Chapter 1

Water Conservation – A Priority for Business

Not a single drop of water received from rain should be allowed to escape into the sea without being utilised for human benefit –
King Parakrama Bahu the Great of Sri Lanka (1153–1186)

1.1 Introduction

Water is life. We recognise the value of water and its role in our day-to-day activities. Religions have recognised the role water plays in our well being. In developed societies, due to past investments in water infrastructure we have come to expect that water will be available 365 days of the year. We have being brought up with the notion that as long as we pay for it we have the right to consume as much as we want. Since there is no substitute to water, water prices have not reflected its intrinsic value and traditionally is subsidised. Consequently water is cheap relative to other resource costs. This has led to global fresh water consumption to rise faster than it is replenished. Between 1990 and 1995, fresh water consumption rose more than twice the rate of population growth. According to a report released by the International Water Management Institute (IWMI) at the Stockholm World Water Conference in 2006, a third of the world's population (roughly 2 billion people) is facing water scarcity now, not in 2025 as earlier predictions forecasted [1]. Water scarcity is not only a third-world problem. In recent years water scarcity have affected developed countries too. For example, in Australia the one in a hundred year drought has made water a political issue. It has highlighted the competing needs of agriculture, the low water prices enjoyed by the farming community which has led to wasteful practices and the need to supply the urban population with water where the majority of the populations live as well as the challenge to maintain environmental flows in the rivers. The world's water is in a crisis. But it is more a crisis of management of water rather than a water crisis. Therein lies the *triple* paradox of water. As the World Business Council for Sustainable Development (WBCSD) succinctly puts it: ***It is cheap, scarce and wasted*** [2].

Water quality is also decreasing and so far has not made the headlines. This alone could bring about a water crisis according to the 2006 Stockholm Water Laureate Professor Asit Biswas [3]. For an example, the rapid industrialisation of China and India will contribute to severe degradation of water quality in those countries if preventive measures are not taken.

Protecting the available water resources is therefore *our shared responsibility*. Business is part of the solution from the supply side as well as from the demand side. This chapter presents nine compelling arguments on why reducing water usage makes good business sense.

1.2 Global Water Resources Availability

From a global perspective, only 35 million km^3 (equal to 3.0%) of the world's water is fresh. Ninety seven percent is seawater and not readily available for human consumption. Of the 3.0%, permanently frozen in the Arctic and Antarctica, groundwater, swamp and permafrost constitute 2.5%. So that leaves only **0.5%** (equal to 105 000 km^3) in rivers and lakes to meet the needs of humans and the requirements of the planet's fresh water ecosystems. Figure 1.1 graphically shows the available global water resources.

Table 1.1 shows that 98% of the world's fresh water (0.5% of the total) is in aquifers.

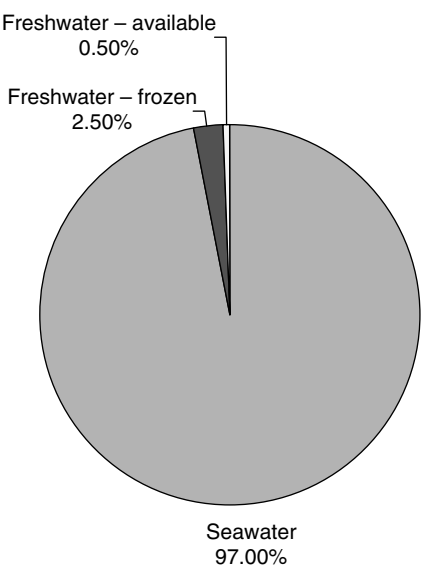

Figure 1.1 Global water resources [4]

Courtesy of the World Business Council for Sustainable Development – *Facts and Trends*. Geneva, Switzerland. August 2005.

Table 1.1 Where is this 0.5% of fresh water?

Water resource	km^3	Million acre-ft	Number of Olympic-sized swimming pools* ($\times 10^6$)	Percentage
Aquifers	10,000,000	8,107,013	4,000,000	97.9%
Rainfall on land (net of rainfall after accounting for evaporation)	119,000	96,473	47,600	1.2%
Natural lakes	91,000	73,774	36,400	0.89%
Man-made storage facilities	5,000	4,054	2,000	0.05%
Rivers	2,120	1,719	848	0.02%
Total	10,217,120	8,283,032	4,086,848	100%

* 1 Olympic-sized swimming pool is assumed to hold 2500 m^3 of water.
Adapted from the World Business Council for Sustainable Development – *Facts and Trends*. Geneva Switzerland. August 2005.

Case Study: World's Largest Aquifer Going Dry [5]

The world's largest aquifer is the Ogallala aquifer in the United States. It supplies water for irrigation to one-third of the United States crops and provides drinking water to Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas and Wyoming. In other words it contains enough water to cover the entire United States to a depth of one-and-a-half feet. Even this aquifer is predicted to run dry in two decades due to over abstraction of water. Nebraska, Kansas and Texas were pumping 88% of all the Ogallala water between them, a massive 20 969 million m^3/yr (17 million acre ft/yr in 1991) more than the Colorado river.

Global demand for water needs to

- satisfy human needs for safe drinking water and proper sanitation
- expand agricultural production to meet population growth
- meet business needs to provide more goods and services for a growing population and
- minimise the impact of climate change on water resources.

1.3 Human Need for Safe Drinking Water and Proper Sanitation

The world's increasing water demands are driven by an increase in global population and urbanisation. The world's population is expected to increase

from approximately 6 billion in the year 2000 to 8–10 billion people in 2050, with 90% of future population growth occurring in developing countries [6]. Over the next three decades, urban growth will bring a further 2 billion people into cities in the developing countries, doubling their size to about 4 billion people. These cities are growing at a rate of 70 million people per year [7].

This growth will result in the creation of mega-cities with populations in excess of 10 million people in each city. In 1950 there was only one mega-city – New York. In 1975 there were 5 and by the year 2015 it is expected that 23 cities around the globe will become mega-cities – 19 of them will be located in developing countries. Table 1.2 shows the 10 largest cities in the world in the year 2000.

These countries already suffer from severe water stress and myriad other social issues. Over 1 billion people or (one in six) live without regular access to safe drinking water. Rapid urbanisation creates squatter towns and slums. For example, currently 40–50% of the population in Jakarta (Indonesia) and a third in Dhaka (Bangladesh), Calcutta (India) and Sao Paulo (Brazil) live in slums [7]. These increases in population will increase the demand for water. Poor sanitation conditions result in increased child mortality. For example, there is one toilet for every 500 people in the slums of Nairobi (Kenya). Leakage rates for most of these cities' water distribution systems are in the high thirties. That is, only two-thirds of the water supplied reaches consumers, whereas in the developed world, approximately 90% of the water supplied reaches the consumer. Poverty also increases the occurrence of water theft – that is, unaccounted for water losses. Figure 1.2 shows the

Table 1.2 The 10 largest cities in the world in 2000

City	Country	Population (millions)
Tokyo	Japan	26.44
Mexico City	Mexico	18.07
Sao Paolo	Brazil	17.96
New York	USA	16.73
Mumbai (Bombay)	India	16.09
Los Angeles	USA	13.21
Calcutta	India	13.06
Shanghai	China	12.89
Dhaka	Bangladesh	12.52
Delhi	India	12.44
Buenos Aires	Argentina	12.02
Jakarta	Indonesia	11.02
Osaka	Japan	11.01
Rio de Janeiro	Brazil	10.65
Karachi	Pakistan	10.03

Source: UN Habitat: *Global Urban Observatory*. Nairobi. 2003.

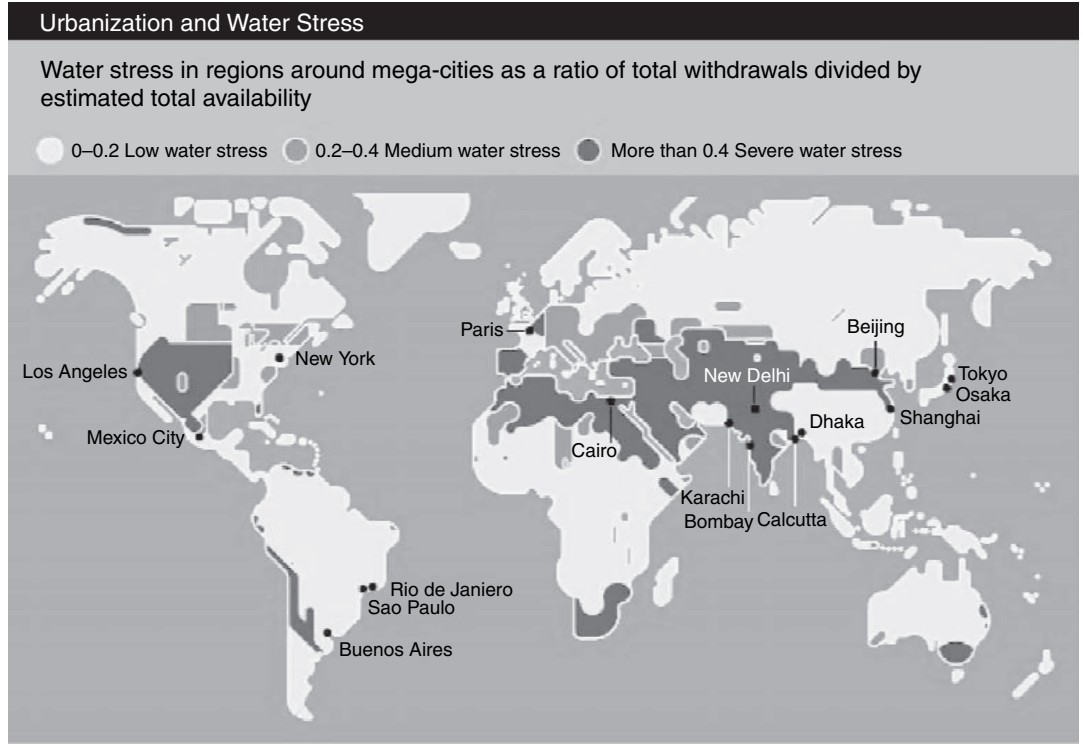

Figure 1.2 The global water challenge – urbanisation and freshwater stress

Source: World Business Council for Sustainable Development – Business in the World of Water. Geneva, Switzerland. August 2006.

urbanisation and water stress in regions around mega-cities as a ratio of total water withdrawals divided by estimated total availability [8].

Whilst almost all the mega-cities are predicted to suffer from water shortages, the problem is particularly acute in China; it is predicted that 550 cities will experience severe water shortages [8].

1.4 Meeting Agricultural Needs

With nearly 70% of global fresh water being used for agriculture (80% in Asia) it will be increasingly difficult to meet global food requirements for a growing population. The development of fresh water resources for human use has compromised natural ecosystems that depend on these resources.

Table 1.3 shows that countries with abundant rainfall, such as in the United Kingdom and France, use relatively small amounts of water for irrigation, whereas countries with low rainfall (which are typically developing countries) use nearly 90% of their water consumption for irrigation.

Case Study: Water Usage in Agriculture in Australia

The water consumption breakdown for year 2000–01 (Figure 1.3) illustrates the heavy use of water in agriculture even though the GDP (gross domestic product) of agriculture has declined significantly from 20% in the first half in the 20th century to 2.9% in 2001–02.

Table 1.3 Sectoral use of fresh water by selected countries

Country	Agricultural (%)	Industrial (%)	Domestic and commercial (%)
India	93	3	4
Egypt	88	5	7
China	87	7	6
Australia*	67	12	12
Netherlands	32	63	5
France	12	71	17
United Kingdom	1	78	21

* Environment flows and water supply accounts for the remainder.

Sources: World Business Council for Sustainable Development Industry. *Fresh Water and Sustainable Development*. April 1998 and Australian Bureau of Statistics *Water Account Australia 2000–01*.

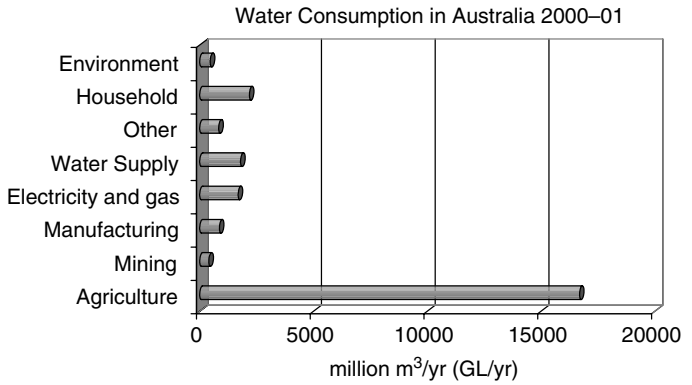

Figure 1.3 Water consumption in Australia 2000–01

Source: Australian Bureau of Statistics.

To cater for an increase in population to 8–10 billion people by 2050, the Food and Agriculture Organisation estimates food demand will double in a similar timeframe. To produce this quantity of food, the additional water use is expected to increase by 50% over the next 30 years to 5600 km^3/yr to eradicate undernutrition and feed an additional 3 billion people. This is almost as much water as the present global consumptive water use in irrigation [9].

Compounding this problem is

- the trend towards water-intensive farming
- over-extraction of water resources
- evaporation of water from open channels
- pollution of these water sources due to heavy reliance on pesticides and fertilizers
- poor land management practices and
- heavily subsidised low water prices encouraging wasteful practices.

Consequently, water has become the number one limiting factor for food production in many parts of Asia and sub-Saharan Africa. The solution is to increase water productivity, that is produce more food from each unit of water. The water used in the production process of an agricultural or industrial product is called the *virtual water* contained in the product [9, 10, 11]. Table 1.4 shows the virtual water requirement per kilogram of some common agricultural products for some selected countries. For example, to produce 1 kg of beef, 13 000 L of water (or more) is required.

Table 1.4 shows that livestock products have a higher virtual water content than cereals and this is understandable. It also shows that USA and Australia are more efficient producers of food than India for the selected products. Export trade in food is in fact *trade in water*. When countries living in water-stressed areas export food, they are in effect exporting water, which further exacerbates the water shortage problem of that country. The largest of the water exporting countries include USA, Canada, Germany and Australia.

Table 1.4 Average virtual water content of some selected products for some of selected countries [9, 10]

Food item	Water requirement m^3/ton		
	USA	Australia	India
Rice (paddy)	1,275	1,022	2,850
Wheat	849	1,588	
Soybeans	1,869	2,106	4,124
Cotton seed	2,535	1,887	8,264
Beef	13,193	16,482	17,112
Pork	3,946	4,397	5,909
Poultry	2,389	7,736	2,914
Lamb	5,977	6,692	6,947

Case Study: Australia's International Trade and Water Exports

Australia's managed water use is 24 000 GL/yr (24 000 million m^3/yr or 19.5 million acre-ft). Australia exports the equivalent of 7500 GL of water/year embodied in goods and services and imports 3500 GL/year [12]. This leaves a net outflow of 4000 GL/year roughly the equivalent to the water consumption of the entire urban sector excluding manufacturing. Given the decreasing contribution that agriculture makes to the Australian economy, the question arises whether the net outflow of 4000 GL/yr is in the nation's long-term interest.

Figure 1.4 shows the virtual water flows in traded crops.

Whilst the problem of under nourishment is a developing-country problem, over capacity and excess of food is a developed-country problem. Obesity, unhealthy food habits, more convenient type foods are driving up water demand in the world. Government subsidies also encourage overproduction. In the Organisation for Economic Cooperation and Development (OECD) countries, farmers receive more than one-third of their income from government subsidies, in total over US$300 billion each year [9].

Increases in life styles in the developing countries will further increase meat consumption which means increased water consumption compared to a cereals- or pulses-based diet.

1.5 The Impact of Climate Change

Much has been written about the impact of climate change. Recently there have been a record number of reports providing evidence that climate change is occurring and more importantly the cost of not doing anything to combat it could cost the world trillions of dollars and the extinction of 40% of the

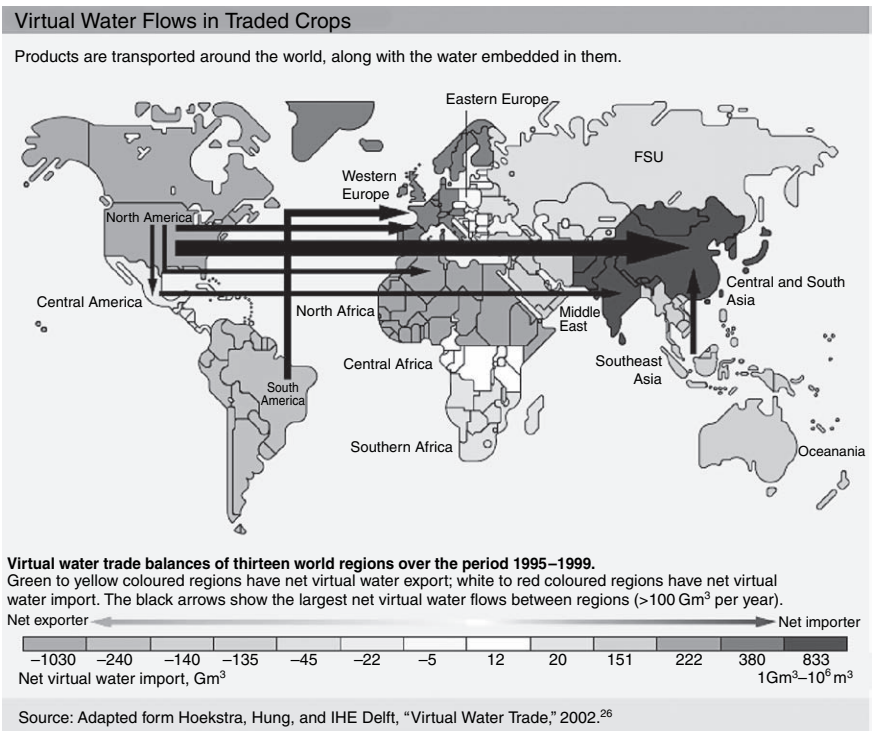

Figure 1.4 Virtual water flows in traded crops

Source: World Business Council for Sustainable Development – Business in the World of Water. Geneva, Switzerland. August 2006.

species. The principle factors driving climate change are well-documented global warming and greenhouse gas effect.

The question is what impact/effect climate change will have on humans, environment, the economy and the water supplies. A wide-ranging UK study conducted by the former chief economist of the World Bank, Sir Nicholas Stern, is the latest and paints a bleak future if no action is taken [13].

The predicted impacts of global warming include the following:

- Higher maximum temperatures with more hot days and heat waves in nearly all land areas. The earth's surface temperature has increased on average by 0.6° C ever since temperature measurements were started in the 1800s. All of the 10 warmest years have occurred since 1990 including each year since 1995. Climate models indicate a global temperature increase of 1.4–5.8° C (2.5–10.4° F) by 2100 [10]. In Australia the temperatures could increase by 1–6° C [14]. What this means is that a city like Brisbane will have in excess of 20 days with average temperatures above 35° C by 2070 [14].

- Will disrupt traditional rainfall and runoff patterns.
- Up to 40% of species will face extinction.
- Longer and more frequent droughts. Already two regional cities in Australia has almost run out of water. If this pattern continues there is going to be migration of people from these cities to the capital cities which have more resources.
- Extreme weather could reduce global gross domestic product up to 1% [13].
- An increase in severity and more frequent weather-related catastrophes like Hurricane Katrina. For an example, the total economic loss from weather-related catastrophes amounted to US$80 billion out of a total of 216 billion [15]. An increase in ocean temperatures will lead to a doubling of Category 4 and 5 hurricanes. Insurance companies will have trouble covering these disasters due to their severity and frequency.
- Decrease in water quality by changing water temperatures, flows, runoff rates and timing, with significant potential impacts on water users [16].
- Changes in natural water availability will affect water management, allocations, prices and reliability [16].
- Increase in regional conflicts. As the river flows change patterns, regional conflicts amongst countries that share these rivers are going to increase. There are over 2000 regional international treaties sharing water rights in river basins. Some predict that the next world war will be fought over water not oil.
- Impacts on global food production due to global warming, change in rainfall patterns and the increase in carbon dioxide levels resulting in higher food prices. For an example, a more variable monsoon on the Indian subcontinent can impact on the food production of a quarter of a billion people in Bangladesh.
- Hotter, drier summers mean increased demand for water for personal use and air-conditioning. According to a study conducted by the CSIRO, for every degree of global warming, evaporation will increase by 8%.

Case Study: Impacts of Drought in Australia – Grain Harvest Worst in 10 Years

Australia is heading for its smallest harvest in 10 years. Australian Bureau of Agricultural and Resource Economics predicted that in the 2006 financial year economic growth will reduce by 0.7% points. A$6.2 billion would be wiped from the value of farm production, a 35% decrease. Wheat harvest alone has reduced from 20 to 9.5 million tons.

Adapted from: *Sydney Morning Herald*. 30 October 2006. p. 9.

1.6 Business Sector Water Usage

Industry (currently) accounts for 20–22% of the world's consumption of fresh water. As shown in Table 1.3, in industrialised countries this can be as high as 78% and in low-income countries (such as India) 3% of total water use. It is expected that the annual water volume used by industry will rise from 752 km^3/yr in 1995 to an estimated 1170 km^3/yr in 2025 [17].

According to a study conducted by the US investment bank Goldman Sachs by 2050, the economies of the group of countries collectively called BRICs (Brazil, Russia, India and China) could surpass the current G6 countries (United States, Japan, Germany, France, Italy and UK) [18]. If these predictions come true, in US dollar terms, China could overtake Germany by 2007/2008; Japan by 2015 and the United States by 2039. India's economy could be larger than all but the United States and China in 30 years. Russia could overtake Germany, France, Italy and the United Kingdom by 2050.

What impact will these growth rates have on water usage and effluent discharges is not hard to conjure.

Case Study: China

China's GDP growth is a staggering 8%. Its rate of resource consumption particularly water is even greater. For an example, water usage to produce a ton of steel in China is calculated to be 3.8 to 9.3 times more than that of the industrialised countries (23–56 m^3 as against 6 m^3/ton of steel in the US and Japan) [8]. Figure 1.5 shows water demand trends and actual wastewater discharges.

Business cannot survive without water and the most important consideration for business is access to clean water. Business uses water in a variety of ways. For example,

- for power and steam generation
- for cooling of air-conditioning systems, process streams and for condensing steam in power plants.
- as a component of product in beverages, pharmaceuticals and so on
- for process needs
- for cleaning vessels and washing floors
- for amenities and
- for irrigation.

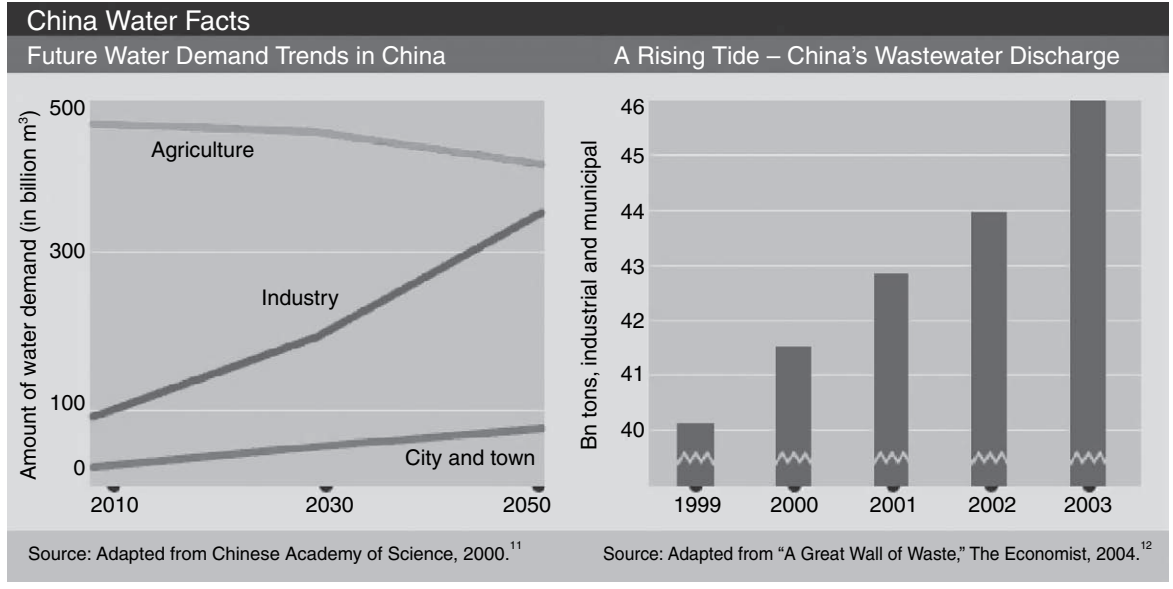

Figure 1.5 China water facts

Source: World Business Council for Sustainable Development – Business on the World of Water, Geneva, Switzerland.

In Sydney, Australia's largest capital city, the business sector consumes approximately 470 million L of water/day. This is approximately 30% of total demand. Of this, industry accounts for 12%, commercial property 10% and government institutions 8% [19].

In contrast to BRICs, in many OECD countries water usage by the industrial sector has been decreasing steadily through the 1980s and 1990s due to economic recession, plant closures, relocation to cheaper sources of labour and a move towards less water-intensive industries.

Not withstanding the efforts to improve industrial water efficiency, it is still at relatively low levels. Renewed efforts are needed to improve water efficiency and reduce water wastage.

Here are a few examples to illustrate the point.

- According to a recent study conducted by the UK Envirowise Agency, British industry and commerce use a staggering 1300 million m^3 (1.05 million acre-feet) of water every year – **triple** the amount actually needed for their activities [20].
- Figure 1.6 shows the breakdown in water usage in the food and beverage industry based on 23 water audits carried out by Sydney Water's **Every Drop Counts Business Program**. It is noteworthy that leakage and wastage accounted for 13% – almost equal to the amount of water consumed in the product.
- According to research conducted by the Pacific Institute in California, the commercial and industrial sectors have the potential to save on average 39% and 35% of their water use respectively [21].

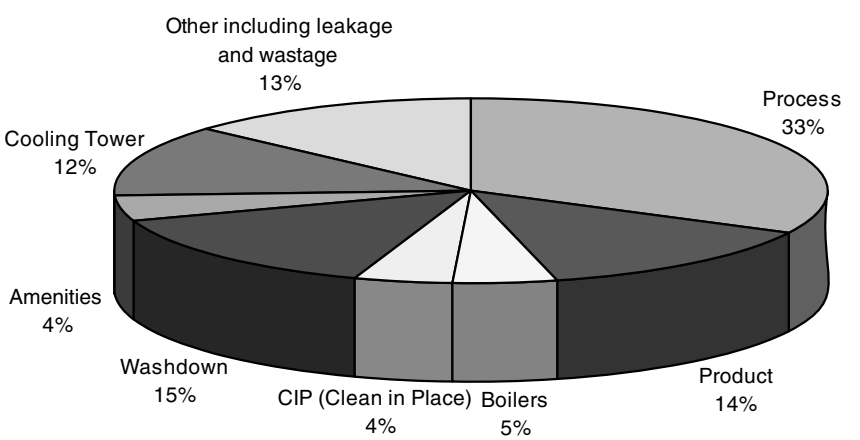

Figure 1.6 Breakdown in water usage within the food and beverage sector in Sydney

Courtesy of Sydney Water.

Tables 1.5 and 1.6 shows sectoral usage and savings potential.

- Table 1.7 shows water usage per unit of product among European Union countries [21]. While there might be differences in the mode of data collection, the wide variations in water usage per unit of product support the argument – that even within the developed countries

Table 1.5 Water usage in the commercial sector in California [21]

Sector	Current usage (Acre – ft*/yr)	Current usage (ML**/year)	Usage as a percentage (%)	Estimated potential savings (%)
Schools	251,000	309,483	13.5	46
Hotels	30,000	36,990	1.6	33
Restaurants	163,000	200,979	8.8	29
Retail	153,000	188,649	8.3	37
Offices	339,000	417,987	18.3	39
Hospitals	37,000	45,621	2.0	41
Golf courses	229,000	282,357	12.4	36
Laundries	30,000	36,990	1.6	50
Other commercial	621,000	765,693	33.5	38
Total commercial	1,853,000	2,284,749	100	39

*1 Acre ft = 1233.5 m^3
**1 ML (mega litre) = 1000 m^3
Courtesy of Pacific Institute, California, USA.

Table 1.6 Water usage in the industrial sector in California [21]

Sector	Current usage (Acre – ft/year)	Current usage (ML/year)	Usage as a percentage (%)	Estimated potential savings (%)
Beverage Processing	57,000	70,281	8.6	16
Dairy processing	17,000	20,961	2.6	29
Fabricated metals	20,000	24,660	3.0	35
Fruit and vegetable processing	70,000	86,310	10.5	26
High tech	75,000	92,475	11.3	39
Meat processing	15,000	18,495	2.3	27
Paper	22,000	27,126	3.3	32
Oil Refining	84,000	103,572	12.6	74
Textiles	29,000	35,757	4.4	38
Other industrial	276,000	340,308	41.5	39
Total Industrial	665,000	819,945	100	35

Table 1.7 Specific water use of industrial production [22]

Country	1 L of beer	1 L of milk	1 kg of cloth	1 kg of paper	1 kg of steel	1 kg of sugar
Austria	10	5	n/d	150	15	15
Denmark	3.4					
France	25	1–4	n/d	250–500	300–600	21–35
Ireland	8				4.5	
Norway	10	1–1.5	130 (all kinds)	20	30	n/d
Spain	6–9	1–5	8–20 (wool)	250	30	3.5–5
Sweden	3–5	1.3	40–50	20	0.6–5.3	0.5
United Kingdom	6.5 (estimated range 2–10)	2.9	6–300 (depends on the type of fabric)	15–30	100	1.5 (estimated range 0.7–6 L)

there are significant opportunities to save water per unit of output. For example, to produce a litre of beer, French beer manufacturers use 25 L of water. Denmark and Sweden use only one-fifth of that amount. Clearly even with an allowance for different production techniques and packaging (draught vs cans), French beer manufacturers could potentially use less water.

1.7 Nine Reasons for Business to Reduce Their Water Consumption

The ultimate objectives of business are to increase profitability and market share. These twin objectives cannot be realised in isolation of the community and the environment. Below are nine reasons why saving water is smart business.

Reason 1 Societal entitlement: Safeguarding security of supply

> I am convinced that helping address societal problems is a responsibility of every business, big and small. Financial achievement can and must go hand-in-hand with social and environmental performance
>
> Indra K. Nooyi

Business operates at the local, state and at the global level. The use of water by business is an *entitlement* granted by the community to business. It is a social contract. Especially in times of drought when the community often faces tough water restrictions, business needs to ensure that they too use

water responsibly thus honouring the social contract. Consequently, being proactive and using water efficiently will reduce the *water footprint* of any business. When this social contract is not met, governments are likely to take measures to force business to be responsible such as

- imposing limits on production capacity
- more stringent conditions on the use and discharge of the water
- non-renewal of licences and prosecution (e.g. mining sector).

These measures always cost more in the long run – either from

- increased compliance costs for the organisation
- damage to the brand image, or
- loss of public confidence.

Case Study: Mandatory Water Saving Action Plans for High Water Users

Faced with a prolonged drought in Sydney, Australia, the New South Wales State government [23] in 2004 mandated that all businesses using 50 000 m^3/yr or more (13.2 million US gal./yr) must develop Water Saving Action Plans and submit them to the regulator of the Department of Energy Utilities and Sustainability. More recently the Queensland government has followed suit with a requirement for business to reduce demand by 25% compared to their 2004/2005 consumption as well develop water-saving plans.

Reason 2 Increasing investor confidence

There is a growing trend to report water usage in company annual reports especially among organisations subscribing to Corporate Social Responsibility (CSR) and Triple Bottom Line (TBL) reporting requirements. CSR is viewed by organisations such as BHP Billion (the largest mining company in the world) as critical to their long-term success. They view their commitment to CSR as reducing their business risks, promotes good business practice.

The UK Environment Agency commissioned Innovest Strategic Value Advisors to research links between sound environmental governance policies and practices, and the financial performance of businesses [24]. The research provides strong evidence of higher financial returns, business opportunity and competitive advantage, with differences in financial performance between environmental leaders and non-leaders as being quite marked. A similar conclusion was arrived at by a Morgan Stanley study. Some examples cited in the Innovest report are given in the case study below.

Inclusion of these companies in indices such as the Dow Jones Sustainability Index (which evaluates companies on their economic performance as well as environmental and social indicators) attracts long-term shareholders – such as pension and superannuation funds and socially responsible mutual

funds (Social Responsibility Investment (SRI)). These companies are seen as organisations focussed on long-term financial outperformance by managing and reducing their business, social and environmental risks. The net result is that investors values these companies higher than their peers, thus attracting a higher share price. Australian companies that are rated well include mining giants BHP and Rio Tinto, insurer IAG, brewer Lion Nathan, banks ANZ, NAB and Westpac and building company Lend Lease. A Goldman Sachs study established that well governed companies relative to their peers outperformed by 5–10%.

According to a survey carried out by Calvert (a mutual fund serving 400 000 investors in the USA), 71% of the Americans are more likely to invest in a company that has been rated higher in terms of their social performance and 77% of Americans would purchase more of their products and services [25]. Naturally, an increase in the stock price rewards shareholders and chief executives alike. In the United Kingdom, some estimates suggest that by 2009, 15% of the stock market will be subject to SRI considerations.

Case Study: Winslow Green Growth Fund

The US-based Winslow Green Growth Fund has consistently outperformed its benchmark over a prolonged period with average annual returns above the benchmark index by 20.41, 5.79 and 11.49% over 1, 3 and 5 years respectively.

Case Study: Investa Property Group

Investa Property Group is Australia's largest listed owner of commercial property. Investa has recognised that sustainability practices make good business sense. In 2003, it publicly set environmental performance targets [26] (Table 1.8) and surpassed some of these. In recognition of those efforts in 2004 it was included in the Dow Jones Sustainability World Index.

Table 1.8 Investa environmental targets

Area	Target	Achieved to March 2005
Electricity	15% reduction in usage by June 2006	15.4%
Water	25% reduction in consumption by 2006	26.9%
Waste recovery	50% diverted from landfill Paper/ Cardboard for recycling	Indeterminable 1,019 tons (up from 381 tons)
Aggregate emissions	30,000 tons saved over 3 years to June 2006	22,351 tons
Australian Business Greenhouse Rating Scheme	Average 3.0 stars by June 2005	3.3 stars

Reason 3 Minimising value chain related risk

Today corporate reputation is a more important measure of success than stock market performance. In 2004, The World Economic Forum sent a survey to all 1500 participants at its 34th Annual Meeting that was held in Davos, Switzerland – to understand the issues that concern top business leaders. Out of this, 132 participants represent the world's 1000 leading global companies. Nearly 60% of the survey respondents estimated that corporate reputation represented more than 40% of a company's market capitalisation [27].

For global companies such as Nike and Gap, protecting their brand image means recognising the responsibility to manage not only their own environmental performance but also that of their global suppliers. Therefore they have adopted *global water quality guidelines* for suppliers. This guideline helps protect human health and water quality around the world. As a result, Nike and Gap reap multiple benefits from these programmes.

Reason 4 Cost reduction

Water costs can account for 1–2% of a manufacturing concern's turnover. Thus saving water is an opportunity to reduce costs. A utility's water charges constitute only the *visible costs* of water – tip of the iceberg. In a manufacturing site, water costs are incurred three times. That is,

- at the main meter
- trade waste charges for pollutant strengths and
- sewer usage charges for volumetric discharge.

Additionally, there are other *hidden* costs of water such as

- additional chemical treatment for further purification, boiler, cooling and wastewater treatment
- cleaning costs
- electricity and gas costs
- maintenance costs
- loss of product and
- monitoring and compliance costs.

For example, unrecovered steam condensate wastes energy and chemicals in addition to water. Figure 1.7 illustrates the visible and invisible costs of water.

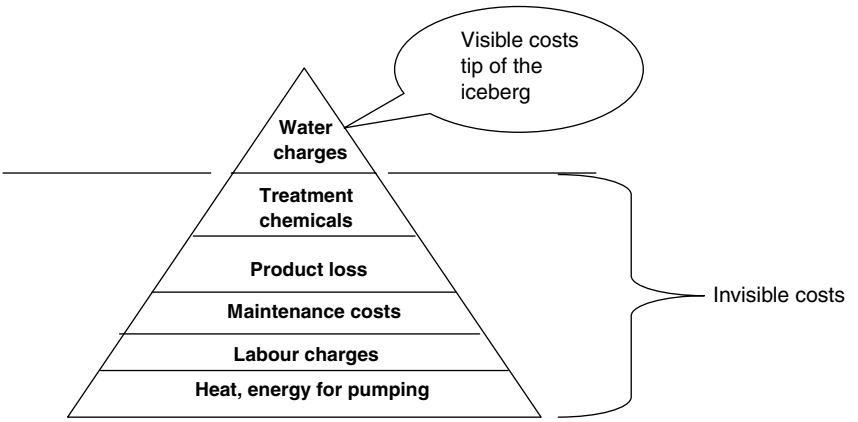

Figure 1.7 Visible and invisible costs of water

Case Study: Unilever Identifies the Hidden Costs of Water

Unilever's Tatura plant in Victoria, Australia, manufactures a range of foods, personal care and household products. Water is used as both an ingredient and a cleaning agent for most production on site. Due to the extremely high quality standards required in food manufacturing, many rigorous processes are in place to ensure standards are met. For example, each time a new product line is produced, all lines must be thoroughly cleaned before production can commence.

To reduce the frequency of cleaning but still ensure line cleanliness, Unilever installed a *pigging* process that negated the use of high-pressure water to clean the lines – hence massive water savings.

The cost savings are

Avoided costs in labour, raw materials and utilities	$360 000
Avoided downtime costs for scheduled cleaning	$200 000
Avoided costs in trade waste charges for BOD	$ 5 000
Total cost savings	**$565 000**
Total cost of implementation	**$1 100 000**
Payback period	**2 years**

Source: *What's New in Food Technology & Manufacturing*. July/August 2004. p. 23–24.

Case Study

A smallgoods manufacturer in Sydney, Australia, estimated that while the water costs are only A$1.20/m^3, the actual cost of water (once internal chemical treatment, wastewater treatment and sewer discharges were included) was A$6.00/m^3 – a fivefold increase in costs. These costs are not easily recognisable because they come under different accounts.

In addition to direct production-related costs, there are other compliance costs. For instance, in the food industry, the Hazard Analysis and Critical Control Point system (HACCP) requires certain procedures be followed; similarly, the Environmental Protection Agency (EPA) may require the reduction of certain substances before discharging effluent to the environment. Many of these costs can be minimised by reducing water use.

Reason 5 A counter-measure for future water price increases

Globally, water prices are set to rise over and above inflation. In the United Kingdom in the year 2006/2007, the average price increases 6.5% inclusive of inflation. Historically water prices have been set to recover the capital and operating costs as well as the associated financial costs and dividends to shareholders. Only recently have governments started using the pricing mechanism as a demand management tool to reduce consumption such as having higher tariffs for high water users. Until prices for water reflect its true cost, water wastage will continue. As the available resources becomes scarce, water prices will increasingly reflect the *scarcity value* of water leading to steeper prices [28].

In Sydney, Australia, in 2005, the price of water increased by 20% [29] and a two-tiered pricing system was introduced to residential customers. There was a charge of 20% extra/m^3 – used above normal domestic consumption – to encourage water conservation practices.

Figure 1.8 shows water prices for some selected cities. Not surprisingly the Caribbean has some of the highest prices in the world. Full cost pricing gives a competitive advantage to the more efficient water users over others.

Reason 6 Production efficiency

Using water more efficiently will make additional water available for increased production without necessitating the purchase of additional water, or, in addition – the need to upgrade infrastructure such as pipes, tanks, pumps and other ancillary equipment.

Reporting efficiency benchmark metrics, comparing them with best practice to management and to the media will portray a more positive view of the site, division or company and result in the ability to attract extra resources.

Reason 7 Drives innovation

Water conservation programmes promote innovative thinking within an organisation. It enables the questioning of outdated practices that are redundant but never eliminated. Value chain analysis, trialling of new products and

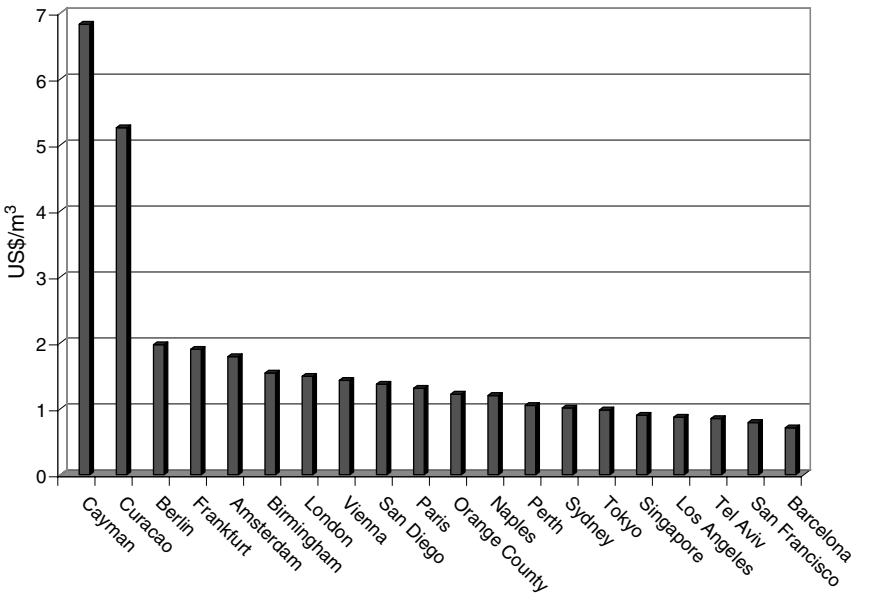

Figure 1.8 The cost of water in major metropolitan areas around the world

Source: *International Desalination & Water Reuse Quarterly, November/December 2005*, p. 47

processes and adoption of new behaviours drive innovation. For example, by one company selling its wastewater to another, the company can re-value its by-product. What was once a compliance cost has now become a revenue generator. Companies can redesign their products to use less water.

Reason 8 Improved staff awareness and morale

When organisations undertake socially beneficial measures (such as water conservation) there is anecdotal evidence that staff morale improves. Employees are part of the wider community. When the organisation demonstrates socially responsible behaviour, then the employees' values are in alignment with the organisation's values and employees take pride in their employer.

Reason 9 Tax relief and rebates

Many organisations use a hurdle rate of a 2- to 3-year payback as a guide for water conservation–related capital expenditure projects. However, due to the low cost of water, worthwhile water-saving projects often struggle to meet these hurdle rates. Realising this some governments and water utilities provide incentives such as rebates, grants and tax relief to encourage business to undertake water conservation projects that otherwise would have been ignored.

For example, the New South Wales government in Australia recently announced a $120 million Water Saving Fund to assist business to invest in worthwhile water conservation projects.

If businesses can depreciate capital expenditure costs related with these investments at a faster rate than that is currently allowed, then governments do not have to give grants. In Australia, the 1997 Tax Act allows for businesses engaging in agriculture to do so. This scheme if extended to the wider business community will become a catalyst for water conservation–related expenditure with a win-win for all concerned. Such a scheme is in place in the United Kingdom. In the United Kingdom, business can claim investments made towards water conservation as a tax-deductible expense under the Enhanced Capital Allowance scheme (ECA).

1.8 Conclusion

The world's water resources are finite. Increasing demands on water resources by the rapid growth of mega-cities, expansion of agriculture and commercial and industrial growth are depleting available resources. The cost of providing clean water is also increasing as readily available resources are depleted. Climate change – with more frequent and longer droughts – is further straining these meagre resources.

The private sector is good at managing risk. There is no bigger risk than the risk to the environment. Therefore business needs to play a proactive role in reversing this trend and minimising their business risks. It is not about positioning, gaining short-term competitive advantage, feel good media releases and other PR exercises but a genuine assessment of the threat to the business and the environment, the social license, higher water prices, inability to expand production, loss of competitiveness, cost increases, damage to the brand name and loss of community and investor confidence. These considerations will demand a proactive approach to water efficiency be adopted. By doing so, business is doing both its fair share to preserve this finite resource and protecting its market position.

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