

Soft water paths

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Not a moment too soon, the world is awakening to the need to rethink fundamentally the way freshwater resources are distributed, managed and used. In an era of technological breakthroughs and the wonders of the information revolution, millions die each year from preventable water-related diseases, and hundreds of millions more suffer from debilitating illnesses. Despite massive investment and effort, by the end of the twentieth century 2.4 billion people (more than lived on the entire planet in 1940) lacked sanitation services of the standard available to most citizens of ancient Rome. More than a billion people still lack adequate, clean drinking water.

No single factor is responsible for this deplorable state of affairs. Weak governments, limited capital, misdirected development efforts and rapid population growth are just some of the many contributing problems. Two paths lie before us: a 'hard path' that will rely almost exclusively on centralized infrastructure to capture, treat and deliver water supplies; and a 'soft path' that will complement the former by investing in decentralized facilities, efficient technologies and policies, and human capital. This soft path will seek to improve overall productivity rather than to find new sources of supply. It will deliver water services that are matched to the needs of end users, on both local and community scales.

The traditional hard-path approach has produced, and will continue to produce, enormous benefits, such as clean water supplies, irrigation and improved human health. But increasingly it is also spawning ecologically damaging, socially intrusive and capital-intensive projects that fail to deliver their promised benefits.

The soft path requires governments,

communities and private companies to collaborate to meet water-related needs, rather than merely to supply water. The productive use of water can be improved by rational application of technology and economics, and by decision-making at the right scale. Ecological health must be considered a fundamental component of water policy. This contrasts with the unshakeable belief of most policy-makers that large, centralized water systems are the only way to meet unrelenting growth in demand, and that such demand is an inevitable outcome of growth in population and gross domestic product (GDP).

Yet the link between economic growth and water demand can be broken. From 1900 to the mid-1990s, the GDP of the United States rose by a factor of 20. Total water withdrawals increased more than tenfold between 1900 and 1980, but then began to decline. By 1995, per-capita withdrawals had dropped by 20% relative to the 1975 figure. A similar pattern can be seen in other industrialized countries, and even some developing nations are decoupling water use from economic and population growth.

Two factors are driving this decoupling. The first is a broad improvement in productive use of water — we are improving our ability to provide the goods and services we want with less water. The second is a shift away from water-intensive industries.

The efficiency of water use can be improved further through technological innovations, new policies and simple improvements in operations. In the 1930s and 1940s, steel production for example typically consumed up to 200–300 tonnes of water per tonne of steel. Today just 3–4 tonnes of water are required to do the same job in the most efficient plants.

Many economies have shifted production away from water-intensive industries

Water management

The soft path seeks to improve the overall productivity of water use and deliver water services matched to the needs of end users, rather than seeking sources of new supply.

such as steel production or chemical manufacturing, to industries such as service provision, telecommunications and computing. This has fuelled a further divergence between economic production and water use. Hong Kong and California, for example, have doubled their economic productivities per unit of water use over the past 30 years.

Improving agricultural productivity is critical because this sector accounts for more than two-thirds of human water withdrawals. Efficient irrigation technologies can help to boost food production with a limited water supply. Precision irrigation, soil-moisture monitoring and laser-levelling of fields, for example, have the potential to double productivity per unit of water for many crops. Shifting from conventional surface irrigation to drip irrigation in India has increased overall water productivity by 45–255% for crops as diverse as banana, cotton, sugar cane and sweet potato. Yet worldwide, only about 1% of irrigated land is irrigated by precision systems.

Many uncertainties remain about the physical, practical and economic potential of soft-path alternatives. But these uncertainties can be reduced through modest investment in data collection and analysis, consistent regulations and standards, and appropriate application of economics. The soft path will not be easy to follow. It will require institutional changes, new management tools and skills, and a greater reliance on actions by many individual water users rather than a few engineers. Yet when compared with the growing cost to society of continuing down the hard path, it is evident that a new way of thinking about our scarce water resources is long overdue. ■

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FURTHER READING

Gleick, P. *et al. The World's Water* Vols 1–3 (Island, Washington DC, 1998, 2000, 2002).
Gleick, P. *Water Int.* 25, 127–138 (2000).
Owens-Viani, L. *et al. Sustainable Use of Water* (Pacific Inst. Stud. Dev. Environ. Security, Oakland, 1999).
Vickers, A. *Handbook of Water Use and Conservation* (WaterPlow, Amherst, Massachusetts, 2001).



Lessons from the past: over 2 billion people now lack the sanitation services enjoyed in ancient Rome.