer is 'not much.' Given there is a real risk of running out, a ten-year-old could tell you that the price of this water should rise if the catchment level falls. Although a number of people have pointed this out over the years, no one has yet been able to implement a water-pricing system that responds to storage levels. [10]

Unfortunately, the pricing is very hard to do. The value of the water in a dam is related to the market price at a point when no more water can be practically extracted from the dam. Not surprisingly, then, a common approach to pricing urban water is to look at the costs of alternatives—at what we might have to pay if our water were sourced from something other than a dam.

The first thing we notice about the price of water is that it is astonishingly cheap. The current price of urban water in most Australian cities, excluding fixed charges, is between $1 and $2 per kilolitre. That is less than 0.2c per litre delivered to our homes. It is hard to think of anything else that we pay to consume that is even close to that cheap.

We have a reasonably good understanding of the costs of alternative sources of supplying water. These include a range of options from the very small (rainwater tanks) to the very large (desalination plants). It has been estimated that the cost of desalination ranges from $1.15 to $3.50 a kilolitre, plus an additional 6 to 18c a kilolitre if we wish to include the costs of greenhouse gas abatement.[11] This is still very cheap, so we might ponder why we would have restrictions if people were prepared to pay this price.

A significant problem with this approach to pricing is that it can take a long time to establish an alternative source. For example, it can take several years to build and connect a desalination plant. If, in the meantime the water in the dam gets low, the price of water in the short term might have to rise to levels well above the costs mentioned above.

How high the price would have to rise in the short term is difficult to judge. We know very little about demand when the price is very high. Due to the inelastic demand and seemingly limited short-term sources of supply we might expect the maximum price to be quite high.[12] There is also the reverse problem. The droughts may ease and it may be another ninety-nine years before we need any additional supply. When the dam is full, a desalination plant may be uneconomic to run. Having built very expensive infrastructure, we might not need it.

The uncertainty of water supply is a headache for governments. The prospect of running out of water is too awful to contemplate. While water, like any other commodity, could be imported, the cost relative to the price we pay today could be immense, and the political fallout a disaster for those responsible for failing to manage the resource and its associated infrastructure effectively.

Without flexible pricing for water, there are limited options to manage demand when dam levels are very low. While higher prices will discourage all uses of water, demand restrictions can only be practically applied (without unthinkable incursions on people's liberties) to outside water use.

So what to do? As we don't have flexible pricing, the only viable alternative is to create additional supply. Desalination plants are attractive because they provide capacity that can be relied upon. In one sense, a desalination plant has the look of a very large and expensive insurance policy. Will desalination plants remove the problem of uncertainty? Unfortunately not. Given the presence of existing catchments, it would be inappropriate to build desalination capacity to meet all of an urban population's needs. The proposed desalination plant for Sydney, for example, could supply about one fifth of the city's current usage when running at its full capacity.[13]

While dam levels were high, there was less of a need to price for uncertainty of supply. The drought has exposed the problems in the current approach. It is time to consider alternatives.

An alternative approach

A competitive market for water could resolve the problem of managing uncertain water supplies. If there were a competitive market, then water suppliers would have an incentive to price appropriately against the risk of running low. As a result, there would be private incentive to invest in new sources of supply, and there would be no need for water restrictions. Competition would also drive retailers to work out the most efficient approach for managing demand given the risk of price changes.

It might seem that catchments are large natural monopolies, and that competitive markets for water derived from them are not obtainable. This is not the case. Precisely because there are large catchments, very competitive markets for urban water can be created. In a paper I wrote with Hugh Sibly, we proposed the approach of creating virtual suppliers by auctioning rights to water that resides in a catchment.[14] These virtual suppliers would then compete with each other in pricing water from the catchment. The market would set the price that determines whether water should be used today or stored for future use.

This proposal does not require changes to how the water is collected or delivered. Water catchment management, treatment, and distribution would all still remain in government hands.[15] What *would* change is that pricing decisions would be handed to a competitive market. This would also give the appropriate pricing signals to alternative suppliers.

Handing water pricing to the market would also create a basis for retail competition. Currently, most householders have no meaningful choices about how much they pay for their water. In a competitive retail market we could imagine that, similar to the way home loans are offered today, retailers might provide households with a variety of different fixed and variable pricing plans. This has a number of advantages. Firstly, it gives households and businesses choice as to how they manage the uncertainty of water supply. Secondly, and more importantly, in choosing their plans, households could indicate their preferences for how the risk should be managed, and give retailers signals and incentives to invest in new sources of supply.

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If the long-term cost of alternative options for urban water provision is around $2 to $3 per kilolitre, households should be able to secure an effectively unlimited supply at that price.

Many elements of the design of a market-based water-pricing system will need to be considered carefully. For example, there are considerations relating to the frequency of water trading, how auctions are conducted, and how to account for catchment storage costs. None of these should cause insurmountable barriers to letting the market determine the price of water.

Conclusion

The current drought has exposed underlying problems with the way we manage urban water. The drought may go away, but our water-management management problems will not. With ever-growing demand and the prospect of greater uncertainty in water catchment levels, the most important investments will not be in additional sources of supply but in alternative approaches to managing urban water.