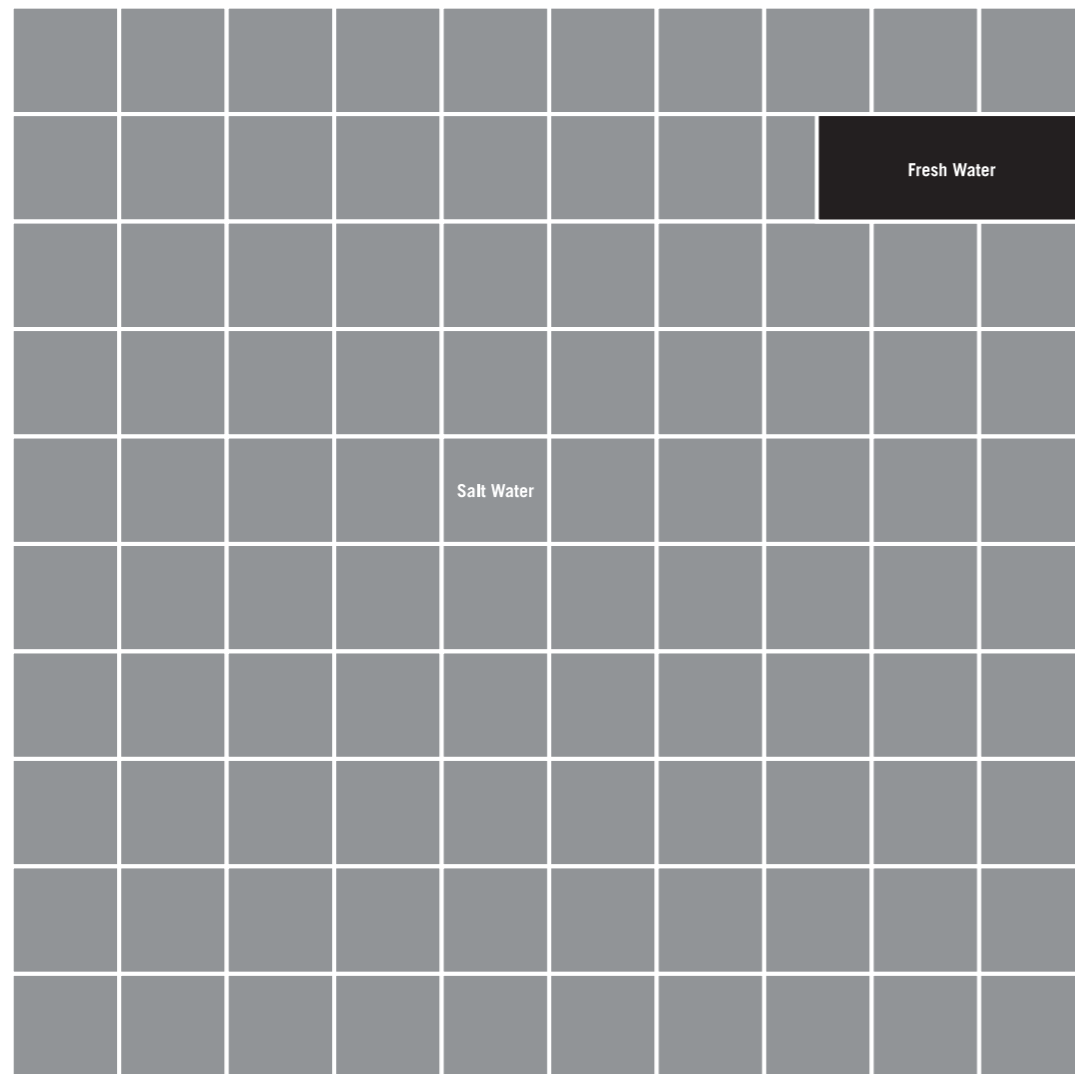
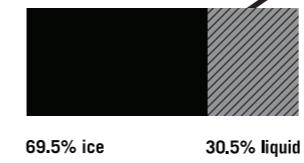


The world's water



The world's fresh water



Less than
1%
of the world's water is fresh water readily available to us in liquid form.

The stuff of life

- ▶ *It goes without saying that water is the stuff of life; it feeds earth's ecosystem, flows through our cities, our buildings and our bodies. It is essential to our existence and a portal to our dreams. And yet — largely through the way we use and abuse this precious resource — we face a water crisis.*

Although 70% of the planet's surface is water, only 3% of this is freshwater and less than 1% is readily available for human use today. The world's growing population, increasing consumption, climate change and the rapid industrialization of the developing world mean that this relatively limited and unevenly distributed resource is under threat. Today, more than a third of the world is short of water and the situation is likely to worsen as consumption increases with prosperity. The World Bank predicts "If the wars of the twentieth century were fought over oil, the wars of this century will be fought over water."

Although we have the convenience of hygiene on tap, we have lost the sense of connection that meant water was used responsively and responsibly. Historically it played an important role in religion, mythology and culture and these rich layers of meaning helped us to understand and value it. Only through reconnecting with water can we shape a sustainable hydrological future.

Water, water everywhere and not a drop to spare...

H2O under the magnifying glass.....

Water is the only substance on Earth which comes in three different forms; liquid, solid and gas. The changes from one state to another depend on temperature and pressure. Ice is less dense than liquid water and expands 9%.

Water's boiling point is related to barometric pressure: on the top of Mt. Everest water boils at about 68°C (154°F), compared to 100°C (212°F) at sea level.

Conversely, water deep in the ocean near geothermal vents can reach temperatures of hundreds of degrees and remain liquid.

Earth's water

Water is the most abundant molecule on the Earth's surface. 70% of the Earth's surface is water (3% of Earth's mass).

Earth's total water = 1,386 million km³
1,351 million km³ is salt water / 35 million km³ is fresh water
(The total volume of water remains almost constant)

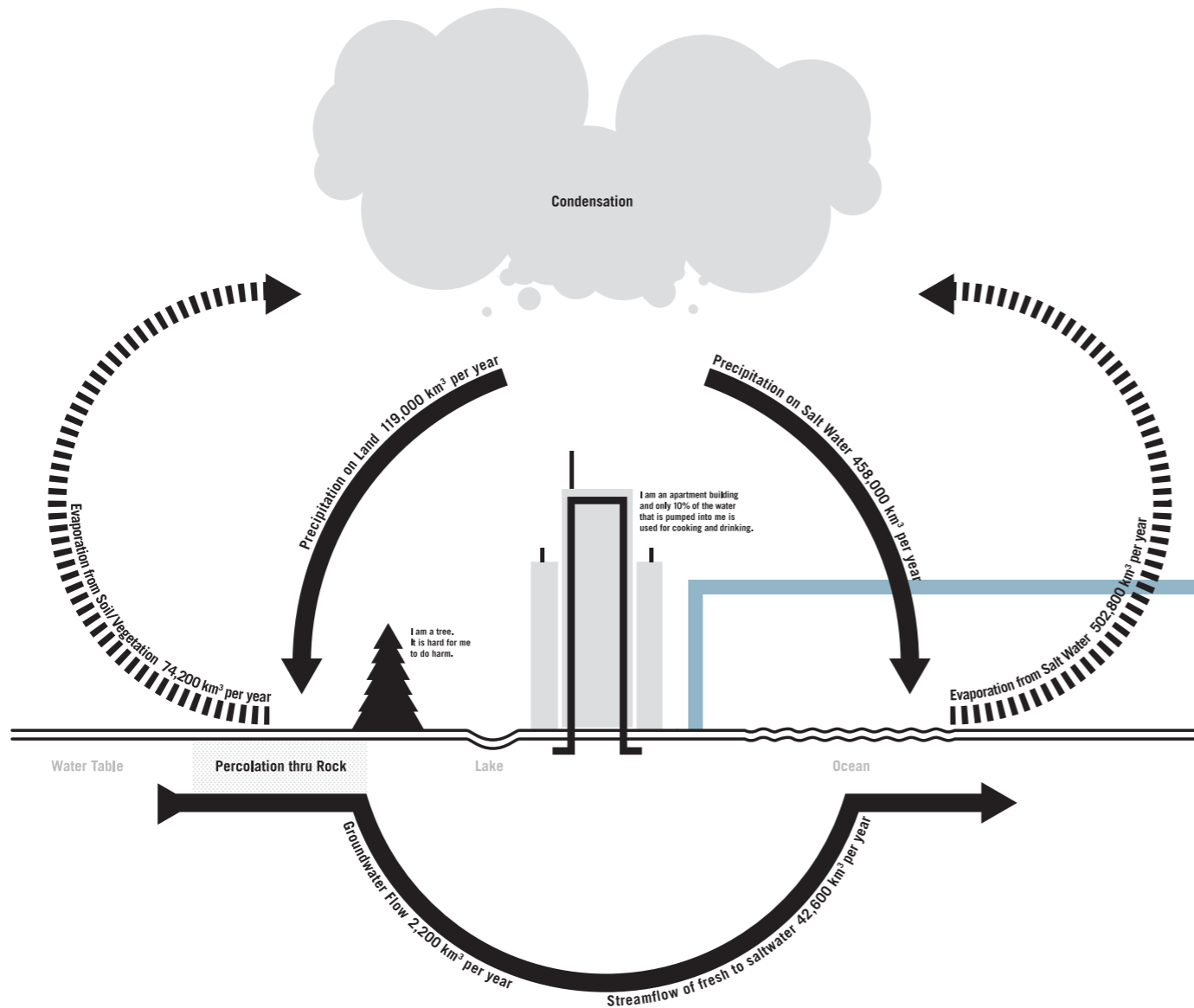
Clink... Clink...

The world's largest iceberg is currently C19A, an iceberg off Antarctica with an area of around 2200 square miles.

The secret life of water...

The hydrological cycle describes the cycling of water through the biosphere as it moves through liquid, solid and gaseous states.

A drop of water will usually spend 9 days in the atmosphere but once it falls to earth it can spend anywhere from 40 years (in a glacier) to 40,000 years (in the ocean) before going back into the cycle. Every drop of water winds up moving through the hydrological cycle.



Our activities that alter the water cycle include: agriculture / construction of dams / de- and afforestation / removal of groundwater from wells / water abstraction from rivers / urbanization / alteration of the chemical composition of the atmosphere / industrial pollution

Run off:

By clearing vegetation from land to build roads and parking lots water cannot seep into the ground to be stored in the aquifer. Because of this it remains on the surface and increases the likelihood of flash floods, causes soil run-off and damages buildings.

I'm a human being and nowadays I behave quite badly...

The water content of the body

Eyeball	99% water
Saliva	almost 99 % water
Tears	90% water (although chemical tears caused by onions are 98% water)
Urine	95% water
Lungs	92% water
Brain	84% water
Blood	82% water
Spleen	79% water
Muscles	75% water
Heart	74% water
Liver	72% water
Kidneys	71% water
Skin	58% water
Fat	50% water
Bones	22% water
Nails (normal)	18% water
Nails (brittle)	16% water
Hair	4% water
Tooth Enamel	2% water (driest part of body)

Water makes up 45-75% of body weight.

From womb to tomb
The water content of a foetus is 99% and at birth the baby is 70-80% water. As an infant the water decreases to 72%. During adulthood the average body water content is 70% and this steadily declines in old age, dropping to 45-50%.

Global The state of water today

► *The first step towards shaping a new water consciousness is understanding how we use water today and the factors that threaten global resources. Many of the ideas about water and its use that have taken shape in the past 150 years are no longer appropriate. We need to rethink the future.*

Total annual use 1900-2000 (2025 projected)
1900-579 km³
1950-1,362 km³
2000-3,793 km³
2025-5,235 km³

More and more and more

Nearly 4,000 cubic kilometres of fresh water are withdrawn every day. While the total amount of fresh water in the world remains almost the same, the amount of water withdrawn per person is increasing. More countries start to rely on desalination and wastewater recycling, and this is the way of the future.

Robbing the bank

More than a quarter of people worldwide rely on groundwater for drinking, but stocks are being used faster than they are being replaced. One day, the wells will simply dry up.

Percentage of drinking water taken from groundwater by region (2000)
75% Europe / 51% USA / 32% Asia-Pacific / 29% Latin America

Where does it go?

World Water Use by sector (2000)
10% domestic/municipal, 21% industry, 69% agriculture

Use by sector: Every year more fresh water is withdrawn for use in agriculture, industry and the home.

Dark waters

What is pollution: Pollution takes many forms, from water polluted by human waste through to water polluted by chemicals used in industry and agriculture. These range from so-called 'organic pollutants' (raw or treated domestic sewage, urban run-off, industrial effluents and farm waste) to heavy metals such as lead and mercury, to fertilisers and pesticides, which run off into rivers and lakes, leach into the soil and thus into the underground aquifers and the water that we drink. Among the most dangerous are POPs (persistent organic pollutants) such as PCBs used in electrical insulation and DDT, which last in system for very long periods, travel long distances and are linked to serious health issues.

Freshwater pollution is a problem for about half the world's population.

Rapidly industrializing countries will need more water, but without proper controls they will further pollute their sources.

Asian rivers are the most polluted in the world. They have three times as many bacteria from human waste as the global average and 20 times more lead than rivers in industrialized countries.

Farming is responsible for 70% of water pollution in the USA.

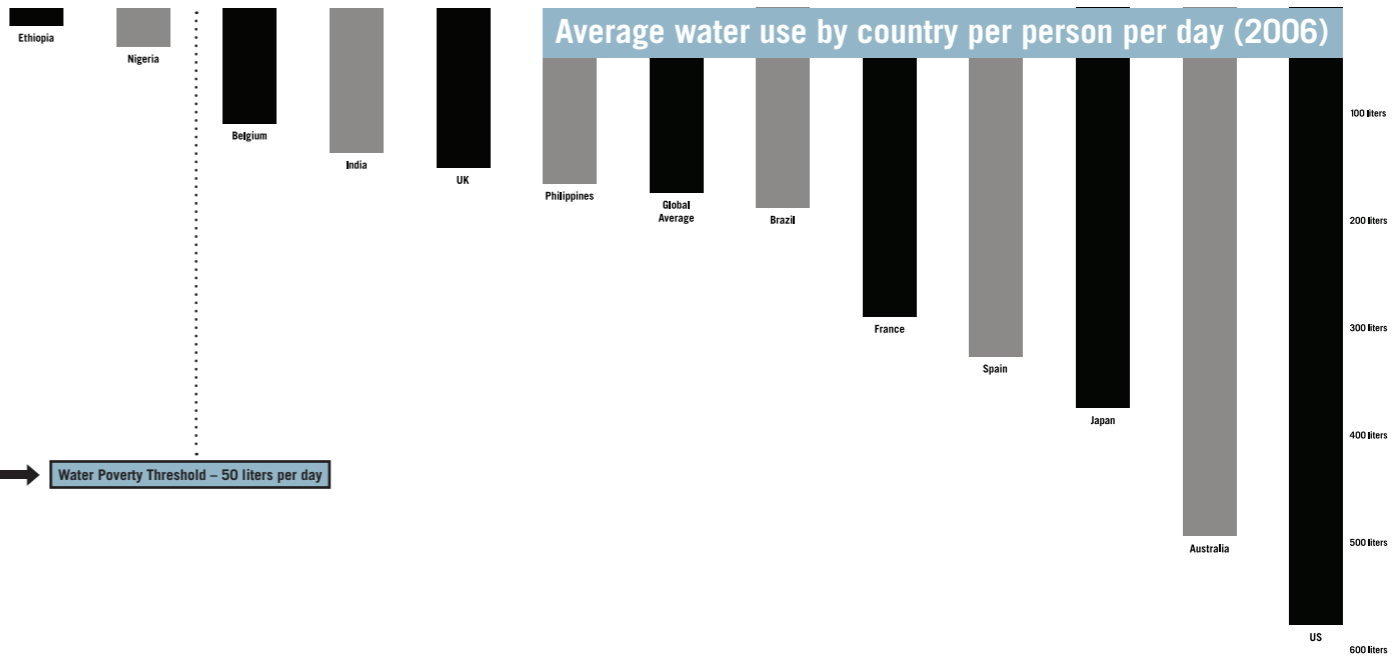
In the Yangtze River, 40 million tons of industrial waste and raw sewage is discharged into the river every day.

The Sarno River in Italy is considered the most polluted river in Europe, featuring a nasty cocktail of sewage, untreated agricultural waste, industrial waste and chemicals.

16.3% plenty of water
 16.7% just enough
 34.7% not enough
 24.5% water stress
 7.8% water scarcity

Have and have nots

More than 1/3 of the world's population is short of water, and the situation is getting worse as populations grow bigger and thirstier.



Water Poverty Threshold - 50 liters per day

% population without water supply:
 Asia = 65%
 Africa = 27%
 Latin America and Caribbean = 6%
 Europe = 2%

2000 global population = 6 billion
 5bn lived in countries chronically short of water

2050 projected global population = 8.9 billion
 4bn may live in countries chronically short of water

71 liters a day - Palestinians
 350 liters a day - Israelis

Water Wars: Disputes arise over how much water each country takes, and the issue of dams. This is the root of much of the conflict between Israel and its neighbours.

Hidden costs: It is usually falls to women to collect the water. The economic cost of this is huge. In India, it is estimated that the national cost of women fetching water is 150 million workdays per year, equivalent to a national loss of income of 10 billion rupees (approx. 208,000,000 dollars / 106,360,000 euro)

Sanitation
 Over a third of the world's population lives with inadequate facilities.

% population without sanitation:
 Asia = 80%
 Africa = 13%
 Latin America and Caribbean = 5%
 Europe = 2%

Floods kill thousands every year and ruin the lives of 1,000,000 more. With climate change they are becoming more frequent.

Illness
 80% of illnesses in developing countries are water-related. At any given time half of the world's hospital beds are occupied by patients suffering from water related diseases.

Number of people killed in floods by income class (1975-2001)
 Low Income 50% / Lower middle income 26% / Upper middle income 23% / High income 1% ★

Local It's down to us

▶▶▶ How can we use water more responsibly and repsonsively? In the home today 70% of drinking quality water is used as a solvent for waste and dirt - flushed away or used for cleaning our homes, our clothes and ourselves. The concept of the water footprint is still fairly new, but awareness of individual as well as collective responsibility is increasing. Water saving initiatives in Queensland, Singapore and Zaragoza have proved remarkably effective. In Zaragoza for instance actual consumption has been reduced to 96 liters per capita per day, a third of Spain's national average.

Water footprint

Belgium's national water footprint is 19.21 Gm³ per year
20% is internal / 80% is external (one gigameter = 1,000,000,000 meters)

Water footprint of an individual is the total water used for the production of the goods and services consumed by the individual.

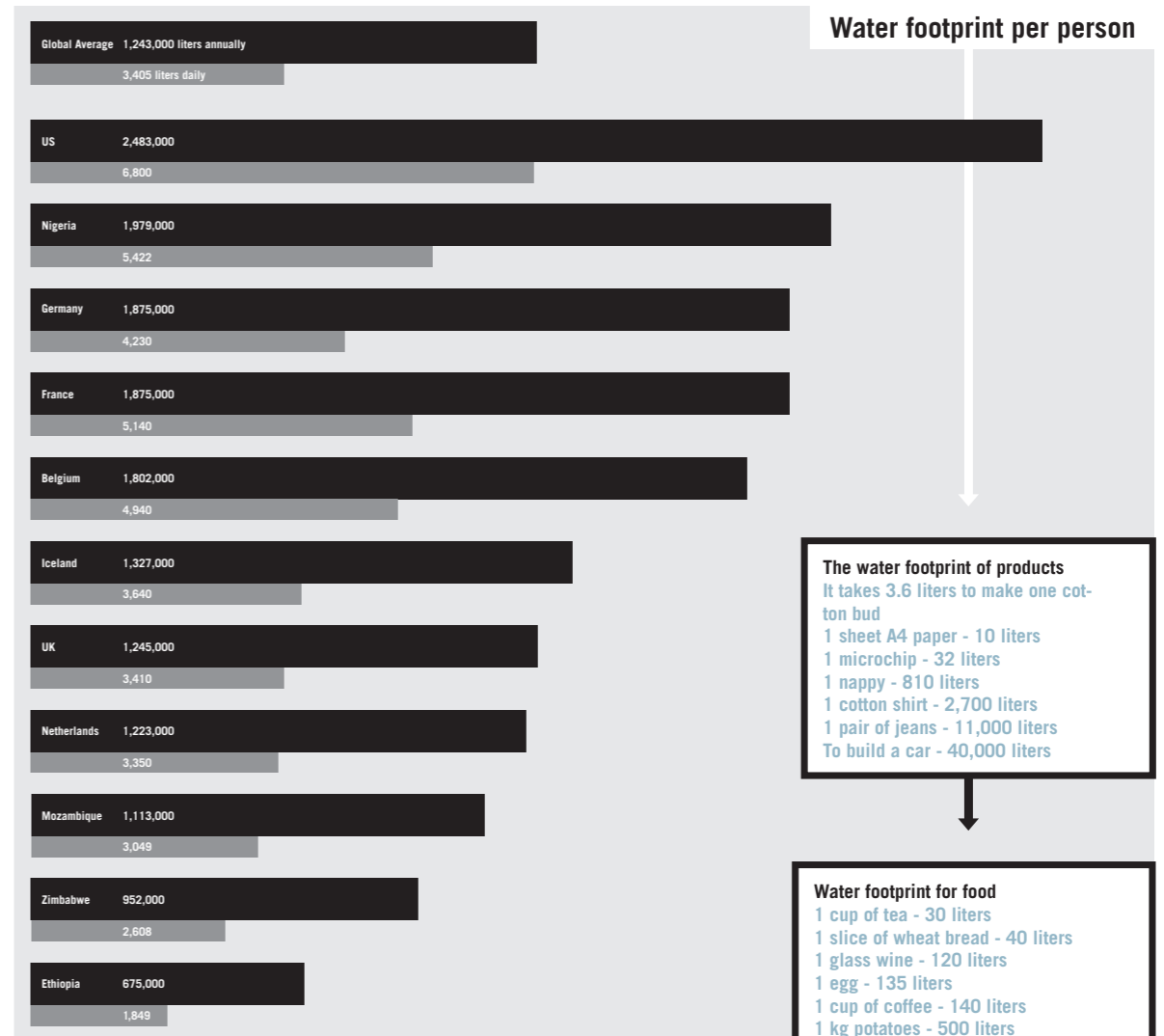
Belgians actually use 108 liters each per day but their virtual water footprint is 4,940 liters per day.

Water footprint of a product: The water footprint of a product (a commodity, goods or services) is the volume of freshwater used to produce the product, measured at the place where it was made. The 'water footprint' of a product is the same as its 'virtual' or 'hidden' water content.

Internal and external water footprint: A country's total water footprint has two components: the part that falls inside the country (internal water footprint) and the part that uses water belonging to other countries (external water footprint).

For Example:

To drink one cup of coffee in the Netherlands takes about 140 liters of water. But this is not actually Dutch water, because the coffee is produced in Latin America, Africa or Asia.



The water footprint of products
It takes 3.6 liters to make one cotton bud
1 sheet A4 paper - 10 liters
1 microchip - 32 liters
1 nappy - 810 liters
1 cotton shirt - 2,700 liters
1 pair of jeans - 11,000 liters
To build a car - 40,000 liters

Water footprint for food
1 cup of tea - 30 liters
1 slice of wheat bread - 40 liters
1 glass wine - 120 liters
1 egg - 135 liters
1 cup of coffee - 140 liters
1 kg potatoes - 500 liters
1 liter of milk - 1,000 liters
1 kg of rice - 1,900 liters
150g burger - 2,500 liters
1 kg beef - 15,000 liters

One Burger
1 Cow (200kg beef) = 15,350 liters to produce 1,300kg of grain and 7,200kg of roughages. Plus 24,000 liters of drinking water and 7000 liters for servicing.
This equals 2,400 liters in one 150g burger.

Why not eat...?
In general the best meats that you can eat are free range and not factory fed, e.g. wild game, kangaroo, caribou, deer, wild rabbit and bison because they rely mostly on available local resources.
The worst are those that are factory farmed since these are often fed intensely processed foods heavily reliant on irrigation.

Alternative Diets
USA style red meat intensive diet = 5,000 liters per day
Vegetarian diet = 2,600 liters per day
Survival diet = 1,000 liters per day

Down the drain
Only 10% of all water withdrawn is for domestic use, but the amount used varies widely between countries.

Typical household consumption patterns in an industrialised nation (2003)
30% Flushing toilet
35% Bathing/Showering
20% Laundry
10% Cooking/Drinking
5% Cleaning

In homes in the industrialized world over 70% of drinking quality water is wasted on flushing and cleaning our homes, our clothes and our bodies. Less than 10% goes on drinking and cooking.

Water use is one of the most conspicuous forms of consumption: as people become richer and enjoy a higher standard of living, so their domestic water use increases.

Increasing domestic water use per year
1950 - 87 cubic km³
1980 - 219 cubic km³
2000 - 384 cubic km³
2025 - 607 cubic km³ (projected)

The water business

Water is a vital natural resource but getting it to those who need it is a problem for governments. For commercial enterprises, though, it is a major opportunity.

The World Bank judged the global trade in water to be US \$1,000 trillion in 2001.

Say no to bottled water!

Although in the industrialized world bottled water is often no healthier than tap water, it can cost up to 10,000 times more.

An estimated 40% of bottled water sold in the USA is just filtered tap water.

Average consumption per year (2002 or latest available)
101 liters - West Europe, 75 liters - USA, 20 liters - East Europe, 7 liters - Asia

Wages spent on Bottled water (2003)
5.7% - Tanzania, 3.2% - Uganda, 1.1% - Pakistan, 0.013% - UK, 0.006% - USA

Poor people who live in slum areas often pay 5-10 times more per liter of water than wealthy people living in the same city.

Global Average:
1994 - 16.3 liters
2004 - 24.2 liters

Belgium and Luxembourg:
1994 - 121.9 liters
2004 - 148.0 liters

It takes 3 liters of water to produce a 1 liter bottle of water.

Drips/Leakage

A leak of one drop per second wastes approximately 10,000 liters a year.

Leaking taps in homes may waste more water than is actually used for cooking and drinking.

40% of water in developing countries is lost through leaking pipes. Some of it finds its way back to groundwater, rivers or lakes, but much of it is evaporated.

% water lost through leaking pipes in large cities (2000)
Asia - 42%, Latin America and Caribbean - 42%, Africa - 36%, North America - 15%

Zaragoza-How to turn a city around

In 1997, Zaragoza set out to show it was possible to solve water shortage problems by using a cheaper, more ecological, faster and socially contentious-free approach: saving water by increasing efficiency in its use.

The Results: the average water use in Zaragoza is 96 liters per person per day, the lowest in Spain. (The average in Spain is 320 liters per person per day)

How It Was Done...

- Installing water saving WCs, taps and showers
- Installing water saving washing machines and dishwashers
- Installing water meters in homes and repairing leaks
- Introducing water saving habits such as recycling household liquid waste

Other model water countries or cities would include Australia (notably Queensland), California and Singapore for their recycled water efforts, although none on the same scale as Zaragoza.

Thirteen water saving tips: Don't waste it!

01. Flow controlled aerators for taps are inexpensive and can reduce water flow by 50%.
02. Make sure your hot water system thermostat is not set too high. Adding cold water to cool very hot water is wasteful.
03. Catch running water whilst waiting for it to warm up. Use it to water plants, rinse dishes or wash fruit and vegetables.
04. If you have a leaking tap, replace the washer or other components as required. Dripping taps can waste 30-200 liters of water per day.
05. Never put water down the drain when there may be another use for it such as watering a plant or garden, or cleaning.
06. Store drinking water in the refrigerator rather than letting the tap run every time you want a cool glass of water.
07. Insulate your water pipes. You'll get hot water faster, save energy and avoid wasting water while it heats up.
08. Avoid flushing the toilet unnecessarily.
09. Don't use the lavatory or sink as a waste bin.
10. Water lawns during the early morning hours when temperatures and wind speed are the lowest. This reduces losses from evaporation.
11. More plants die from over-watering than from under-watering.
12. Cook food in as little water as possible. This will also retain more of the nutrients.
13. Wash your car on the grass. This will water your lawn at the same time.

The difference it makes...
Some everyday activities with and without water conservation
per person per day

	Without Conservation	With Conservation
Shower	70 liters	35 liter
Laundry	50 liters	35 liters
Taps	38.7 liters	19.3 liters
Leaks	15 liters	0 liters
Bath	80 liters	50 liters

Edited by Ilse Crawford and Jane Withers

karlssonwilker, inc. drank 3 liters water of while designing this.

Research: Jennifer Chan and Lucinda Parrish

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