

# Water footprint as a tool for integrated water resources management

Consultative Workshop on  
Water Footprint, Neutrality and Efficiency  
1- 3 June 2010, Osaka, Japan

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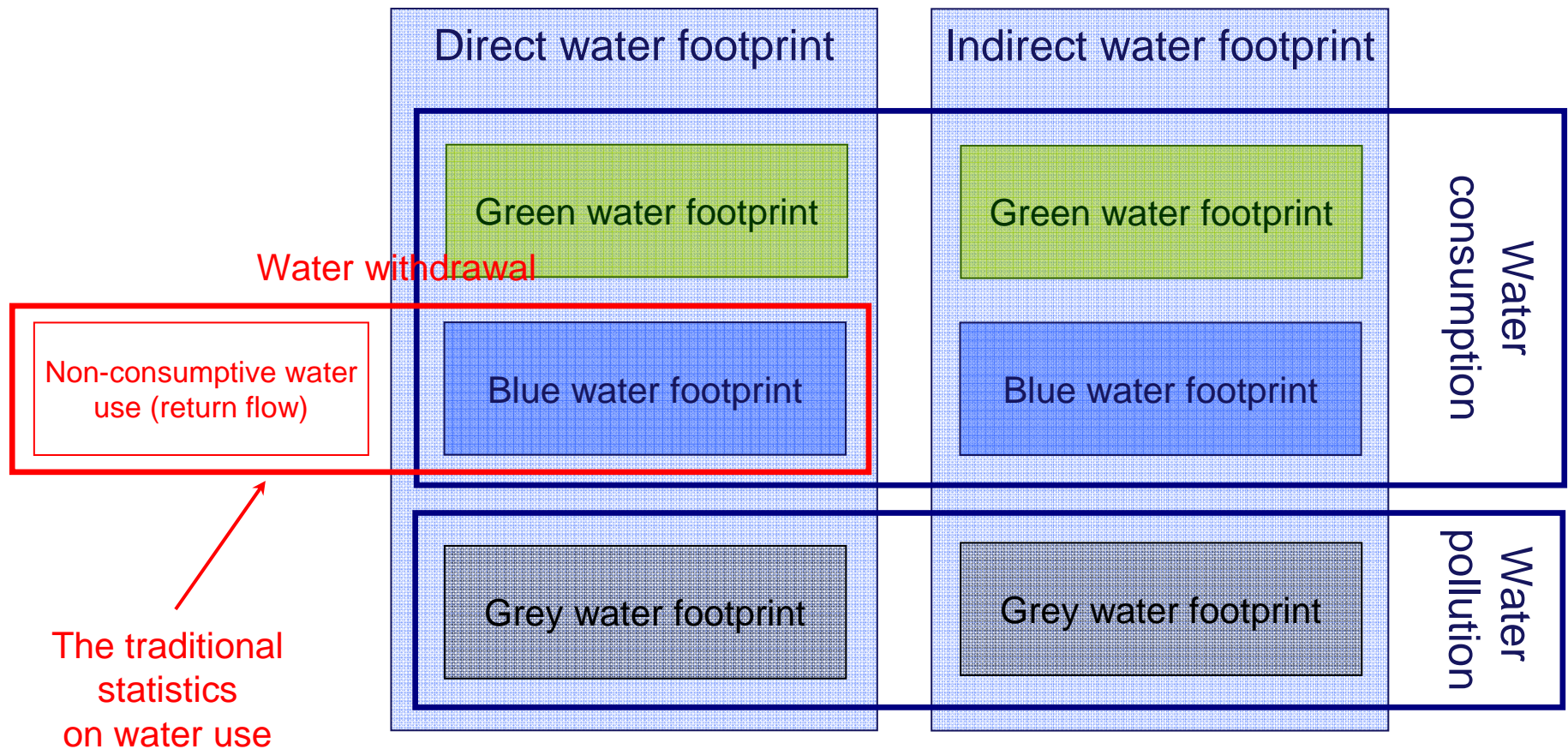


# The water footprint concept

- ▶ The WF is an indicator of water use that looks at both direct and indirect water use of a consumer or producer.
- ▶ Water use is measured in terms of:
  - water volumes consumed (evaporated or otherwise not returned)
  - polluted per unit of time
- ▶ Geographically explicit
- ▶ A WF can be calculated for:
  - process
  - product
  - consumer
  - group of consumers (e.g. municipality, province, state, nation)
  - producer (e.g. a public organization, private enterprise)

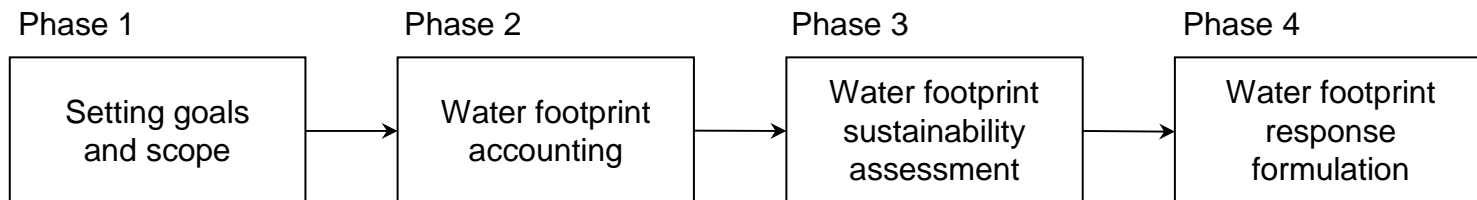


# Components of a water footprint



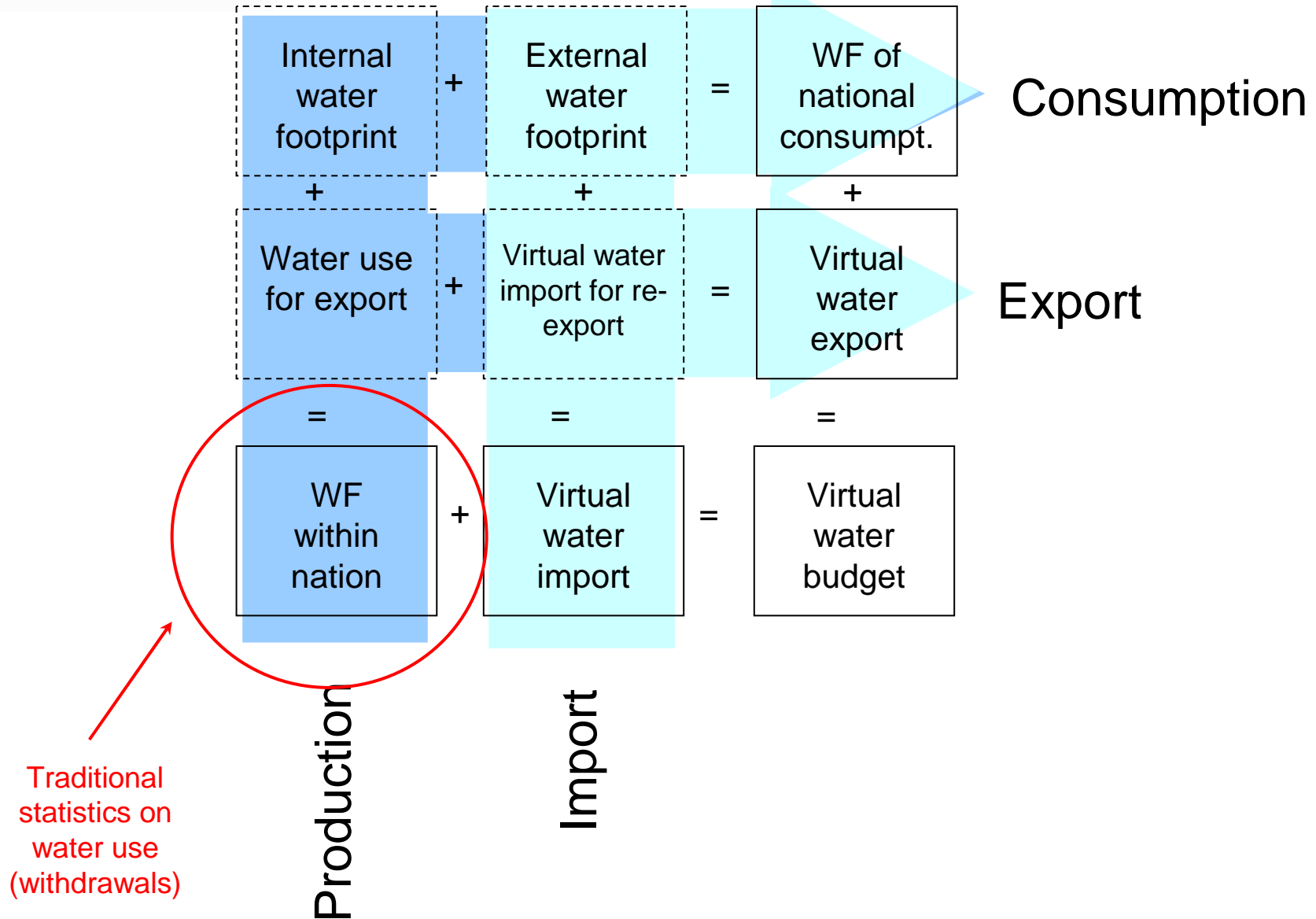


# WF assessment steps





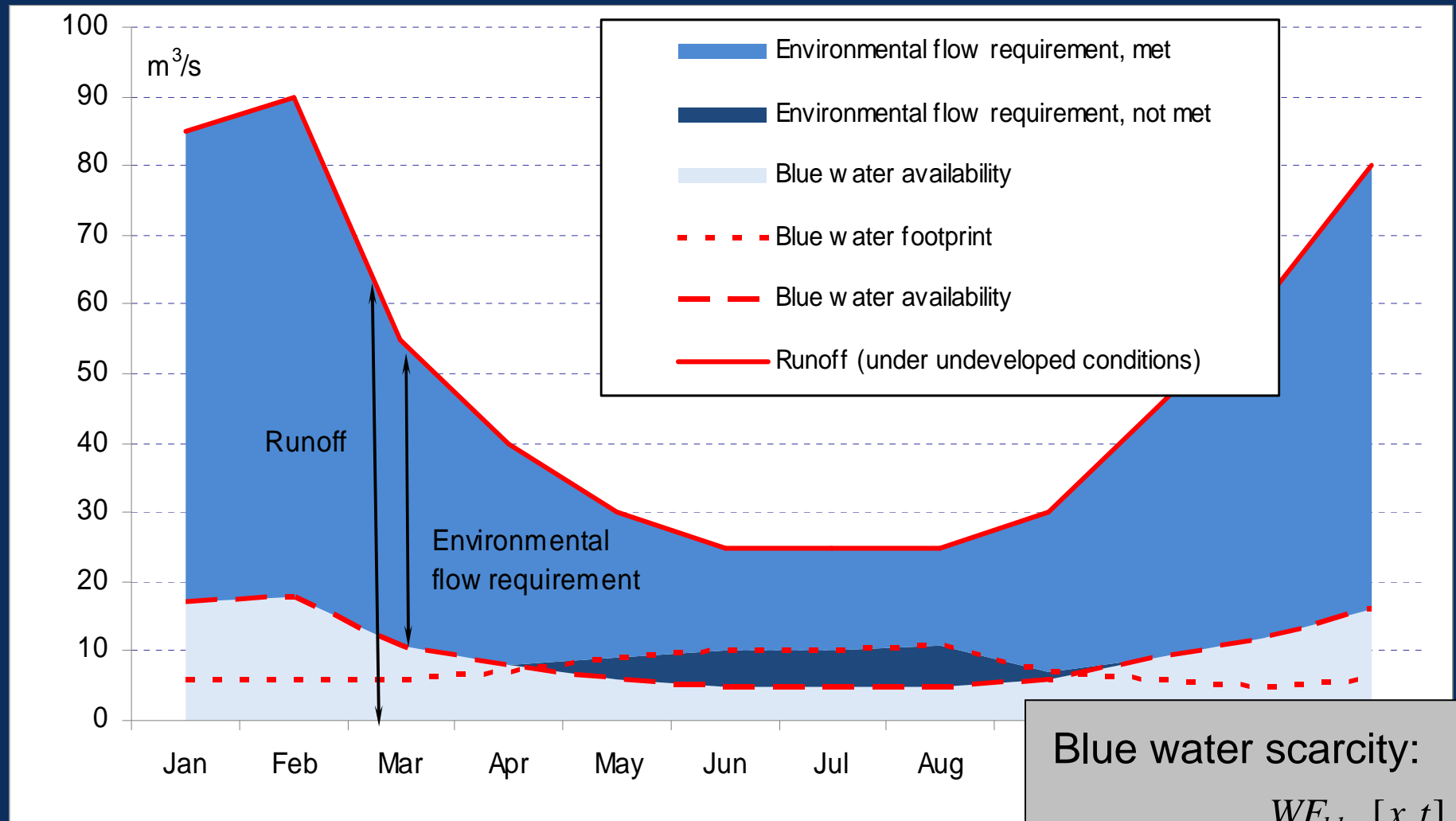
# National water accounting framework





# WF sustainability assessment

## Comparing 'blue WF' to 'blue water availability'



Blue water scarcity:

$$WS_{blue}[x, t] = \frac{WF_{blue}[x, t]}{WA_{blue}[x, t]}$$



## WF policy framework

### 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



# WF policy framework

## 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.
- ▶ Promote business/product transparency
  - Water footprint reporting
  - Shared standards
  - Labelling of products
  - Certification of businesses
  - Benchmarking
  - Quantitative footprint reduction targets



## Government perspective

- ▶ Embed WF analysis in national water policy making (statistics, water plans) indicator beyond GDP
- ▶ Promote coherence between water and other governmental policies: environmental, agricultural, energy, trade, foreign policy.
- ▶ Reduce the own organizational water footprint:
  - reducing the water footprint of public services.
- ▶ Promote product transparency
- ▶ support or force businesses to make annual water footprint accounts and to implement water footprint reduction measures.
  - e.g. water label for water-intensive products;
  - e.g. water-certification of businesses.



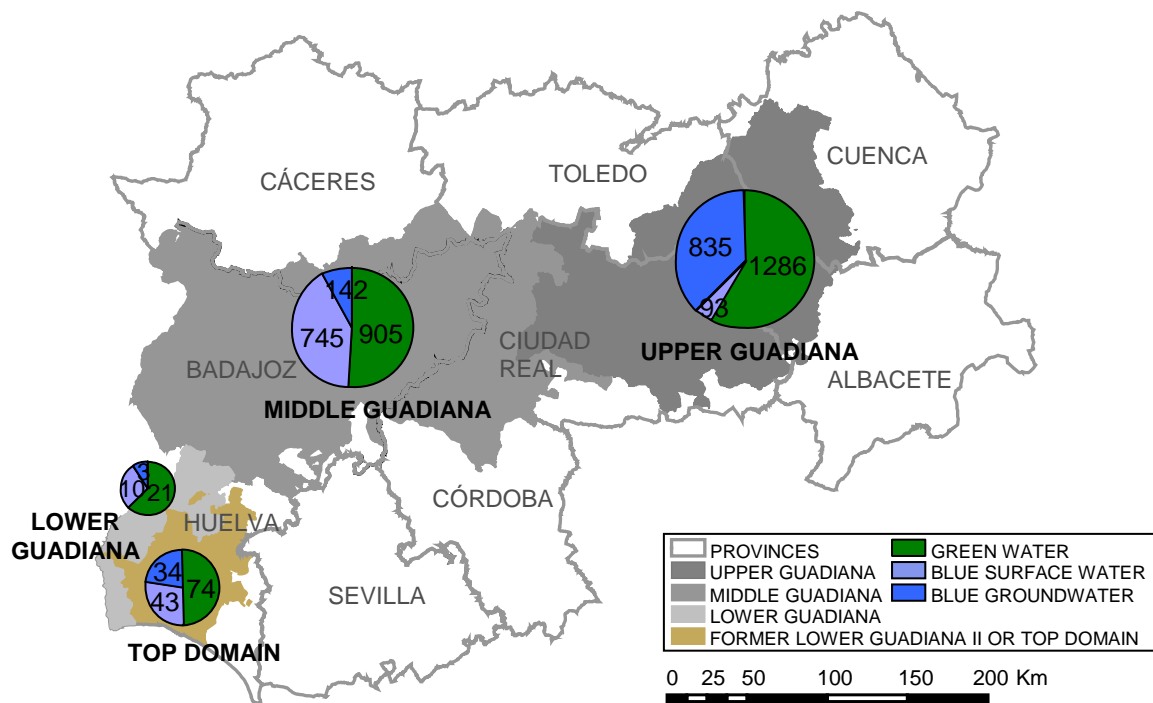
# Existing case studies

Geographic unit	Source
<b>GLOBAL</b>	
International	Chapagain & Hoekstra (2004), Hoekstra & Chapagain (2008)
<b>NATIONAL</b>	
Indonesia	Bulsink et al. (2009)
Netherlands	Van Oel et al. (2009)
Spain	Aldaya et al. (2008), Garrido et al. (2010)
Germany	Sonnenberg et al. (2009)
China	Liu & Savenije (2008), Ma et al. (2006)
India	Verma et al. (2008), Kampman et al. (in press)
Cyprus	Zoumides (2008)
Tunisia	Chaded et al. (2008)
UK	Chapagain & Orr (2008)
Morocco	Hoekstra & Chapagain (2007)
<b>REGIONAL AND RIVER BASIN</b>	
Mancha Occidental Region	Aldaya et al. (2009)
Doñana Region	Aldaya et al. (2009)
Guadalquivir river basin	Rodríguez-Casado et al. (2009)
Guadiana river basin	Aldaya & Llamas (2008)
Lower Fraser valley and Okanagan basins	Brown et al. (2009), Schreier et al. (2007), Schendel et al. (2007)
Heihe river basin	Chen et al. (2005)



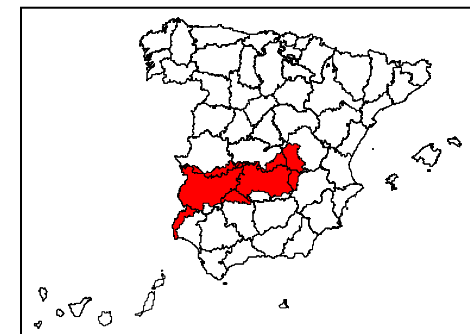
# Existing case studies

**WF Guadiana river basin** - green and blue (surface and groundwater)  
- related economic analysis



Source: Aldaya and Llamas (2008)

Spanish regulation (2008) requires including the WF analysis in the River Basin Management Plans according to the EU WFD.





## Conclusions

### WF assessment:

- ▶ One element to look at when assessing the sustainable use of water resources
- ▶ Framework to inform and support decision-making
- ▶ Inform water allocation decisions at different levels
- ▶ Inform cross sectoral policy making
- ▶ Build citizen awareness

### Better understanding and agreement needed on:

- ▶ Grey WF, WF sustainability indicators
- ▶ VWT consideration in the Doha Development round (WTO)
- ▶ Developing countries

**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.



# Water Footprint

Water Footprint  
NETWORK

## Introduction

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

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.

1350 litres water



1 kg wheat



### Highlights of the site

[Water footprint calculator](#)  
[Product gallery](#)

### Press release World Water Day

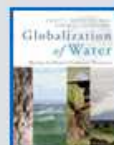
UNEP joins the Water Footprint Network, working towards a globally shared water footprint standard, [read more...](#)

### 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."



**Water Footprint Manual**  
Practical guide on water footprint assessment



**Globalisation of Water**  
Comprehensive book on water footprint and virtual water trade.

**Key publications**  
[Water Footprints of Nations](#)  
[Water Footprint Bioenergy](#)  
[Download other publications](#)  
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- Agenda
- About WFN
- Product Water Footprints
- Your Water Footprint
- National Water Footprints
- Corporate Water Footprints
- Global Water Footprint
- Training Materials
- Publications
- Glossary
- FAQ
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# Water Footprint

Water Footprint  
NETWORK

## Your Water Footprint » Extended Calculator

Introduction

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Your individual water footprint is equal to the water required to produce the goods and services consumed by you. Please take your time and feel free to use the extended water footprint calculator to assess your own unique water footprint. The calculations are based on the water requirements per unit of product as in your country of residence.

Note: put decimals behind a point, not a comma (e.g. write 1.5 and not 1,5).

Select a Country

### Food consumption

Cereal products (wheat, rice, maize, etc.)

kg per week

Meat products

kg per week

Dairy products

kg per week

Eggs

number per week

How do you prefer to take your food?

High fat

How is your sugar and sweets consumption?

High

Vegetables

kg per week

Fruits

kg per week

Starchy roots (potatoes, cassava)

kg per week

How many cups of coffee do you take per day?

cup per day

How many cups of tea do you take per day?

cup per day

### Domestic water use