Water footprint as a tool to inform policy: Challenges and opportunities

Maite Aldaya

Consultant on Water Efficiency
United Nations Environment Programme
Division of Technology, Industry and Economics
Sustainable Consumption and Production Branch

Overview

1. Water footprint assessment
   - Goals and scope
   - Water footprint accounting
   - Sustainability assessment
   - Response

2. Challenges and opportunities
3. Concluding remarks

1. Water footprint assessment

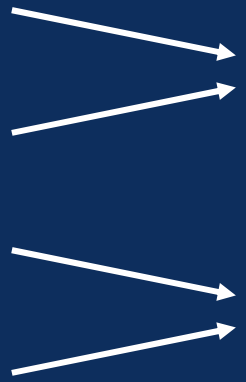
Conceptual framework

IPCC
(1990s)

Input-output & LCA
(1950s) (1960s)

Ecological Footprint
(Rees and Wackernagel,1990s)

Integrated Water Resources Management (Virtual Water)
(Allan,1990s)



Carbon Footprint

Water Footprint
(Hoekstra, 2002)

The water footprint concept

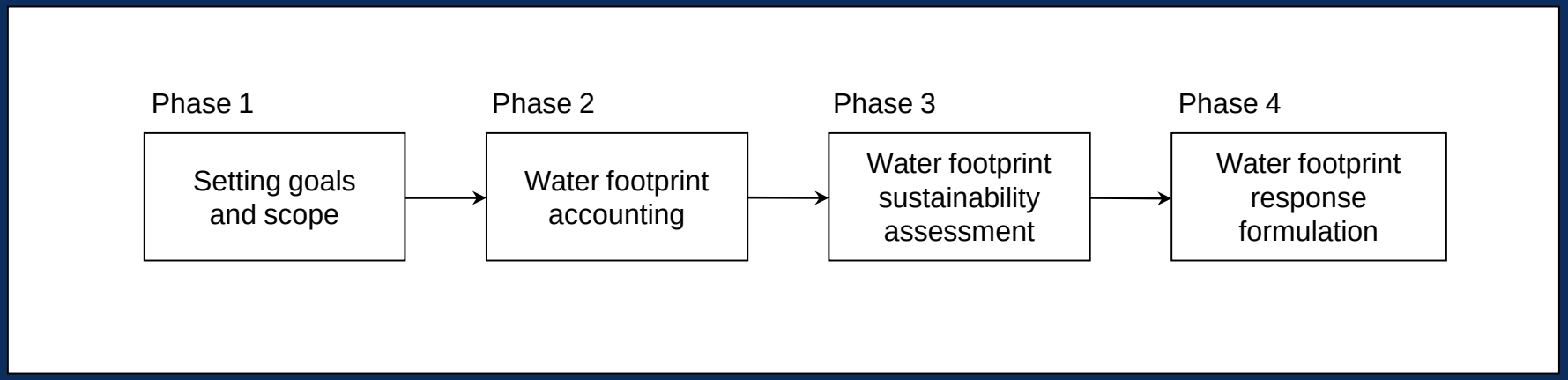
► The WF is an indicator of water use that looks at both direct and indirect water use of a consumer or producer.

► Water use is measured in terms of:
- water volumes consumed (evaporated or otherwise not returned)
- polluted per unit of time

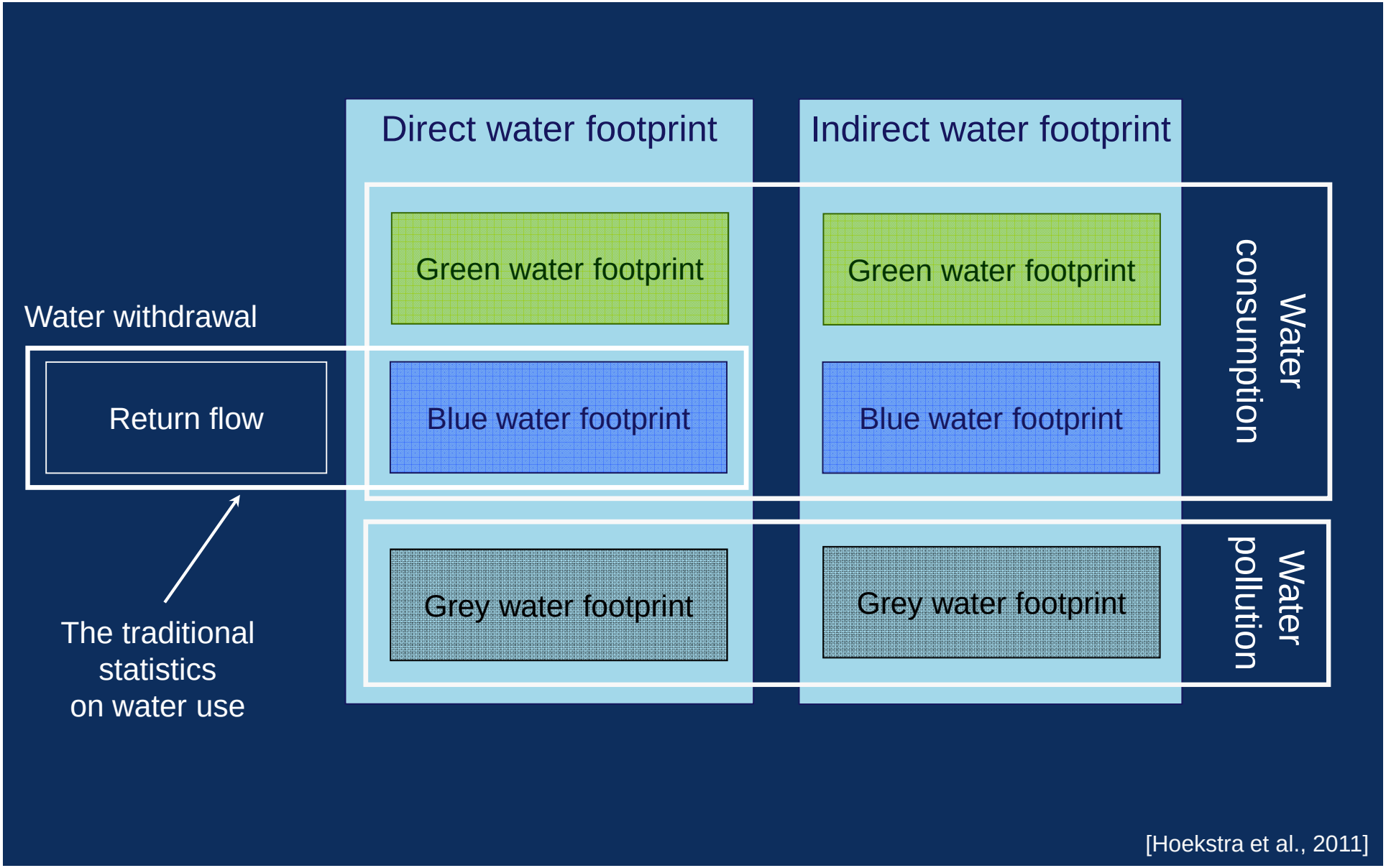
► Geographically and temporally explicit

► 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

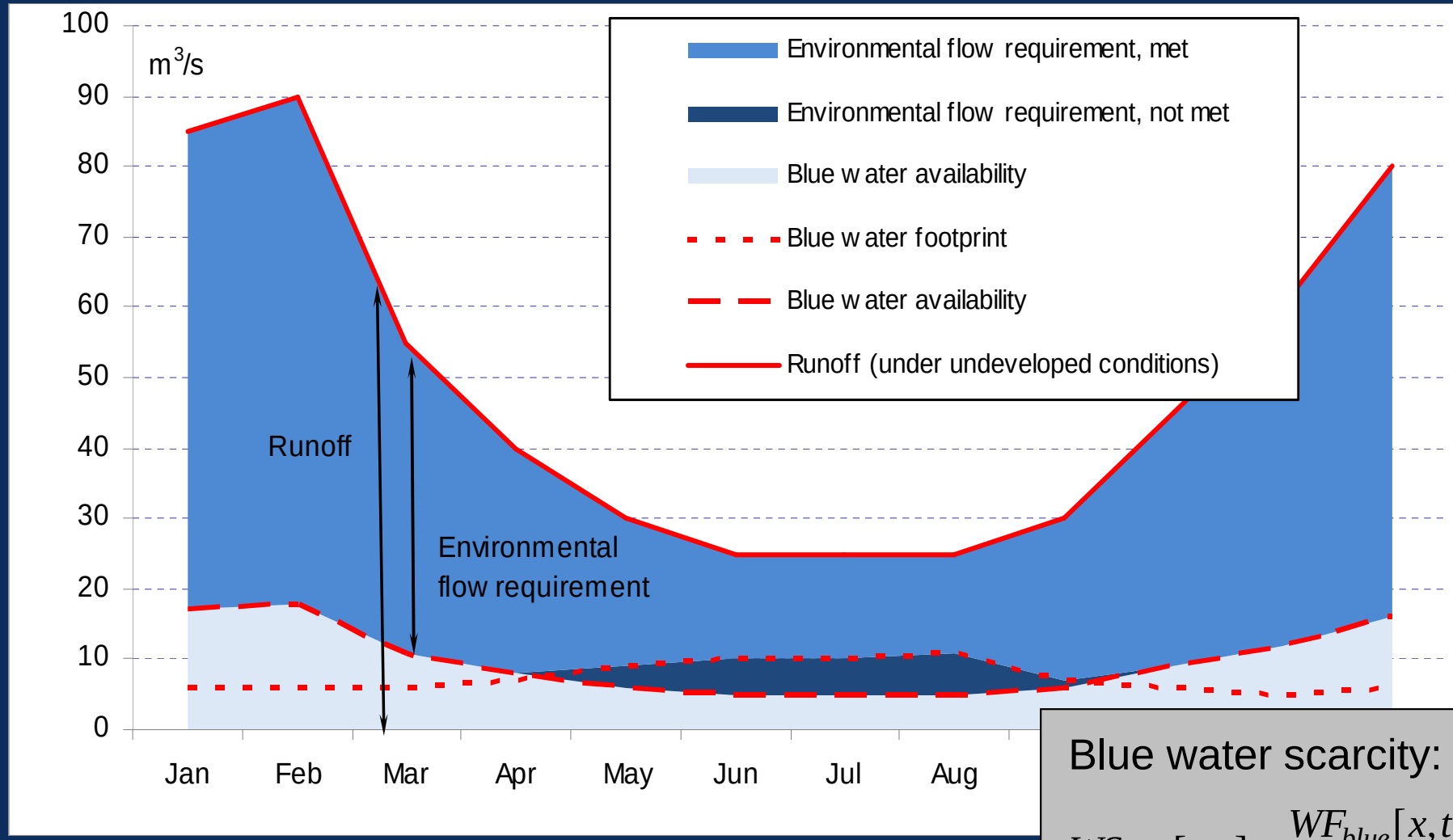


WF assessment steps



[Hoekstra et al., 2011]

WF assessment steps



Comparing ‘blue WF’ to ‘blue water availability’

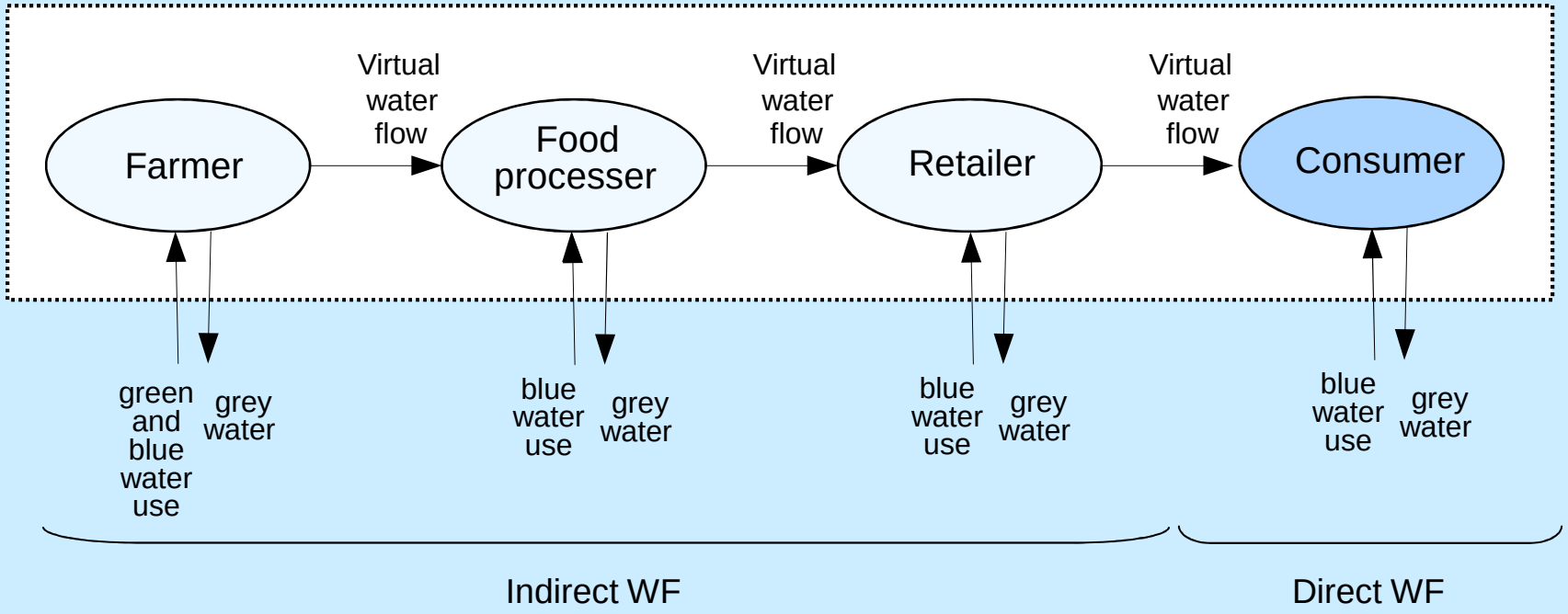
Blue water scarcity:

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

2. Challenges and Opportunities

2. Consumer Opportunities

The water footprint of a consumer



[Hoekstra, 2008]

2. Consumer Opportunities

The total water footprint of a consumer in the UK

► about 3% of your water footprint is at home.

150 litre/day

► about 97% of your water footprint is ‘invisible’, it is related to the products you buy in the supermarket.

3400 litre/day for agricultural products
1100 litre/day for industrial products

► about 60 to 65% of your water footprint lies abroad.

2. Consumer Opportunities

Reduction of the direct water footprint:

- water saving toilet, shower-head, etc.

"Save water in the supermarket"

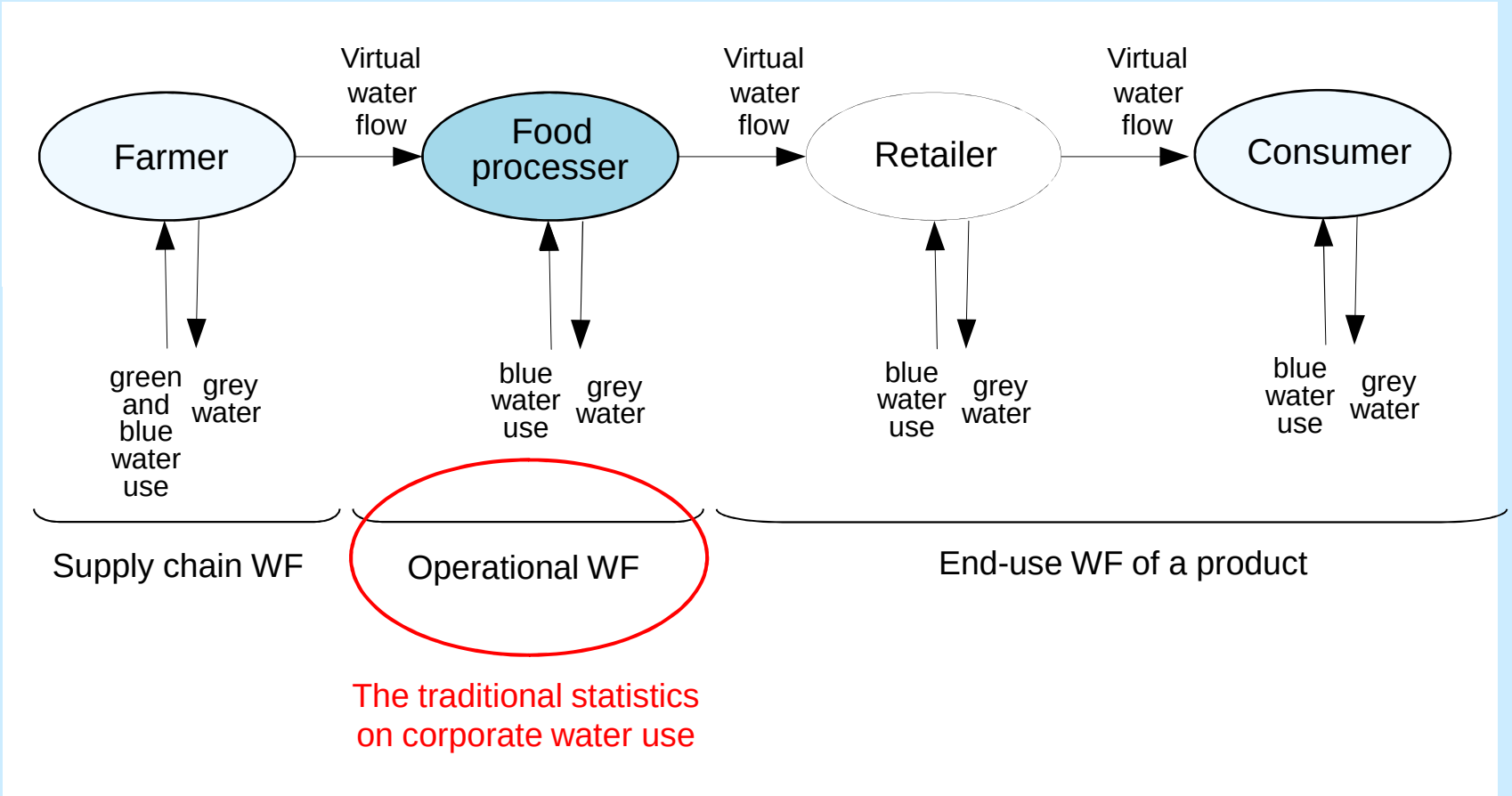
Reduction of the indirect water footprint:

- 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

2. Companies Opportunities

The water footprint of a food processor



[Hoekstra, 2008]

2. Companies Opportunities

Water footprint: what's new for business

- From operations to supply-chain thinking.
- Shifting focus from water withdrawals to consumptive water use.
- From securing the 'right to abstract & emit' to assessing the full range of economic, social and environmental impacts of water use in space and time.
- From meeting emission standards to managing grey water footprint.

[Hoekstra, 2008]

2. Companies Opportunities

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

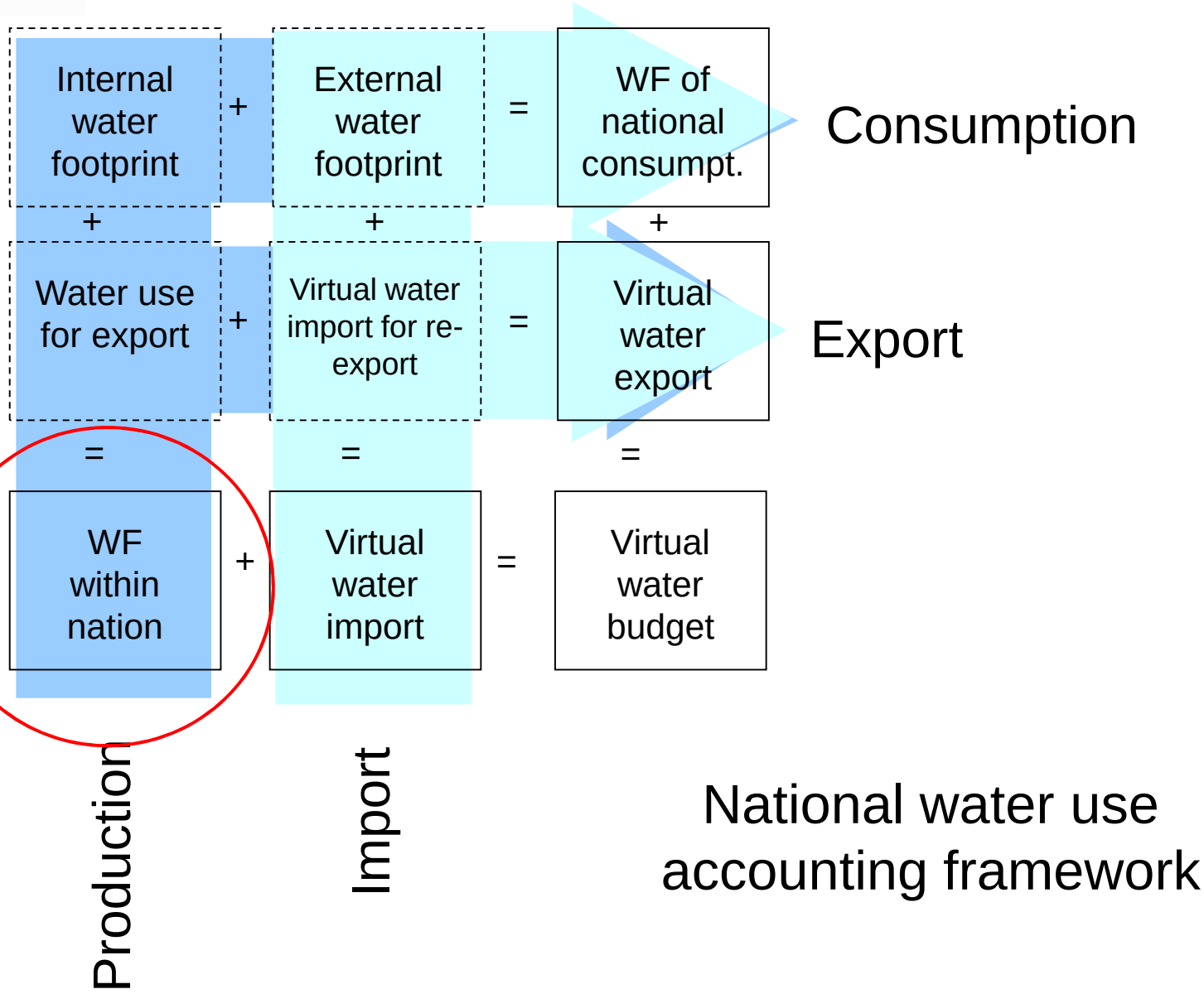
- Water footprint reporting
- Shared standards
- Labelling of products
- Certification of businesses
- Benchmarking
- Quantitative footprint reduction targets

2. Companies Opportunities

ISO 14046 Water Footprint

- Development process: 2010-2012.
- Objective: develop an international standard specifying requirements and guidelines to assess and report water footprint based on life cycle assessment.

2. Government Opportunities



2. Government Opportunities

Water use efficiency at different levels

Level	Means
User level Local water use efficiency	Create incentives to the water user: water pricing, promoting technology, awareness raising
River basin level Water allocation efficiency	Allocate water where its value added is highest
Global level Global water use efficiency	Virtual water trade from water-abundant to water-scarce regions

Key question: how to develop a coherent set of actions at different spatial levels to solve local water problems?

2. Government Opportunities

Embed WF assessment 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.

2. Methodological and data Challenges

- Default data
  - regional specific product WFs
  - environmental water needs, water quality standards, natural concentrations
- Truncation problem
- Base year, variability and trends in time
- Uncertainties
- Splitting up blue and grey WF into more specific components
  - blue: surface water, renewable groundwater, fossil groundwater.
  - grey: per type of pollution.
- Spatial and temporal resolution of analysis
- Potential use of remote sensing
- Environmental, social and economics sustainability criteria
- Effectiveness of various policy response options

2. Challenges in application

- Communication
- Impact shifting -Trade-offs water / ecological / carbon footprint
- Rebound effect
- Opportunity costs
- Impact or volumes
- Implications to national water planning
- Application in river basin and catchment studies
- Coherence in policy across different policy fields
- Applications in different business sectors
- Comparative product studies
- Water footprint assessment – LCA
- Product labeling / certification

3. Concluding remarks

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

Thanks!