

# A Comprehensive Introduction to Water Footprints

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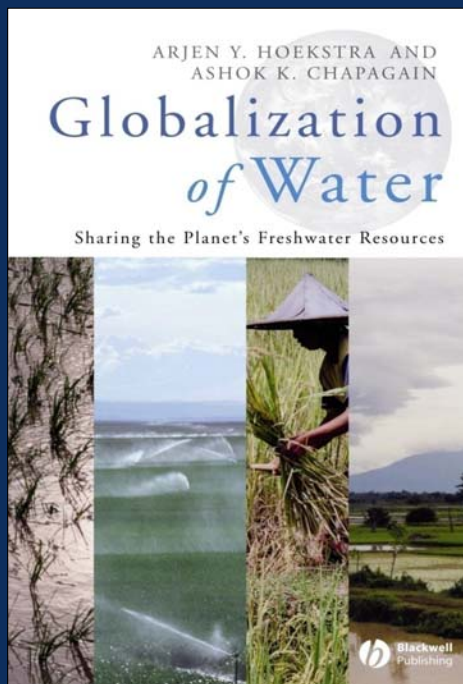
[www.waterfootprint.org](http://www.waterfootprint.org)

Water Footprint  
NETWORK

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## Overview Presentation

1. The water footprint of products
2. The water footprint of a nation  
The relation between national consumption, trade and water
3. The water footprint of a business
4. From concept to practice  
Water footprint impact assessment  
Reducing water footprints
5. Conclusion
6. The way forward

We discuss the relation between water management, consumption and globalisation of trade from a product perspective, a governmental perspective and a business perspective. We focus all the time on developing understanding of the relation between water, production chains and trade. Finally we will make the step from concept to practice. The things presented here are very much exploratory, because we are currently in a early stage of recognition and awareness raising. The translation of new understanding into policy is a trajectory ahead.

Background materials can be freely downloaded from [www.waterfootprint.org](http://www.waterfootprint.org).

Further, the following book is recommended:

Hoekstra, A.Y. and Chapagain, A.K. (2008) *Globalization of water: Sharing the planet's freshwater resources*, Blackwell Publishing, Oxford, UK, ISBN 978 1 4051 6335 4.





## Water footprint of a product

- ▶ the volume of fresh water used to produce the product, summed over the various steps of the production chain.
- ▶ when and where the water was used: a water footprint includes a temporal and spatial dimension.
- ▶ type of water use: green, blue, grey water footprint.

The water footprint of a product (good or service) is the volume of fresh water used to produce the product, summed over the various steps of the production chain. 'Water use' is measured in terms of water volumes consumed (evaporated) and/or polluted. The water footprint is a geographically explicit indicator, not only showing volumes of water use and pollution, but also the locations and timing of water use.

The total water footprint of a product breaks down into three components: the blue, green and gray water footprint. The blue water footprint is the volume of freshwater that evaporated from the global blue water resources (surface water and ground water) to produce the goods and services consumed by the individual or community. The green water footprint is the volume of water evaporated from the global green water resources (rainwater stored in the soil as soil moisture). The gray water footprint is the volume of polluted water that associates with the production of all goods and services for the individual or community. The latter is calculated as the volume of water that is required to dilute pollutants to such an extent that the quality of the water remains above agreed water quality standards.



## Water footprint of a product

### Green water footprint

- ▶ volume of rainwater evaporated.

### Blue water footprint

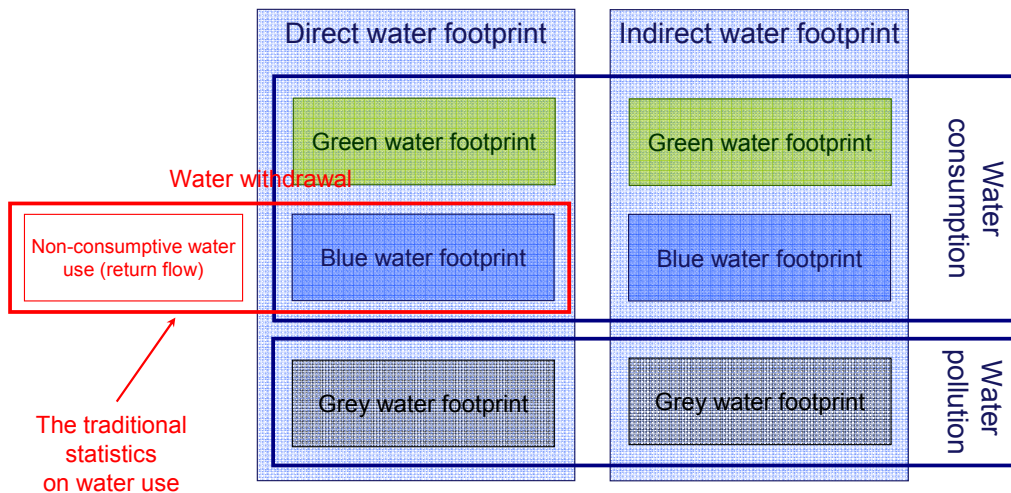
- ▶ volume of surface or groundwater evaporated.

### Grey water footprint

- ▶ volume of polluted water.



## Components of a water footprint



[Hoekstra, 2008]

The water footprint is an indicator of water use that looks at both direct and indirect water use of a consumer or producer. Direct water use refers to the water use by the consumer or producer himself. Indirect water use refers to the water use in the production chain of products bought by the consumer or producer. Source: Hoekstra, A.Y. (2008) Water neutral: reducing and offsetting the impacts of water footprints, Value of Water Research Report Series No.28, UNESCO-IHE.

## Assessing the water footprint of crop and animal products

### Water footprint of a crop

- Crop water use ( $\text{m}^3/\text{ha}$ ) / Crop yield ( $\text{ton}/\text{ha}$ )

### Water footprint of an animal

- Sum of water for feed, drinking and servicing

### Water footprint of a crop or livestock product

- Distribute the water footprint of the root product over its derived products

The water footprint ( $\text{m}^3/\text{ton}$ ) of primary crops can be calculated as the crop water use at field level ( $\text{m}^3/\text{ha}$ ) divided by the crop yield ( $\text{ton}/\text{ha}$ ). The crop water use depends on the crop water requirement on the one hand and the actual soil water available on the other hand. When a primary crop is processed into a crop product (e.g. paddy rice processed into brown rice), the water footprint of the processed product is calculated by dividing the water footprint of the primary product by the so-called product fraction (i.e. the weight of crop product in ton obtained per ton of primary crop). If a primary crop is processed into two different products or more (for example soybean processed into soybean flour and soybean oil), we need to distribute the water footprint of the primary crop to its products. We do this proportionally to the value of the crop products.

# Crop water requirement

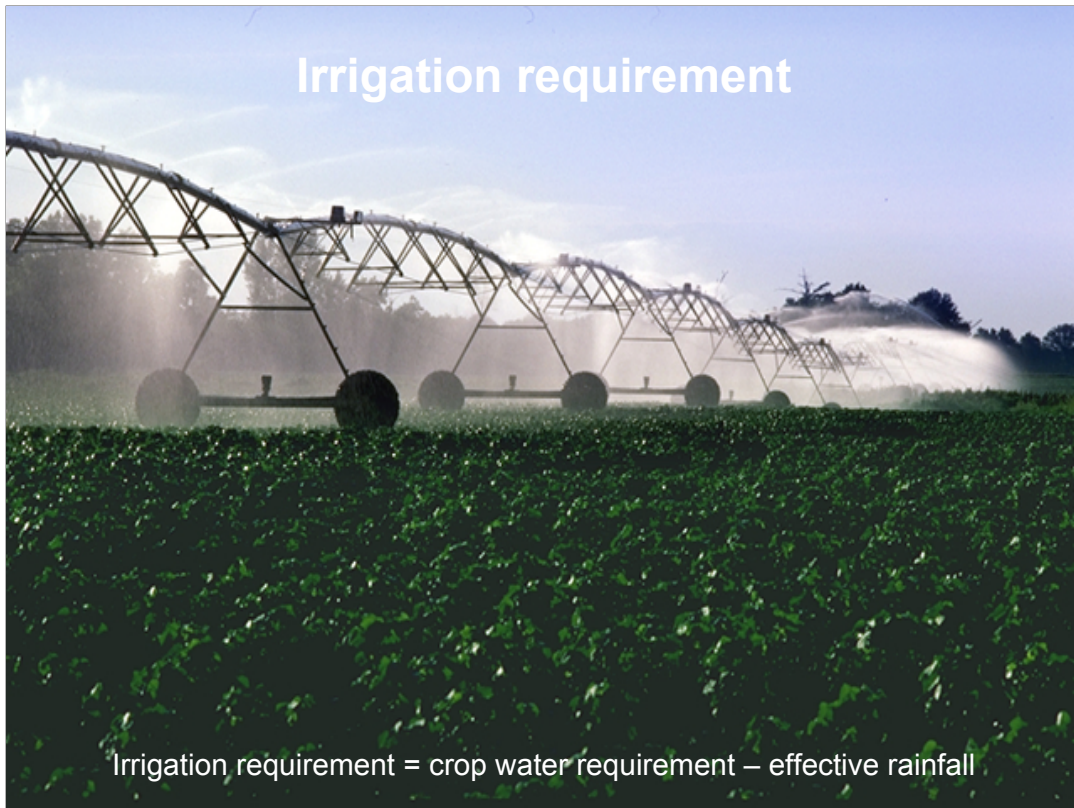
1. **Calculate reference crop evapotranspiration  $ET_0$  (mm/day)**  
e.g. Penman-Monteith equation
2. **Calculate crop evapotranspiration  $Et_c$  (mm/day)**  
 $Et_c = ET_0 \times K_c$  where  $K_c$  = crop coefficient
3. **Calculate crop water requirement  $CWR$  (m<sup>3</sup>/ha)**  
 $CWR = \sum Et_c$  [accumulate over growing period]

cfrederick 05

The water requirement of a crop can be estimated based on climate data (like temperature, wind speed, etc.) and crop characteristics. Various models are available to estimate crop water requirements. A common model is the CropWat model of the Food and Agriculture Organization (FAO), which is freely available online.

Photo: wheat field.





When rainfall does not meet the crop water requirement, the gap is the irrigation water requirement. When the irrigation water requirement is supplied indeed, growing conditions are optimal (provided that other factors like nutrient availability are optimal as well). If the irrigation requirement is not met or only partly, the yield is likely to be lower than optimal. The yield reduction depends on the volumes and timing of the water shortages.

Picture: Pivot irrigation on cotton.

## Crop water use

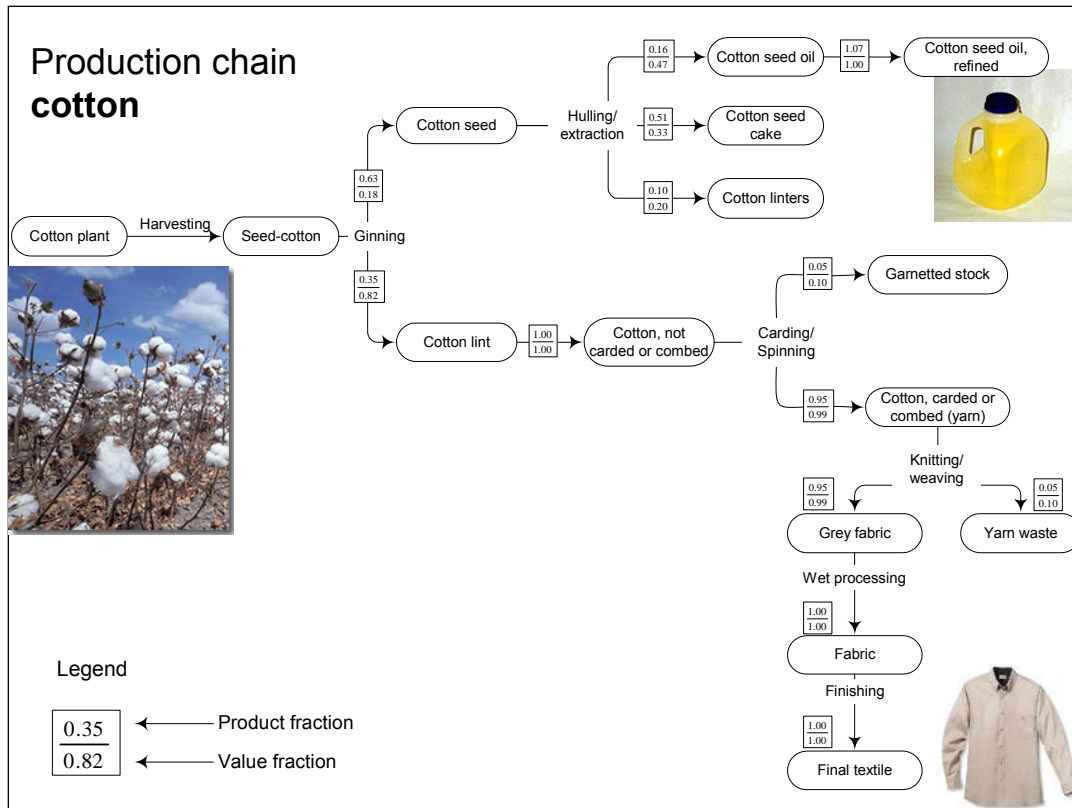
Green water use by crop =  
 $\min(\text{crop water requirement, effective precipitation})$

Blue water use by crop =  
 $\min(\text{irrigation requirement, effective irrigation})$

Green water use refers to the volume of rainwater that evaporates from a crop field during the growing period. Blue water use refers to the volume of irrigation water (withdrawn from surface or ground water) that evaporates from a crop field during the growing period. The distinction between green and blue water has been introduced by Malin Falkenmark, Swedish hydrologist.

## Grey water footprint

- volume of polluted freshwater that associates with the production of a product in its full supply-chain.
- calculated as the volume of water that is required to dilute pollutants to such an extent that the quality of the water remains above agreed water quality standards.



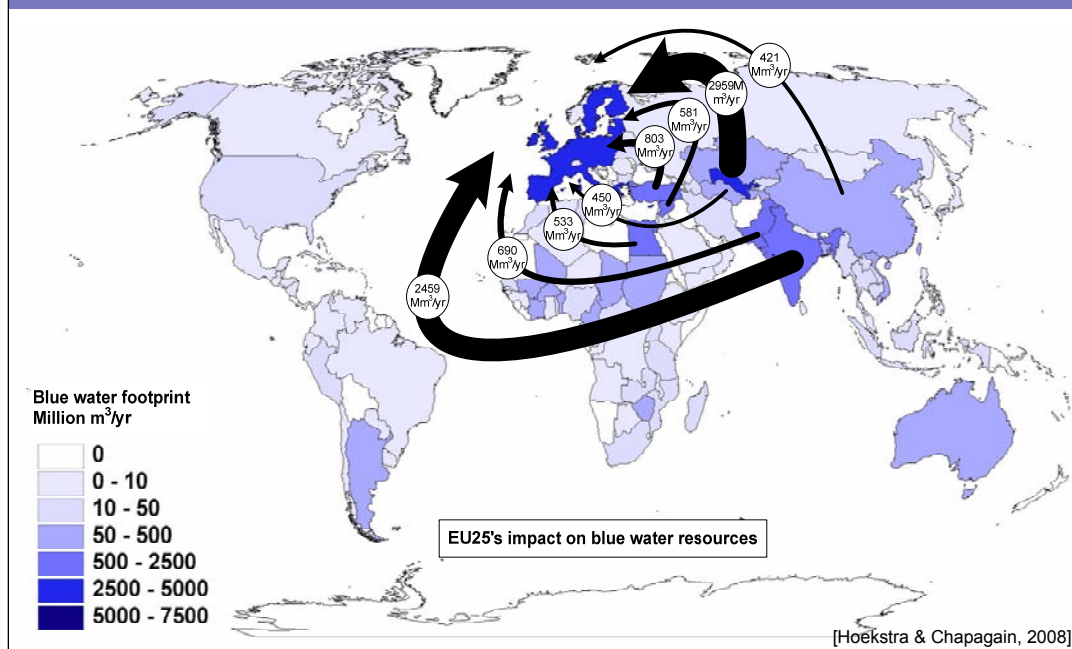
A cotton shirt is made from cotton fabric, which is made from combed or carded cotton, which is derived from cotton lint, which comes from seed cotton, which is harvested from the cotton field. Indeed, before the final cotton textile reaches to the hands of a consumer it passes through a number of intermediate processes and products. First the seed cotton is processed into lint (we get only 350 kg of lint out of 1000 kg of seed cotton), then after carding, spinning and weaving we get grey fabric (1000 kg of lint produces only 900 kg of grey fabric), then it goes to the wet processing (bleaching and dyeing) and finishes as final printed cotton textile. It requires about 30 m<sup>3</sup> per ton for bleaching, 140 m<sup>3</sup> per ton for dyeing and 190 m<sup>3</sup> per ton for printing. The average water footprint of printed cotton (for example a pair of jeans weighing 1 kilogram) is 11000 litres per kilogram.



[Hoekstra & Chapagain, 2008]

Water footprint: 2700 litres for 1 cotton shirt. In order to get 1 kg of final cotton textile, one requires 11,000 litres of water (as a global average). Thus, when we have a shirt with a weight of 250 gram, this shirt costs 2700 litres. Of this total water volume, 45% is irrigation water consumed (evaporated) by the cotton plant; 41% is rainwater evaporated from the cotton field during the growing period; and 14% is water required to dilute the wastewater flows that result from the use of fertilisers in the field and the use of chemicals in the textile industry. Globally, the annual cotton production evaporates 210 billion cubic meters of water and pollutes 50 billion cubic meters of water. This is 3.5 % of the global water use for crop production.

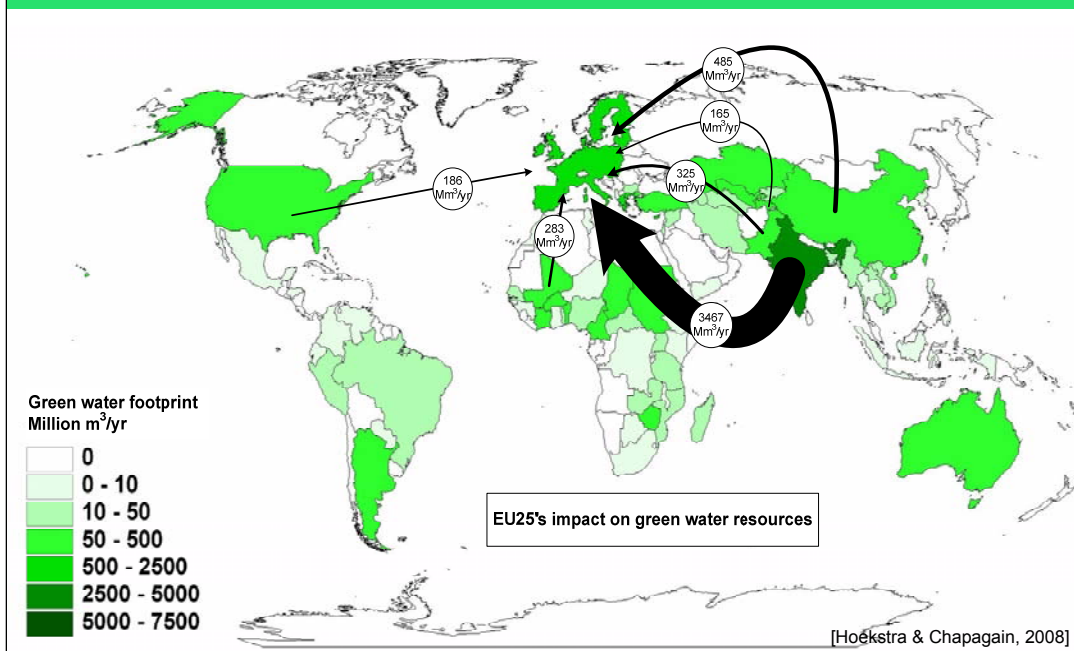
## Water footprint of EU's cotton consumption (blue water)



The water footprint has a spatial dimension, so it can be mapped. A water footprint map shows the volumes of water used at various locations, for example the water used worldwide to make the products consumed by a given community.

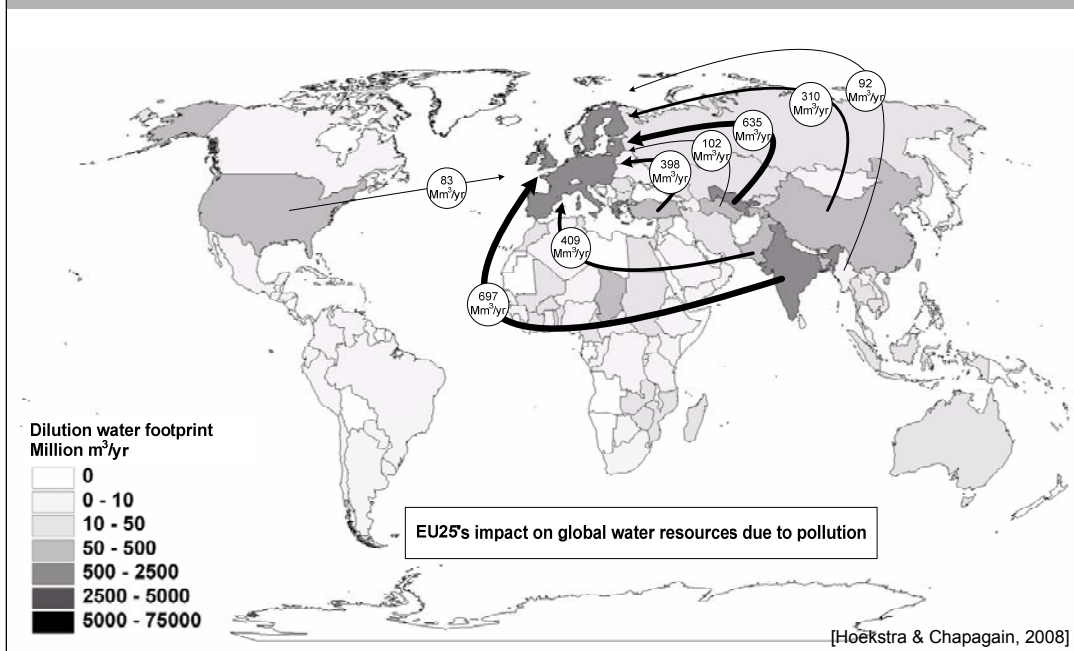
The impact of consumption of cotton products by citizens in EU25 on the world's water resources (million m<sup>3</sup>/yr). Period 1997-2001. This slide shows the blue water footprint, i.e. the volume of irrigation water evaporated. Source: Hoekstra and Chapagain (2008), map 15.

## Water footprint of EU's cotton consumption (green water)



This slide shows the green water footprint related to EU's cotton consumption, i.e. the volumes of rainwater evaporated for crop growth.

## Water footprint of EU's cotton consumption (grey water)



This slide shows the gray water footprint related to EU's cotton consumption, i.e. the volumes of water polluted because of cotton production and processing.



The water footprint:  
making a link between consumption in one place and  
impacts on water systems elsewhere



Shrinking Aral Sea

Water use for cotton production can have major impacts on the environment. Particularly intensive irrigation schemes can have disastrous effects, as shown for example in the case of Uzbekistan and the desiccation of the Aral Sea.



The Indus River dolphin (*Platanista minor*) is one of the world's rarest mammals and the second most endangered freshwater river dolphin. Approximately 1,100 specimens of this species exist today in a small fraction of their former range, the lower reaches of the Indus River in Pakistan. However, the population of this species has gradually declined because of various factors, including water pollution, poaching, fragmentation of habitat due to barrages, and dolphin strandings in the irrigation canals. (Source: WWF).  
Pollution (pesticide runoff) from mainly cotton.

Yangtze dolphin extinct, Indus severely threatened. Water for people and nature requires management which focuses on multiple needs of systems. WF analysis allows us to trace supply and identify impacts. It gives clear steer on risk and responsibility.

This is a **global average** and **aggregate** number. Policy decisions should be taken on the basis of:

1. Actual water footprint of certain coffee at the precise production location.
2. Ratio green/blue/grey water footprint.
3. Local impacts of the water footprint based on local vulnerability and scarcity.



[Hoekstra & Chapagain, 2008]

It costs about 21,000 litres of water to produce 1 kg of roasted coffee. For a standard cup of coffee we require 7 gram of roasted coffee, so that a cup of coffee costs 140 litres of water. Assuming that a standard cup of coffee is 125 ml, we thus need more than 1100 drops of water for producing one drop of coffee. Drinking tea instead of coffee would save a lot of water. For a standard cup of tea of 250 ml we require 30 litres of water.



[Hoekstra & Chapagain, 2008]

The water footprint of pure chocolate is 2400 litres for a 100-gram bar (as a world average!). Composition of dark chocolate: 40% cocoa paste (water footprint 33260 litres/kg); 20% cocoa butter (water footprint 50730 litres/kg); 40% sugar (water footprint 1526 litres/kg). We then can calculate:  $40\% \cdot 33260 + 20\% \cdot 50730 + 40\% \cdot 1526 = 24060$  litres/kg = 2400 liters for one 100gr chocolate bar. The water footprint of milk powder is 4600 litres/kg, so that milk chocolate will have a bit larger water footprint (about 2500 litres for one 100gr chocolate bar) than dark chocolate when total cocoa content remains the same. Most crucial for the water footprint of chocolate is the cocoa paste and cocoa butter content.



[Hoekstra & Chapagain, 2008]

For 1 kg of refined sugar from SUGAR CANE we require about 1500 litres of water. Sugar cane consumes about 220 billion cubic meters of water annually, which is 3.4 % of the global water use for crop production. Sugar from sugar beets requires less water per kg.



[Hoekstra & Chapagain, 2008]



[Hoekstra & Chapagain, 2008]



The major part of the water footprint of a hamburger refers to the water needed to make the feed for the cow.

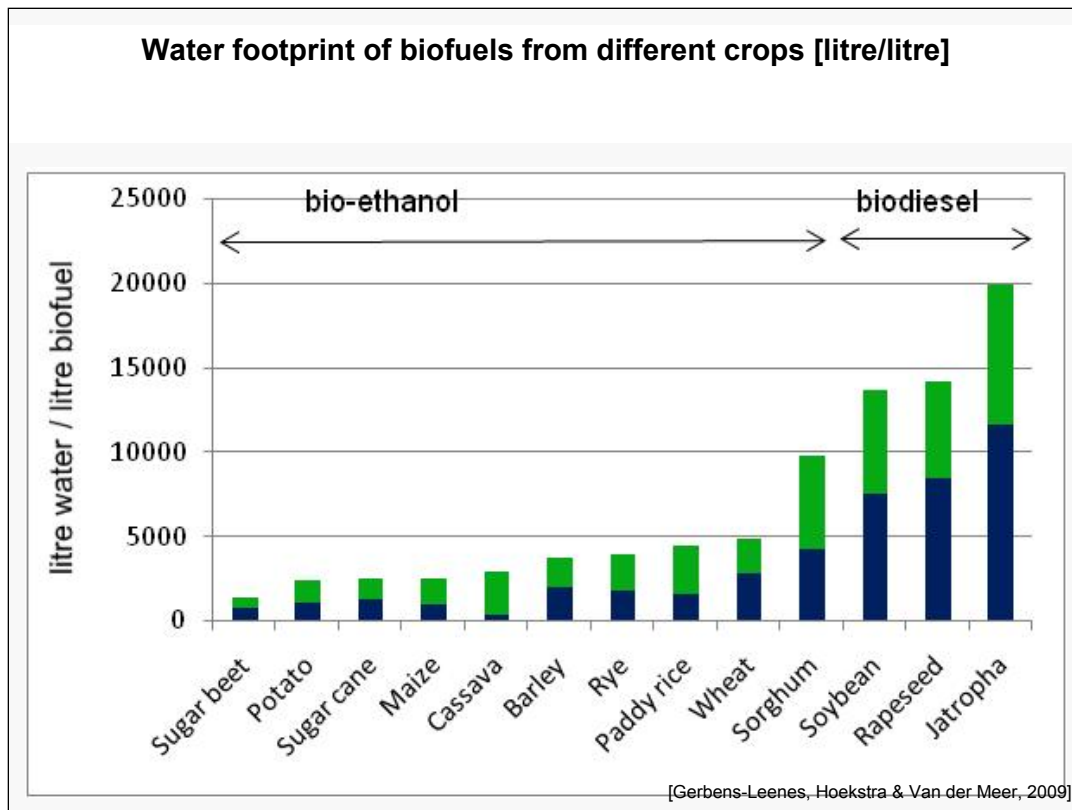




[Hoekstra & Chapagain, 2008]



Water footprint: 10 litres of water for one A4-sheet of paper. We assume here eighty-grams paper (80g/m<sup>2</sup>). Further we assume that the paper is produced from wood.



Source: Gerbens-Leenes, W., Hoekstra, A.Y. and Van der Meer, T.H. (2009) The water footprint of bio-energy, *Proceedings of the National Academy of Sciences*, PNAS Early Edition, doi:10.1073/pnas.0812619106.



The water footprint  
of a nation



## Water footprint of a nation

- ▶ total amount of water that is used to produce the goods and services consumed by the inhabitants of the nation.
- ▶ two components:
  - internal water footprint – inside the country.
  - external water footprint – in other countries.

The water footprint is an indicator of water use that looks at both direct and indirect water use. The water footprint of a nation is defined as the total amount of water that is used to produce the goods and services consumed by the inhabitants of the nation.

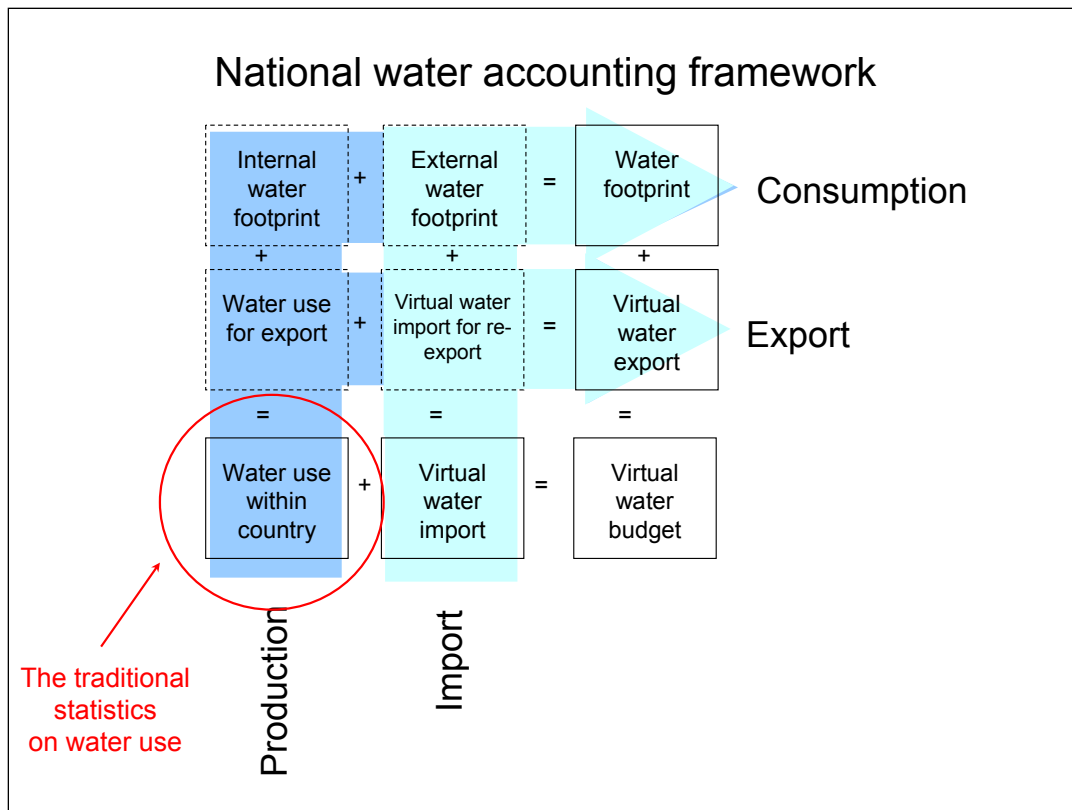
The water footprint of a nation has two components. The internal water footprint is defined as the water use within the country in so far it is used to produce goods and services consumed by the national population. The external water footprint of a country is defined as the annual volume of water resources used in other countries to produce goods and services imported into and consumed in the country considered.



## Water footprint of a nation

- ▶ National water footprint =  
national water use  
+ virtual water import  
– virtual water export

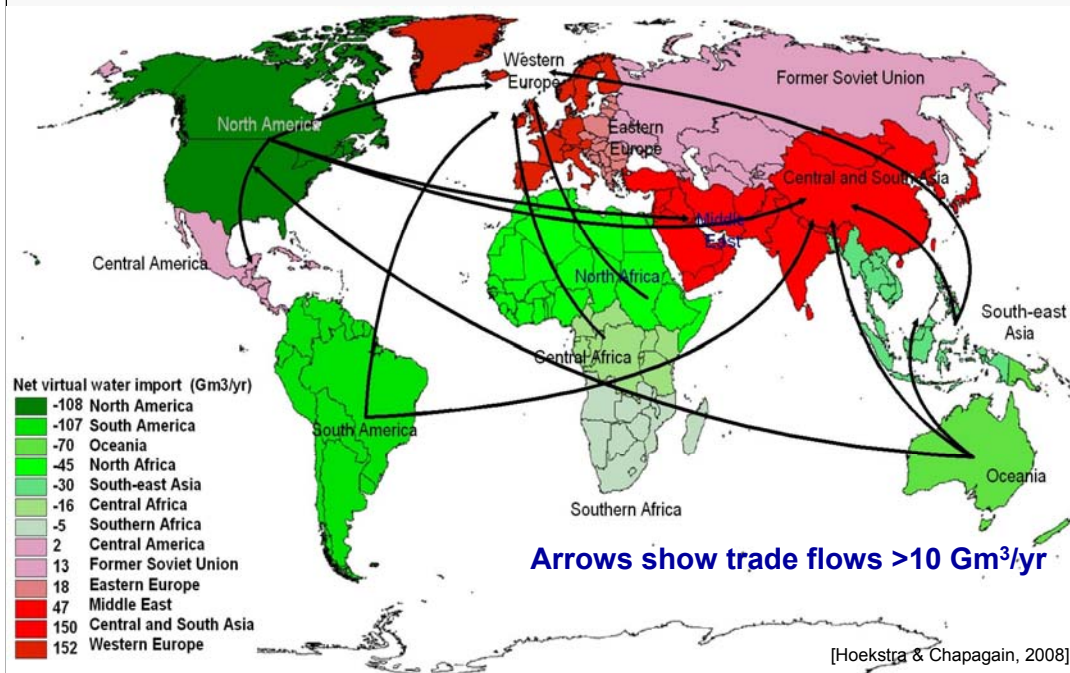
The national water footprint can be assessed in two ways. In the top-down approach, the water footprint of a nation is calculated as the total use of domestic water resources plus the gross virtual-water import minus the gross virtual-water export. The bottom-up approach is to consider the sum of all goods and services consumed multiplied with their respective product water footprint.



The internal water footprint is the water use within the country in so far it is used to produce goods and services consumed by the national population. The external water footprint of a country is the annual volume of water resources used in other countries to produce goods and services imported into and consumed in the country considered. It is equal to the virtual-water import into the country minus the volume of virtual-water exported to other countries as a result of re-export of imported products. The virtual-water export consists of exported water of domestic origin and re-exported water of foreign origin. The virtual-water import will partly be consumed, thus constituting the external water footprint of the country, and partly be re-exported. The sum of virtual water import and water use within a country is equal to the sum of the virtual water export and the country's water footprint. This sum is called the virtual-water budget of a country.

Traditionally countries formulate national water plans by looking how to satisfy water users. Even though countries nowadays consider options to reduce water demand in addition to options to increase supply, they generally do not include the global dimension of water management. In this way they do not explicitly consider options to save water through import of water-intensive products. In addition, by looking only at water use in the own country, most governments have a blind spot to the issue of sustainability of national consumption. As a matter of fact many countries have significantly externalized their water footprint without looking whether the imported products are related to water depletion or pollution in the producing countries. Governments can and should engage with consumers and businesses to work towards sustainable consumer products. National water footprint accounting should be a standard component in national water statistics and provide a basis to formulate a national water plan and river basin plans that are coherent with national trade policy and national environmental policy.

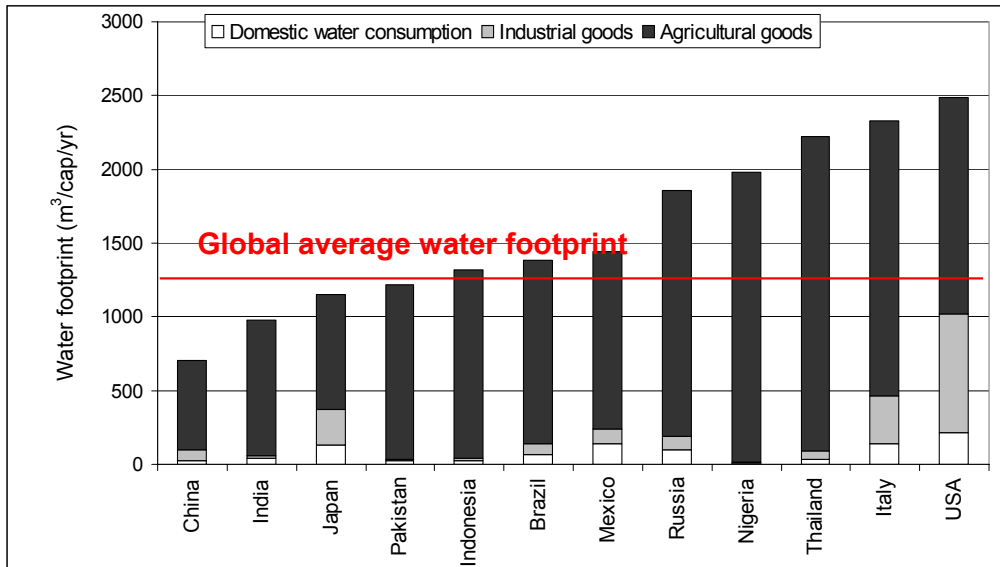
## Regional virtual water balances (only agricultural trade)



Regional virtual-water balances and net interregional virtual-water flows related to trade in agricultural products. Only the biggest net flows (>10 billion m<sup>3</sup>/yr) are shown. Period 1997-2001. Source: Hoekstra and Chapagain (2008), map 2.



## Water footprint per capita



[Hoekstra & Chapagain, 2008]

USA has a large water footprint because of the high consumption level. Nigeria and Thailand have a large water footprint because of inefficient water use (large water use per unit of product).

## Major determinants of a water footprint

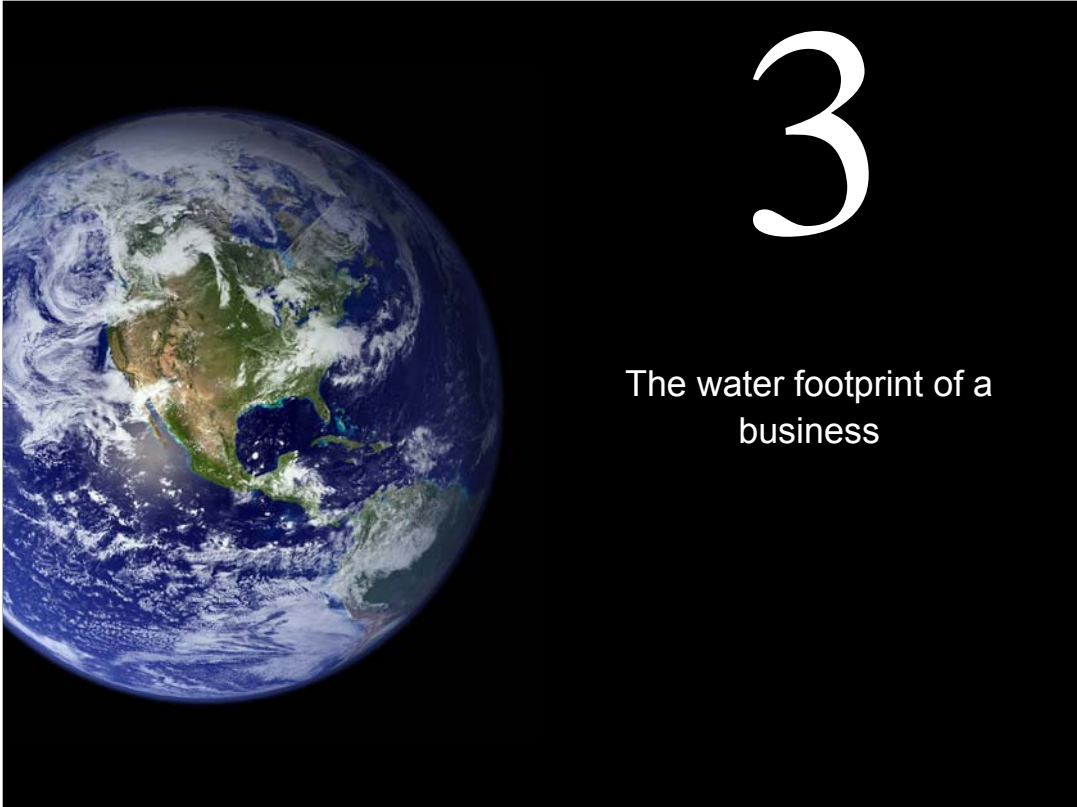
### 1. Consumption characteristics

- Consumption volume
- Consumption pattern

### 2. Production circumstances

- Climate: evaporative demand at place of production
- Agricultural practice: water use efficiency

USA has a large water footprint because of the high consumption level. Nigeria and Thailand have a large water footprint because of inefficient water use (large water use per unit of product).



## Why businesses are interested

- corporate social responsibility
- corporate image / marketing perspective
- business risks related to
  - freshwater shortage for own operations
  - freshwater shortage in supply chain
- anticipate regulatory control

For many companies, fresh water is a basic ingredient for their operations, while effluents may lead to pollution of the local water system. Initially, public pressure has been the most important reason for sustainability initiatives in businesses. Today, however, many companies recognize that failure to manage the issue of fresh water raises different sorts of business risk, including damage to the corporate image, threat of increased regulatory control, financial risks caused by pollution, and insufficient freshwater availability for operations. A number of multinationals recognise now that proactive management can avoid risks and contribute to their profitability and competitiveness. Business water footprint accounting is increasingly regarded as an essential part of sustainable corporate performance accounting. An increasing number of businesses recognize that not only their operations, but also their supplies depend and impact on natural water systems.

## Water footprint of a business

### Operational water footprint

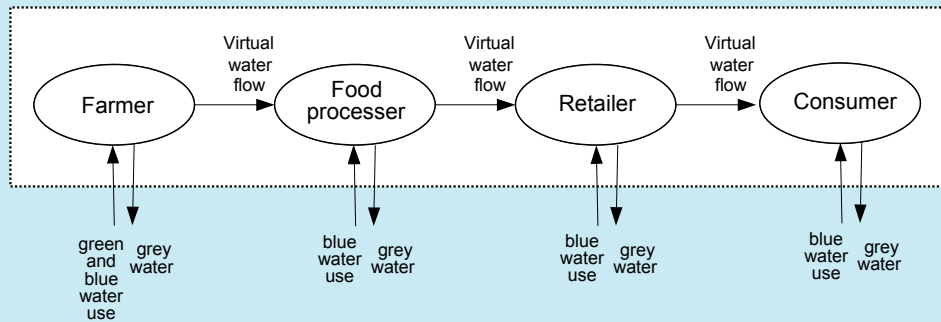
- the **direct** water use by the producer – for producing, manufacturing or for supporting activities.

### Supply-chain water footprint

- the **indirect** water use in the producer's supply chain.

The water footprint of a business is the total volume of fresh water that is used directly and indirectly to run and support a business. The water footprint of a business consists of two components: the direct water use by the producer, for producing/manufacturing and supporting activities, and the indirect water use, i.e. the water use in the producer's supply chain. The 'water footprint of a business' is the same as the total 'water footprint of the business output products'.

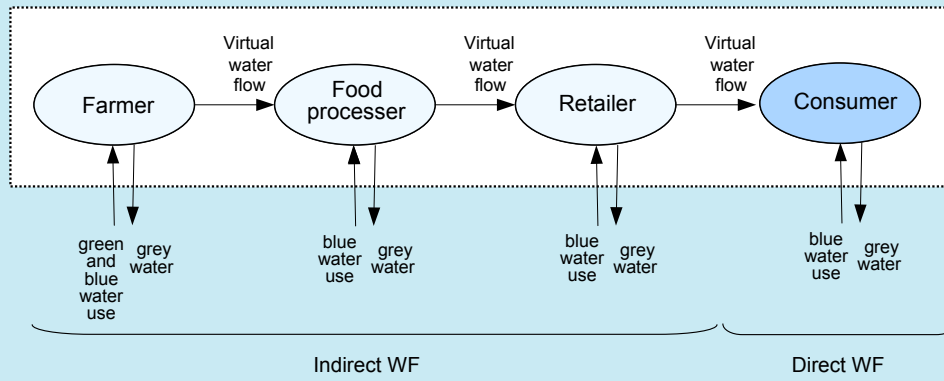
## The virtual water chain



[Hoekstra, 2008]

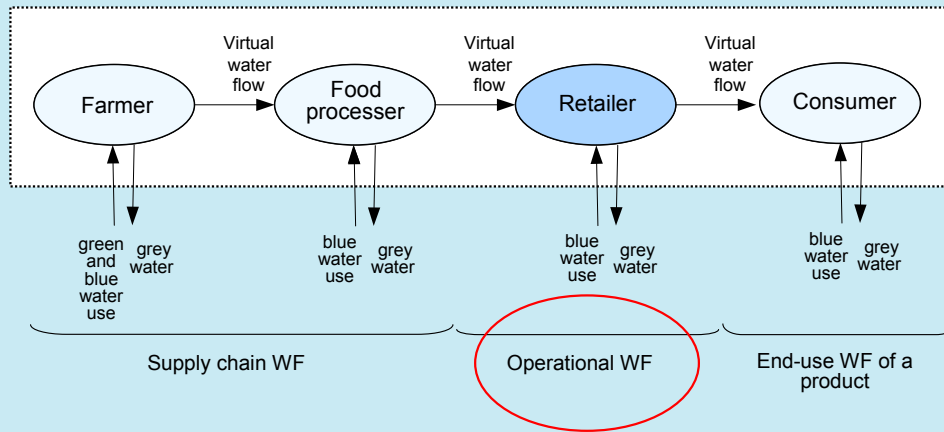
The virtual water chain is the chain of production and consumption of water-intensive goods. A typical virtual water chain consists of a farmer at the primary production end, a consumer at the consumption end and, depending on the commodity at stake, some intermediaries such as a food processor and a retailer. Each stage depends on some real water input and a virtual water inflow.

## The water footprint of a consumer



[Hoekstra, 2008]

## The water footprint of a retailer

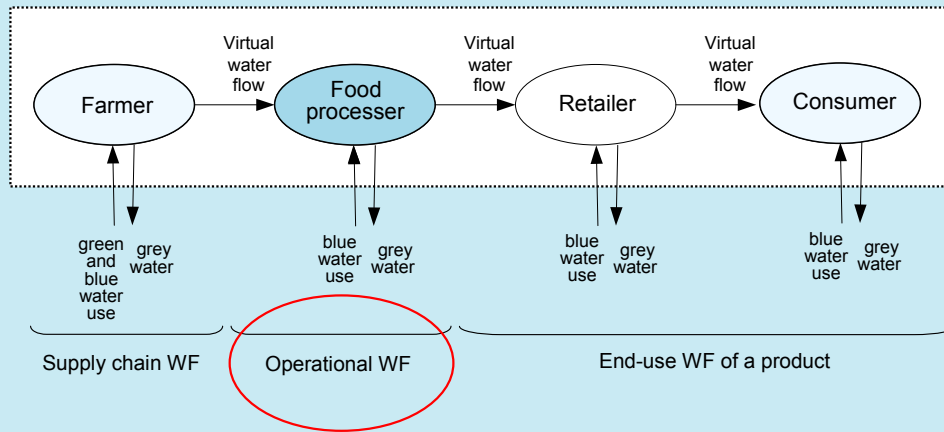


The traditional statistics  
on corporate water use

[Hoekstra, 2008]



## The water footprint of a food processor



The traditional statistics  
on corporate water use

[Hoekstra, 2008]

## Water footprint – Carbon footprint

### Water footprint

- spatial and temporal dimension
- actual, locally specific values
- always referring to full supply-chain
- focus on reducing own water footprint (water use units are not interchangeable)

### Carbon footprint

- no spatial / temporal dimension
- global average values
- supply-chain included only in 'scope 3 carbon accounting'
- many efforts focused on offsetting (carbon emission units are interchangeable)

*Water footprint and carbon footprint are complementary tools.*

[Hoekstra, 2009]

## Water footprint – Life cycle assessment

### Water footprint

- measuring freshwater appropriation
- multi-dimensional (type of water use, location, timing)
- actual water volumes, no weighing
- WF accounts offer basis for impact assessment and formulation of sustainable water use strategy

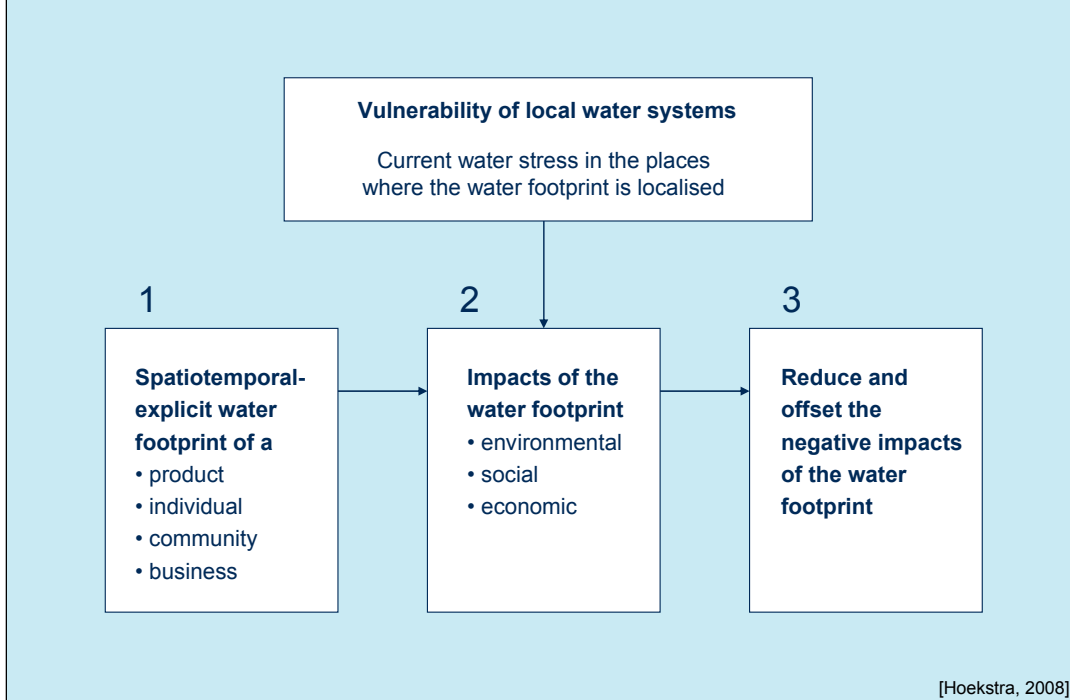
### LCA

- measuring overall environmental impact
- no spatial dimension
- weighing water volumes based on impacts
- LCA offers basis for comparing products with respect to overall environmental impact

[Hoekstra, 2009]



## From water footprint accounting to policy formulation



Source: Hoekstra, A.Y. (2008) Water neutral: reducing and offsetting the impacts of water footprints, Value of Water Research Report Series No.28, UNESCO-IHE.

## Water footprint impact assessment

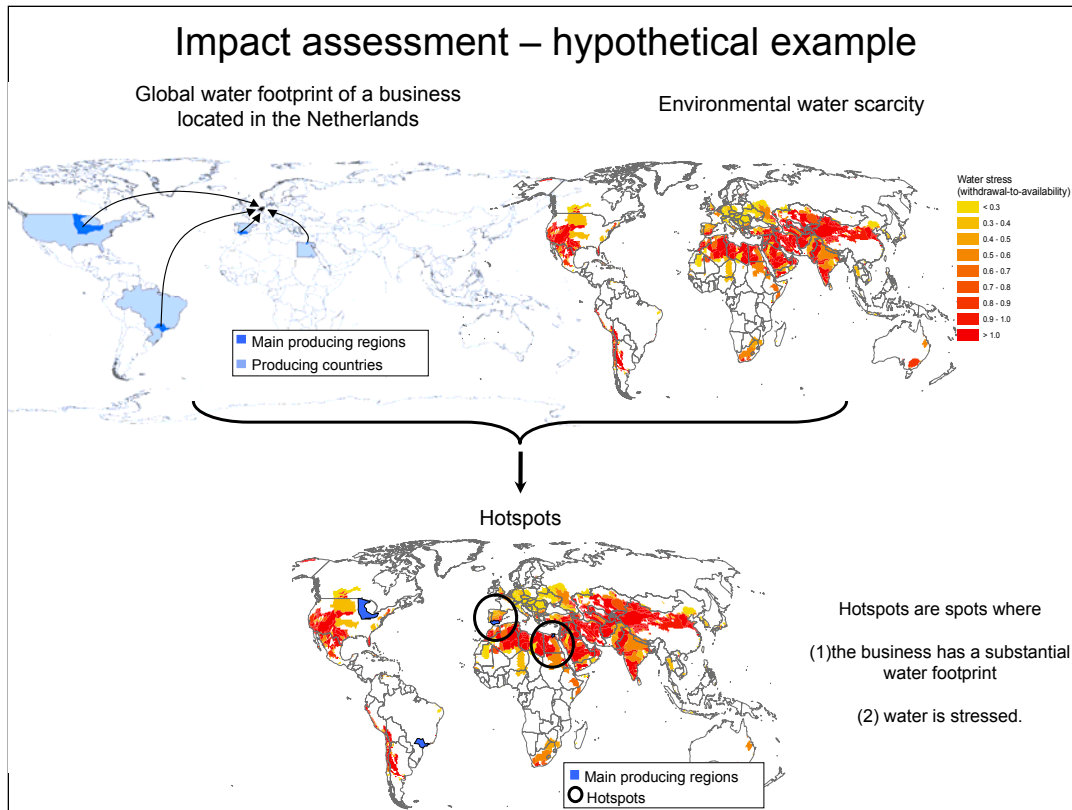
Global map of where  
the water footprint  
is located

Global map of where  
water systems are  
stressed

Overlay

Global hotspot map

Source: Hoekstra, A.Y. (2008) Water neutral: reducing and offsetting the impacts of water footprints, Value of Water Research Report Series No.28, UNESCO-IHE.



Water scarcity level by basin taking into account environmental water requirements. The index is calculated by dividing the water withdrawal in a certain area by the total runoff in that area lessened by the environmental water requirements. Source: Smakhtin, V., Revenga, C., and Döll, P. (2004) Taking into account environmental water requirements in global-scale water resources assessments, Comprehensive Assessment Research Report 2, IWMI, Colombo, Sri Lanka.

## Reducing and offsetting the impacts of water footprints

**Reduction:** all what is 'reasonably possible' should have been done to reduce the existing water footprint; do not undertake water-using activities if better alternatives are available.

**Offsetting:** the residual water footprint is offset by making a 'reasonable investment' in establishing or supporting projects that aim at a sustainable, equitable and efficient use of water in the catchment where the residual water footprint is located.

[Hoekstra, 2008]

Source: Hoekstra, A.Y. (2008) Water neutral: reducing and offsetting the impacts of water footprints, Value of Water Research Report Series No.28, UNESCO-IHE.



## Consumer perspective

### Reduction of the direct water footprint:

- water saving toilet, shower-head, etc.

### Reduction of the indirect water footprint:

- substitution of a consumer product that has a large water footprint by a different type of product that has a smaller water footprint;
- substitution of a consumer product that has a large water footprint by the same product that is derived from another source with smaller water footprint.

Ask product transparency from businesses and regulation from governments

[Hoekstra, 2008]

Examples of the first sort of substitution are replacing rice consumption in the Netherlands by potatoes or replacing cane sugar by beet sugar. An example of the second sort of substitution is replacing cotton clothes that originate from semi-arid regions with irrigated cotton fields by cotton clothes produced in wetter areas with rain-fed cotton growing. Both sorts of action require that the consumer is provided with proper information about the water footprints of specific products. For the first sort of substitution some general knowledge about the water footprints of different types of products may be sufficient, but for the second sort of substitution individual items need to be labelled in the shop. Source: Hoekstra, A.Y. (2008) Water neutral: reducing and offsetting the impacts of water footprints, Value of Water Research Report Series No.28, UNESCO-IHE.

## Business perspective

Reduction of the operational water footprint:

- water saving in own operations.

Reduction of the supply-chain water footprint:

- influencing suppliers;
- changing to other suppliers;
- transform business model in order to incorporate or better control supply chains.

[Hoekstra, 2008]

Source: Hoekstra, A.Y. (2008) Water neutral: reducing and offsetting the impacts of water footprints, Value of Water Research Report Series No.28, UNESCO-IHE.

## Business / product transparency

Water footprint reporting

Shared standards

Labelling of products

Certification of businesses

Benchmarking

Quantitative footprint reduction targets

## Government perspective

### Reduction of own organizational water footprint:

- Reducing the water footprint of public services.

### Embedding water footprint analysis in legislation

### Supporting / forcing businesses:

- to make annual business water footprint accounts;
- to implement measures that reduce the impacts of business water footprints.

### Promoting product transparency

- through promoting a water label for water-intensive products;
- through water-certification of businesses.



## Shared responsibility and an incremental approach

- **Consumers** or consumer or environmental organizations push businesses and governments to address water use and impacts along supply chains.
- Some **businesses** act voluntarily in an early stage.
- **Governments** promote businesses in an early phase and implement regulations in a later phase.



**Mission:** Promoting sustainable, equitable and efficient water use through development of **shared standards** on water footprint accounting and guidelines for the reduction and offsetting of impacts of water footprints.

**Network:** bringing together expertise from academia, businesses, civil society, governments and international organisations.

The mission of the Water Footprint Network is to promote the transition towards sustainable, fair and efficient use of fresh water resources worldwide by:

- \* advancing the concept of the ‘water footprint’, a spatially and temporally explicit indicator of direct and indirect water use of consumers and producers;
- \* increasing the water footprint awareness of communities, government bodies and businesses and their understanding of how consumption of goods and services and production chains relate to water use and impacts on fresh-water systems; and
- \* encouraging forms of water governance that reduce the negative ecological and social impacts of the water footprints of communities, countries and businesses.

The Water Footprint Network aims to come to broadly shared global standards on water footprint accounting. We try to prevent what has happened in the case of the carbon footprint: a multitude of different definitions, approaches and methods, so that it is difficult to properly assess claims in this field. A unique set of global standards on the water footprint will make efforts of businesses and communities that strive for a reduction of their water footprint more transparent.

## Partners

partners from six continents

- research institutions
- governmental institutions
- non-governmental organisations
- large companies from different sectors
- branche organisations
- consultants
- international institutions



Waterfootprint.org: Water footprint and virtual water

http://www.waterfootprint.org/?page=files/home

Water Footprint NETWORK

# Water Footprint


## Introduction

[\[Spanish\]](#) [\[Italian\]](#) [\[French\]](#) [\[German\]](#) [\[Turkish\]](#)

Introduction  
 About WFN  
 National Water Footprints  
 Corporate Water Footprints  
 Your Footprint Calculator  
 Product Gallery  
 Case Studies  
 Publications  
 Glossary  
 Links  
 Contact


People use lots of water for drinking, cooking and washing, but even more for producing things such as food, paper, cotton clothes, etc. The water footprint is an indicator of water use that looks at both direct and indirect water use of a consumer or producer. The water footprint of an individual, community or business is defined as the total volume of freshwater that is used to produce the goods and services consumed by the individual or community or produced by the business.

**16000 litres water** → **1 kg beef**



**The relation between consumption and water use**

"The interest in the water footprint is rooted in the recognition that human impacts on freshwater systems can ultimately be linked to human consumption, and that issues like water shortages and pollution can be better understood and addressed by considering production and supply chains as a whole," says Professor Arjen Y. Hoekstra, creator of the water footprint concept and scientific director of the Water Footprint Network. "Water problems are often closely tied to the structure of the global economy. Many countries have significantly externalised their water footprint, importing water-intensive goods from elsewhere. This puts pressure on the water resources in the exporting regions, where too often mechanisms for wise water governance and conservation are lacking. Not only governments, but also consumers, businesses and civil society communities can play a role in achieving a better management of water resources."

 **New in 2008:** Book on 'Globalisation of Water'

The 2007-paper on 'Water Footprints of Nations'  
[Water Footprints of Nations](#)

The 2008-paper on 'Water Neutrality'  
[Water Neutrality](#)

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Some facts and figures

Feel free to go to the water footprint website, find much more info and freely download publications.

Waterfootprint.org: Water footprint and virtual water

http://www.waterfootprint.org/?page=files/productgallery&product=coffee

Water Footprint NETWORK

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Apple Barley Beef Beer Bread Cheese Chicken Coconuts


**Productgallery**

**Coffee**

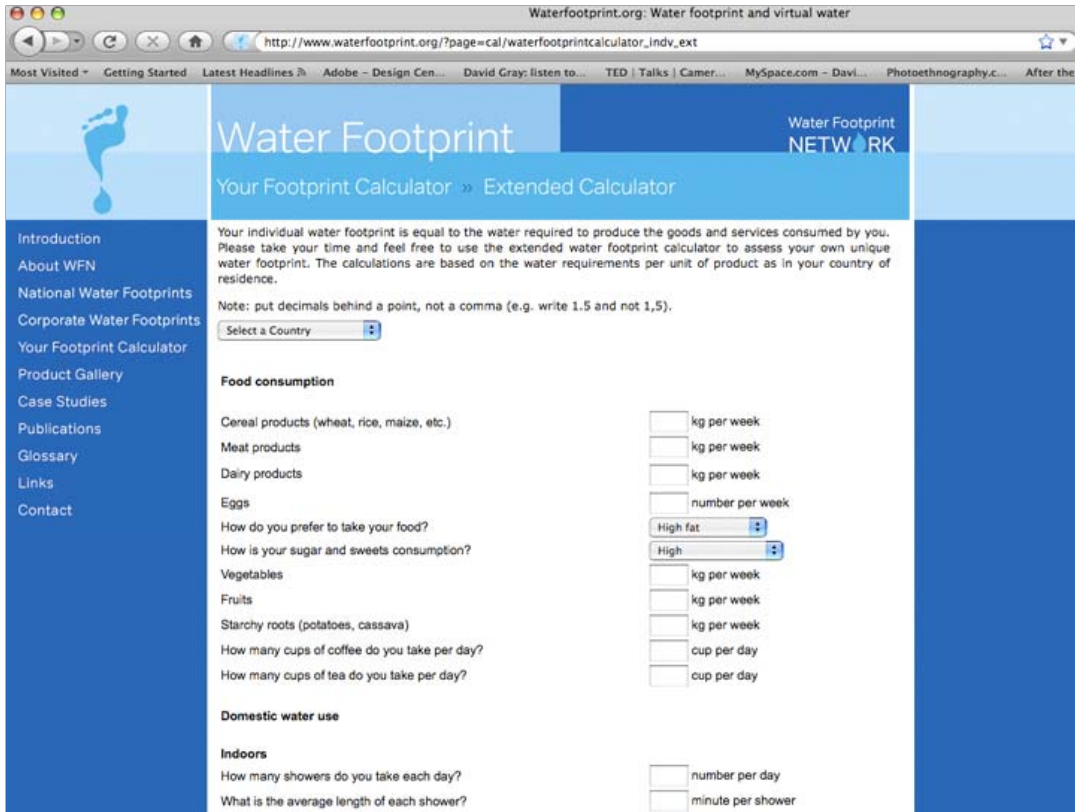
Water footprint: 140 litres for 1 cup of coffee.

It costs about 21000 litres of water to produce 1 kg of roasted coffee. For a standard cup of coffee we require 7 gram of roasted coffee, so that a cup of coffee costs 140 litres of water. Assuming that a standard cup of coffee is 125 ml, we thus need more than 1100 drops of water for producing one drop of coffee. Drinking tea instead of coffee would save a lot of water. For a standard cup of tea of 250 ml we require 30 litres of water.

The world population requires about 120 billion cubic metres of water per year in order to be able to drink coffee. This is equivalent to 1.5 times the annual Rhine



Find the water footprint of various products in the Product Gallery on the water footprint website.



Calculate your own water footprint at [www.waterfootprint.org](http://www.waterfootprint.org)