

The value of water



Water and
wealth

High quality
tap water

Improving
water
environment

www.water.org.uk

Network economics

Networks exist because they are often the best, most efficient way to share something between many people. Postal and telecommunications networks replaced a system whereby those who could afford it sent horse-back couriers; everyone else depended on the goodwill of others to see letters reach their destinations. Similarly, it is a hallmark of countries in poverty that their people spend much time collecting firewood and water.

The extension of energy and water networks is one of the most basic steps in the progress of civilisation. Water is heavy and expensive to transport. The network, which distributes it to customers, thus provides them with a particularly valuable service, at a particularly low environmental cost.

In the UK we take our water so much for granted that those who experience loss of supply are likely to remember it for the rest of their lives. As our survival depends on reliable water services and a clean water environment we naturally recognise the essential contribution they make. But in other ways the value of water is less obvious.

This pamphlet argues that in rich societies relative values can disguise economic and social importance. At low relative cost, clean water keeps us healthy and (increasingly) happy. It supports our complex modern lives and helps industry flourish.

Consequently more and more people are coming to appreciate how water adds value and are willing to pay a little more to secure and enhance a significant national asset.

Water and wealth

We cannot judge the value of water by looking at the amount we spend

Uncomplicated, wholesome water is not just about survival. Of course everyday life would be impossible without it. But we are also beginning to appreciate that it is just as important to many of society's more complex products, services and activities.

The richer we are, the more water we use, and the less we pay for it relative to national output. Investment over many centuries has made water cheap by comparison with many of the technical 'essentials' of modern living. So it is no wonder that these can appear many times more valuable than water. Look at what we spend on television and mobile phones beside the cost of mains water and and sewerage and it's easy to see how this happens.

The simple availability of water 24 hours a day, 7 days a week, is another measure of our wealth. In the UK we use on average 150 litres per person per day in our homes and gardens.

This is ten times the international standard for emergency water provision, to refugee camps for

Market	Annual expenditure 2003-04 £ billion
Mobile telephones	12.0
Satellite television	5.5
Cosmetics	1.0
Beer	18.0
Mains water	3.8
Sewerage	4.1

Sources: The Carphone Warehouse, TNS, Euromonitor, Ofwat, water companies.

example, to cover all drinking, cooking, clothes washing and hygiene needs.

Wealth creation depends on high quality water

In many countries the link between water and well-being is a matter of life or death. A child dies every 15 seconds from water-related disease. Economies suffer from large numbers of people being unable to work due to illness caused by lack of clean water or poor sanitation.

A society that is not burdened with unnecessary ill-health has the capacity to be more productive and raise output per head significantly. Clean water and better sanitation go a long way to help reduce global poverty. Not surprisingly, the most quoted of the United Nations Millennium Development Goals is the commitment to reduce by half the numbers lacking clean water and adequate sanitation by 2015.

Globally 6 billion working days are lost each year due to unsafe water and poor sanitation.

In the UK we long ago made the investment in water infrastructure needed to trigger better health and greater productivity. The outbreak of the water-borne London Cholera in 1853 killed over 10,000 people. Four years later the 'Great Stink' from the pollution of the River Thames encouraged the government to construct a sewerage system for London, which benefited the water supply, public health and the environment. Other cities followed. It was a huge cost to the public purse, but we continue to reap the benefits.



Country	GDP per person	Domestic use per person per day
USA	\$38000	350 litres
Australia	\$29000	270 litres
UK	\$28000	150 litres
Asia typical	\$3000*	85 litres*
Africa typical	\$1000*	47 litres*

* Indicative figures. Poorer countries may well use more water overall because of irrigation. This chart relates to domestic use. In Africa and Asia figures shown are typical where there is piped supply – in many places there is not.



Our most fundamental network – and most hidden

As domestic customers, and as citizens, we have low relative water prices partly because of major investment in the network infrastructure. We all benefit many times a day. Yet as with any efficient network we usually forget it is there. We rarely measure its value in terms of environmental, economic or social progress.

To put some (admittedly fantastical) perspective on this, imagine if all our water came to us in bottles. We can assume that economies of scale would reduce the price of a litre from current levels (often hundreds of times more than tap water), and also that a price higher than the cost of tap water would reduce demand. But the new water supply business would still account for a very large share of national output. On top of this there would be high environmental costs caused by increased long-distance transport and a massive recycling task.

Back in the real world, we might reflect that it is only because we have such a readily available supply of high quality affordable tap water that we can enjoy the luxury of choice associated with bottled water.

Low cost, high value

Putting a value on an essential is hard. We naturally want to pay as little as possible for something we know we cannot do without. In the UK the average cost of a litre of tap water is currently around one tenth of a penny.

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Natural and built assets

Our water assets, with an estimated replacement value of over £200 billion, have been built up from Roman times. The UK has over 400,000 freshwater ponds and lakes, covering 190,000 hectares, and 70,000km of rivers. Drinking water comes from 1,584 boreholes, 666 reservoirs and 602 direct abstractions. It is treated at 2,500 water treatment works and delivered to us through 325,000 km of water main. Wastewater is taken from our homes in 300,000km of sewers to 9,000 wastewater treatment works before being returned safely to the environment.

Source: Water UK

In rich countries the price of water services is inversely proportional to national wealth, while quality, quantity and availability are directly related to it. A simple comparison with poorer nations, where water carriers charge very high prices and drudgery holds back economic development, shows how the cost of water is a measure of our wealth.

We can also measure the relative value of water by looking at the proportion of the individual average income required to pay for it. In the UK, for most households, total water service bills are less than 2% of income. In a poor country like Ethiopia, just buying water from a tap stand can cost a family over 10% of its income and even then it has to be collected.

The right to water and sanitation is enshrined or implicit in United Nations conventions.

All communities should have access to the safe, affordable and sufficient water supply and adequate sanitation that define rich societies and which we take for granted.

What we get for our money

Household use	Litres used	Water cost	Heating cost
Taking a shower	35	6p	9p
Taking a bath	80	14p	20p
Flushing a toilet	8	1-2p	--
Using a washing a machine	65	11p	19p
Using a dishwasher	25	4p	16p
Watering the garden (Hosepipe 1 hour)	540	95p	--

Source: Ofwat: Water and Sewerage Bills 2005-06

The wealth that comes from an efficient water and wastewater infrastructure depends on continuing investment in maintenance and renewal.

Approximately half the average charge for clean water is invested in the mains network. Most of the rest is for treatment and storage. In sewerage around a third of the charge is spent on the network, with much of the remainder used for treatment.

The vast majority of UK businesses and public services depend to some degree on our high quality, universally available and reasonably priced water supply and our improving water environment. This applies particularly to manufacturing and process industries, agriculture and horticulture, but also to property, recreation and tourism. Many of these sectors compete in international markets where quality, price and availability are key requirements for success.

An efficient water supply and a clean environment are also necessary for successful communities. Anthropologists tell us that societies value, and identify with, 'their' water. We are programmed to connect with water.

Beliefs and values

The cultural meanings and values associated with water are very powerful and have proved remarkably consistent over time. All our experiences of water are involved, and water is central to some of our most important social rituals. Baptism is an obvious example, but many ordinary activities, such as bathing or watering the garden, are highly ritualised too, and reflect ideas and beliefs about water as well as practical needs.

Veronica Strang, Evaluating Water: Cultural Beliefs and Values, Water UK 2002

United Nations Millennium Goal for water

In September 2000, at the United Nations Millennium Summit, world leaders agreed to a set of Millennium Development Goals for combatting poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women. Among these is the commitment to reduce by half the proportion of people without sustainable access to safe drinking water by 2015. Currently more than 2.6 billion people - over 40% of the world's population - do not have basic sanitation and more than one billion people still use unsafe sources of drinking water.

Source: UN Millennium Project

High quality tap water

Water adds value in its own right...

The public water supply in the UK is among the best in the world in terms of quality and availability. The importance to industry of clean water, efficient networks and effective wastewater management is well understood. High quality water supply and wastewater management help deliver a successful economy and healthy environment.

Our expertise in the UK is also invaluable in addressing the urgent global need for water provision and sanitation. Water company staff, equipment manufacturers, construction companies and consultants are in demand worldwide.

All businesses use water and return wastewater to the environment, which of course costs money. Advances in water efficiency, leakage detection, recycling and disposal of waste by-products are bringing commercial and public sector organisations measurable cost savings. These come directly, in lower water and waste charges, and indirectly through energy



Product	Water required for manufacture
Pint of beer	6 litres
100g jar instant coffee	8 litres
Daily Newspaper	10 litres
Aluminium can	20 litres
50kg cement	30 litres
Cotton shirt	150 litres
Car tyre	20,000 litres

Source: Biffa

savings, reduced environmental impact and other benefits. Longer term, greater efficiency also helps protect our natural resources and security of supply.

... and is the lifeblood of other industries

Water for manufacturing

Modern developed nations require huge quantities of water for industry. As well as being incorporated into many products, water is used as a coolant, a solvent, a transport agent and a source of energy.

In the UK approximately 14% of our water is used for manufacturing. A car coming off the production line, for example, will have used at least 450,000 litres of water (including 80,000 to produce the tonne of steel from which the car is made, and 40,000 for the fabrication process). Many thousands more litres of water are involved in the manufacture of its glass, plastic and fabric components. Manufacturing a desktop computer requires 1,500 litres of water, a Sunday newspaper 70 litres and a tonne of paper 30,000 litres

Water for food

The food industry uses water for irrigation of crops and market gardens, food washing, processing and packaging. Water is an important constituent of food and drink products, and volume and quality

requirements can be high. For example, 6 litres of water is required to produce a pint of beer and 20 litres to manufacture an aluminium can to hold the beer.

Water for energy

The largest user of water in the UK (accounting for 45% of resources used) is the energy industry, which relies on direct abstractions from rivers and the sea. To produce one kilowatt-hour of electricity requires 140 litres of water in fossil fuel plants and 205 litres in nuclear power plants. Some of this water is converted to steam, to drive the generator producing the electricity. In thermal power generation, however, most is used for condenser cooling.

Water is also a vital source of renewable energy; there are currently around 200 hydroelectric schemes in the UK, generating 2% of our electricity, compared with a worldwide figure of 20%.

Water and health

Increasingly the value of our water supply is seen in individual health and development. We are beginning to understand the importance of being properly hydrated – and the ill-effects we can suffer through even moderate dehydration. In the UK, water enables each of us, in good health or not, to take a step towards greater well-being.

Research is telling us that many of the symptoms we associate with ill-health or poor physical performance are prevented, relieved or removed when we begin to drink enough water. With sufficient intake, some medical treatments and procedures become more effective. The potential

Water efficiency adds value

Greater water efficiency adds value in economic terms and by reducing impact on the environment. Water companies advise and work with customers to improve their water efficiency and the Environment Agency operates an award scheme to recognise innovation. The 2005 overall winner was Sheepgrove Farm, a 2000-acre mixed organic farm in Berkshire. Its sustainable water management project saved over 1600 cubic metres by reusing treated wastewater; it also installed water-efficient appliances in its offices and conference centre.

Health product for all

In a real sense low cost, high quality drinking water helps us all obtain the riches of good health whatever our financial status.

Now it seems that good hydration is even more important than we thought. Recent research shows that an adequate intake of water works powerfully for all round health and helps prevent serious illness.

This makes top quality tap water – available to everyone, at a price everyone can afford – the most equal and inclusive of health products.

Source: Water UK

cost savings to society in healthcare terms are hard to calculate but could be significant. For us individually, the benefits are myriad.

As an example of our growing understanding of the connection between water and well-being, look at the determination to improve access and attitudes to drinking water among young people. We know that poor hydration can reduce a child's concentration (and that drinking too many sugary soft drinks can contribute to obesity and hyperactivity). As a result, the UK government and devolved administrations are actively promoting access to drinking water in schools, and in so doing recognising the benefits that our high quality water supply gives.

Water services and industry

UK manufacturing companies typically spend 4.4% of turnover on buying water and managing wastewater. This rises significantly in certain sectors.

Agriculture	4.43%
Brewing/Food Manufacture	7.9%
Pulp/Paper/Packaging	0.5%
Chemical/Pharmaceuticals	5.19%
Industrial/Petrochemicals	2.73%

Source: IWEX Report 2004

Improving water environment

Water in the environment adds value

We should not think of water as a renewable resource. It is finite. The water we use today is the same that existed on the planet millions of years ago. Nature recycles water, but because of the impact that we have upon our most precious resource, it is essential that we keep its quality as high as possible.

As the water environment improves, so too does everything it touches.

Continual demand for water in homes and factories means that wastewater has to be cleaned before being returned to the environment. In economic terms, cleaner raw water means less costly treatment to make it suitable for drinking and for industry. Since 1990 the quality of our rivers, canals and estuaries has significantly improved through better wastewater management, action by industry to control discharges and with the guardianship of the environmental regulators.

The case for investing to protect and enhance our environment is shown in the value to society of cleaner resources. A healthy water environment improves our quality of life. It benefits almost everyone who lives near to, exercises



in, studies or even just watches TV programmes featuring water. It has a direct economic effect on tourism and recreation, which account for a growing proportion of our national wealth.

For thousands of years we have navigated our rivers as a means of travel and to transport goods. Canals were among the earliest transport systems in the UK and underpinned transformation into an industrial society. Much of industry grew up around the waterways. As our natural water environment improves in quality we are seeing a resurgence in use of rivers, canals, lakes and reservoirs for leisure and commercial purposes.

Wider economic and social gains come from the regeneration of deprived areas close to the water. This is an essential element of urban renewal in the UK and many of our cities – Cardiff, Birmingham, Newcastle-Gateshead, Liverpool and Manchester among them – have benefited from successful redevelopments. This has boosted property markets, and waterside residences are now at a premium. The increase in socio-economic activity also often underpins development over a much greater area.

Water and wildlife

In the UK biodiversity greatly enhances our quality of life, and we share with many wildlife species the benefits of a cleaner, better-managed water environment. Rivers and streams form important corridors that allow wildlife to move safely, particularly within urban areas, and our waterways support a great variety of life, including insects, molluscs and freshwater sponges.

Clean water is essential to a thriving bird population. Our wetland habitats provide important nesting and feeding areas. This is of great importance to us, as demonstrated through the work of the RSPB, which has more than a million members in the UK. Many of our waterways and their surroundings are now designated wildlife sites, protected areas for breeding birds and Sites of Special Scientific Interest

Water returns

The economic gains of a high quality water environment are measured in tourism, employment, property and even our communications infrastructure. Every year in the UK visitors to inland waterways spend £1 billion on goods and services supporting 54,000 jobs. Waterways carry 3 million tonnes of freight annually and towpaths hide 650km of fibre optic cable. Around half the population lives within 5 miles of a river or canal.

Source: Inland Waterways Association 2005

(SSSIs). A high quality natural water environment is also essential for the conservation of species such as the otter, the water vole and certain rare plants.

Water for rest and play

Enhanced water quality helps create and sustain economic activity based on leisure, recreation and tourism. In Wales, for example, the quality of the environment is the primary motivation for 40% of holidaymakers, tourists and day visitors. Rural tourism is important because it encourages diversification of economic activity and can help maintain livelihoods where other activities are in decline.

Some of the most popular pastimes in the UK are water-based. Angling, for example, still has more active devotees than any other sporting pastime, with 4 million taking part. It has an economic value of over £3 billion per year. Of 91 million domestic holiday trips taken in 2003, a quarter involved a water-based activity.

Inland visitors are attracted to accommodation by rivers and lakes for their quiet ambience. Even man-made water bodies and reservoirs (with a primary

Property premium

From being synonymous with inner city dereliction, waterways have now become bywords for urban regeneration and trendy city living. Waterside property now commands a premium of up to 20% and new developments are helping to revive the canals, rivers and docks for the 21st century.

British Waterways January 2005



River at the heart of plans for Tees Valley

A new River Tees crossing and an expansion of riverside and water-based leisure facilities are at the heart of regeneration plans developed by Stockton and Middlesborough councils...

The framework builds on the existing plans for waterfront regeneration at Greater Middlehaven and Northbank, and Stockton's own town centre strategy. As well as a river crossing, it calls for a new corridor to connect the two towns and the possibility of a full-size international rowing lake.

Stockton Council cabinet member for regeneration Bob Cook said that the initiative is intended to give the Tees Valley "the economic clout of a major city". He said: "Our plans for Stockton and Middlesborough will influence the lives of nearly one million people. We want them to be a catalyst for growth and regeneration in the North-East as a whole."

Regeneration and Renewal, 21 January 2005

role to store drinking water) are popular for recreation, and today there are around 60,000 boats on the UK's waterways and lakes.

The beach also retains its importance even if the sea is cold! Almost a quarter of all leisure trips in the UK are to the coast, and thousands of businesses rely upon visitors and the clean water environment that attracts them.

Conclusion

The subject of this paper is the value of mains water and the water environment in the UK. However, we also refer to the contrast between rich and poor nations, which provides the clearest evidence of the value of clean water in economic and social progress.

As normally understood, environmental awareness and protection go along with prosperity. To be rich is to have the means and the understanding to improve your quality of life. Here in the UK we are fortunate in having the benefit of years of investment in clean water, but also the capacity and will to build on this success.

www.water.org.uk

Water UK represents UK water and wastewater service suppliers at national and European level.

Water UK
1 Queen Anne's Gate
London SW1H 9BT
Telephone 020 7344 1844

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The value of the water environment can be experienced in person at Wildlife Trust and water company sites. Here is a small selection. Water companies and Trusts throughout the country welcome visitors to a wide variety of recreational activities. Community groups and schools are increasingly taking up the opportunities.

Rutland Water: Anglian Water, Leicester and Rutland Wildlife Trust. **Wigan Flashes:** United Utilities, Lancashire, Manchester and North Merseyside Wildlife Trusts. **Carsington Water:** Severn Trent. **Rye Meads:** Hertfordshire and Middlesex Wildlife Trusts, Thames Water. **Woodwalton Fen, Holme Fen:** Cambridgeshire Wildlife Trust. **Erith Marshes:** London Wildlife Trust, Thames Water. **Chew Valley Lake:** Bristol Water.

More information... CRostron@derbyshirewt.co.uk www.water.org.uk www.wildlifetrusts.org