Water Crises

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One in three people worldwide live in water-scarce regions. Particularly in the Middle East and Africa, leaders have warned of water shortages caused by surging populations and climate change. Then, in March 2007, the World Bank put out a report from Cairo urging governments to improve their water resources. The report concluded that water availability per person worldwide will drop to half by 2050.

Many countries already face crises in meeting water demands, and water rationing, even in certain parts of the USA, seems inevitable. Water shortages are expected to have long-term effects on economic growth, putting increasing pressure on public budgets. They are certain to cause poverty and exacerbate social tensions within and between communities. Accountability of government agencies and water service providers is needed; transparency will be essential, allowing the public to know why decisions are made and what is meant to be achieved. Otherwise discontent and violence could result.

While water shortages are likely to affect Africa and the Middle East first and most seriously, the price of water has been increasing throughout the world. For example, over the past five years, municipal water rates have increased by an average of 27% in the

United States, 32% in the UK, 45% in Australia, 50% in South Africa, and 58% in Canada. In Tunisia, the price of irrigation water increased fourfold over the last decade.

The price of water is largely determined by four factors: (1) the cost of treatment, (2) the cost of transport from its source to the user, (3) the total demand for the water, and (4) price subsidies. The cost of transporting water is determined largely by how far it has to be carried and how high it has to be lifted. Growing cities and towns often have to go hundreds of miles to find the water needed to satisfy their increasing thirst. For example, Southern Californian cities such as San Diego import water from the Colorado River, nearly 300 miles away. Moreover, to bring it up to acceptable standards for human consumption, this water must be diluted with water from the North, which comes about 700 miles. As metropolitan areas grow, transport distances must unavoidably increase. For example, China is currently constructing two canals that are 1,156 and 1,267 km long to transfer water from the Yangtze River to Beijing and other growing areas in the northern provinces.

Pumping water from underground sources, or pumping it over land to higher elevations, is energy-intensive. Five hundred cubic meters of water raised a height of 100 m requires some 200 kW-hours of electricity. The costs, already appreciable, are constantly increasing as are expenses for pumps, wells, and piping materials. Mexico City, at an elevation of about 2,200 m, has to pump some of its water supply up over 1,000 m. The operating costs alone amount to

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\$130 million dollars annually. Pumping this water requires more energy than is consumed by the entire city of Puebla, home to 8 million people!

In India, water scarcity has prompted some farmers to profit by selling their water instead of farming. The water they formerly used to irrigate their crops is pumped from their wells and trucked to nearby cities. These farmers harvest water rather than food! At the same time, they are causing dangerously rapid decreases in underground water tables. Similar practices are becoming prevalent in many other parts of the world.

In most countries, consumers don't pay the actual cost of water because governments subsidize the water supply. This has some obvious benefits, but under such arrangements, the people don't come to appreciate what they are receiving. Sometimes water is available for almost nothing. This leads to excessive waste; the average American household, for example, consumes about 500 cubic meters (~130,000 gal) of water per year, or about 300 gal per day, equivalent to the water used by an entire village in Africa in the same period of time.

Governmental water subsidies are costly, but they are nevertheless provided in virtually all megacities worldwide. For instance, water revenues in the city of Delhi are less than 20% of what the city spends to provide water. Moreover, farmers in California's Central Valley use roughly one fifth of the state's water and pay on average slightly over 1¢ per cubic meter. This value is just 2% of what Los Angeles pays for its drinking water; it is only a tiny fraction of the replacement value. Consequently, many farmers have given up farming. They can make more money by selling their water to the cities! On the average, nearly 40% of municipal suppliers worldwide do not charge enough for water to even meet their basic operating costs.

Subsidies often benefit higher-income families more than the poor. Urban slum residents in developing countries frequently have no access to municipal water supplies and instead purchase water from

private purveyors who bring it in by truck. Because unscrupulous vendors often control the distribution, prices are very high. For instance, in several Asian cities, households forced to purchase water from private vendors, pay more than 10 times as much as middle-income families that are connected to the municipality's distribution system. The poorest households in El Salvador and Jamaica use more than 10% of their income to satisfy basic water needs, while those in Uganda spend an estimated 22% of their income on water.

Water is currently managed as if it were nearly worthless. It is, in fact, an increasingly scarce life-sustaining resource. One step towards rational water management might be to place a price on water that reflects its value. This could be expected to result in price increases that would disproportionately affect low-income families. To avoid this problem, a block rate pricing system could be instigated where a low level of consumption – that required to satisfy basic needs – is cheap, with prices increasing with higher levels of consumption. In Osaka, Japan, for instance, users pay a set monthly fee that includes 10 m³ of water; beyond that, prices increase in steps, more than quadrupling for high-volume users. Ensuring that the poorer households have the requisite water protects them from price gouging by private vendors.

Although pricing water at a fair rate might create political and social problems, it should lead to greater frugality and eliminate the drain on government budgets. Higher prices could force farmers and industries to use water more efficiently. It would encourage everyone to buy more water-efficient appliances and reduce the amount of water wasted. Many efficiency improvements are relatively inexpensive and pay for themselves. Moreover, any improvement that reduces hot water use is doubly advantageous over time because it saves energy as well as water. Such practices are desperately needed in order to give the Earth the opportunity to renew itself in response to the abuses of humankind.