SSWM

sustainable sanitation and water management

Virtual Water

Andrea Pain, seecon international gmbh

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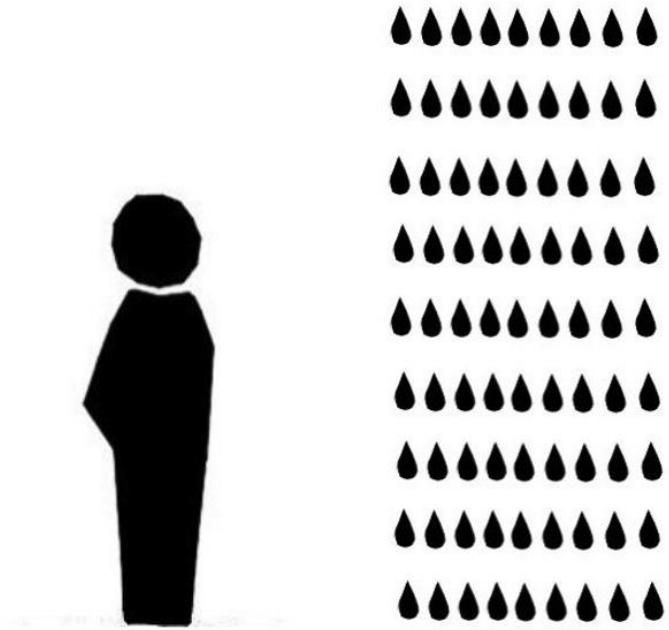
Depending on the initial situations and respective local circumstances, there is no guarantee that single measures described in the toolbox will make the local water and sanitation system more sustainable. The main aim of the SSWM Toolbox is to be a reference tool to provide ideas for improving the local water and sanitation situation in a sustainable manner. Results depend largely on the respective situation and the implementation and combination of the measures described. An in-depth analysis of respective advantages and disadvantages and the suitability of the measure is necessary in every single case. We do not assume any responsibility for and make no warranty with respect to the results that may be obtained from the use of the information provided.

Contents



1. Introduction

What is Virtual Water?

- The production processes of many goods consumes water that is not contained in the final product
- Because it is invisible to the consumer, this water is called “virtual water”
- By adding up the quantity of water that was used throughout the whole production process, we can calculate the “water footprint” of the product

Source: http://www.watercache.com/blog/2011/10/reclaimed-water-smart-cities-fracking-for-gas/#.T7uTm3Oevww

2. The Three Colours of Virtual Water

What is the Environmental Impact of Production?

Consider: availability and pressure on local water resources (blue and green), volume of grey water produced

Blue water

- Surface water
- Groundwater

Grey water

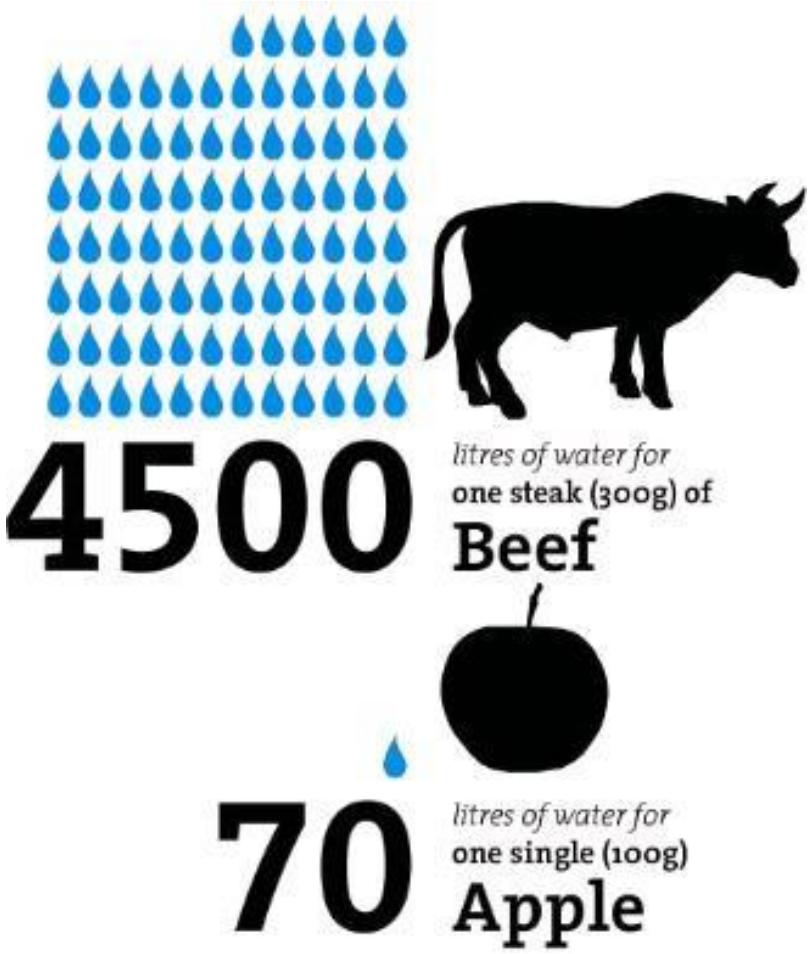
- Polluted water resulting from production process

Green water

- Rainwater

3. Virtual Water in Common Products

Direct and Indirect Water Usage



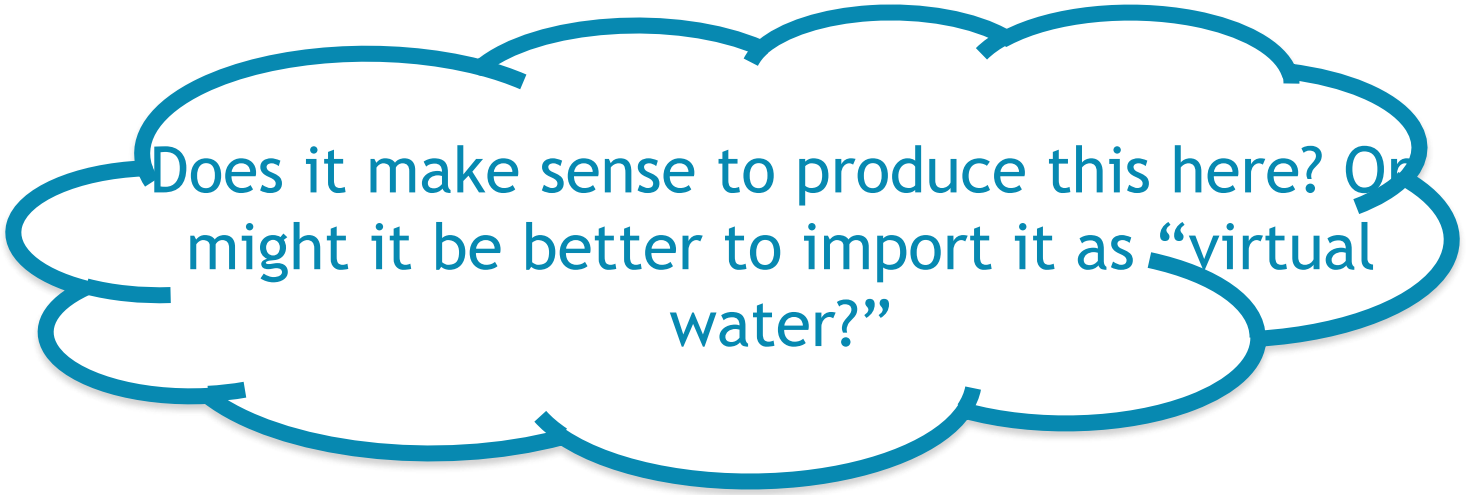
- Virtual water must be added throughout production chain (example: to produce beef, you must first produce feed)
- More intensive production → more virtual water needed
- Take into account:
  - **Direct water use** (irrigation, drinking)
  - **Indirect water use** (feed production, industrial processes)

Source: http://www.spiegel.de/international/world/bild-644867-6726.htl

4. The Importance of Virtual Water

What Can Virtual Water Tell Us?

- Knowing virtual water can help to make the best use of water resources in areas of water scarcity
  - **Key questions**: What is the availability of "blue" water? Of "green" water? What will be the impact on the local hydrologic cycle?



5. Evaluating Water Footprints

Optimising Global Water Use

- Consider the local system:
  - How much water is needed for production?
  - How much water is locally available?
  - Competition for water resources (i.e. drinking water, agriculture)

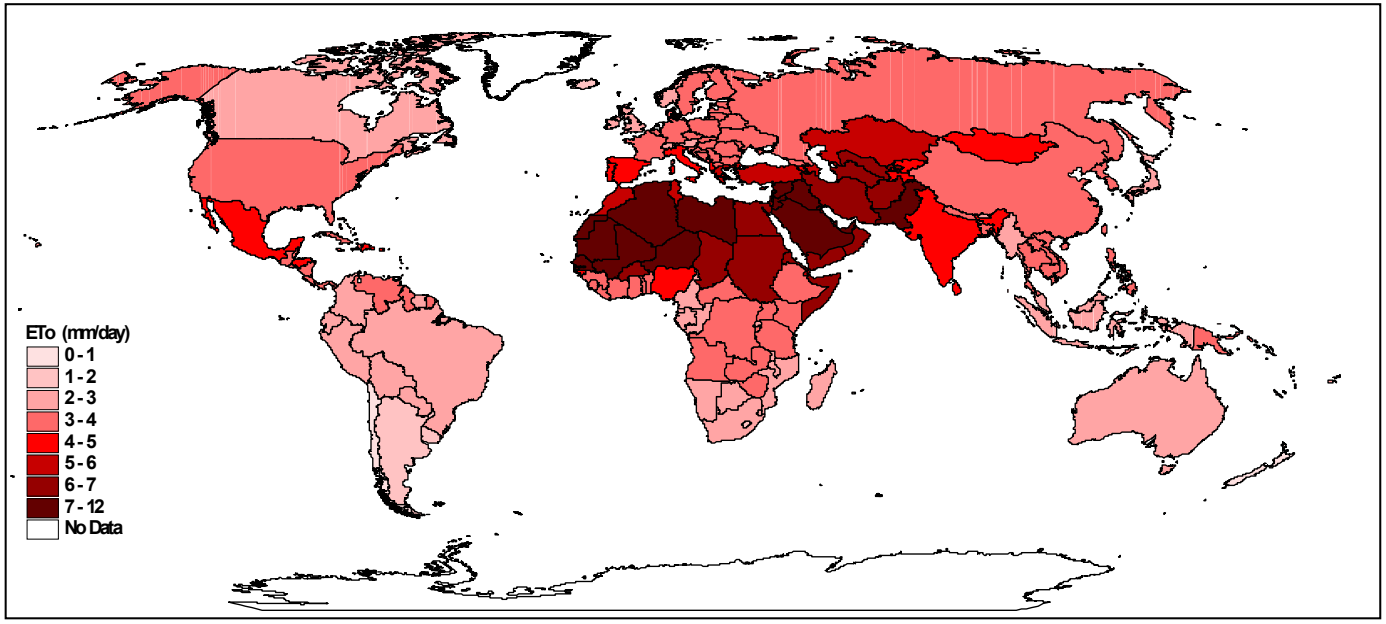
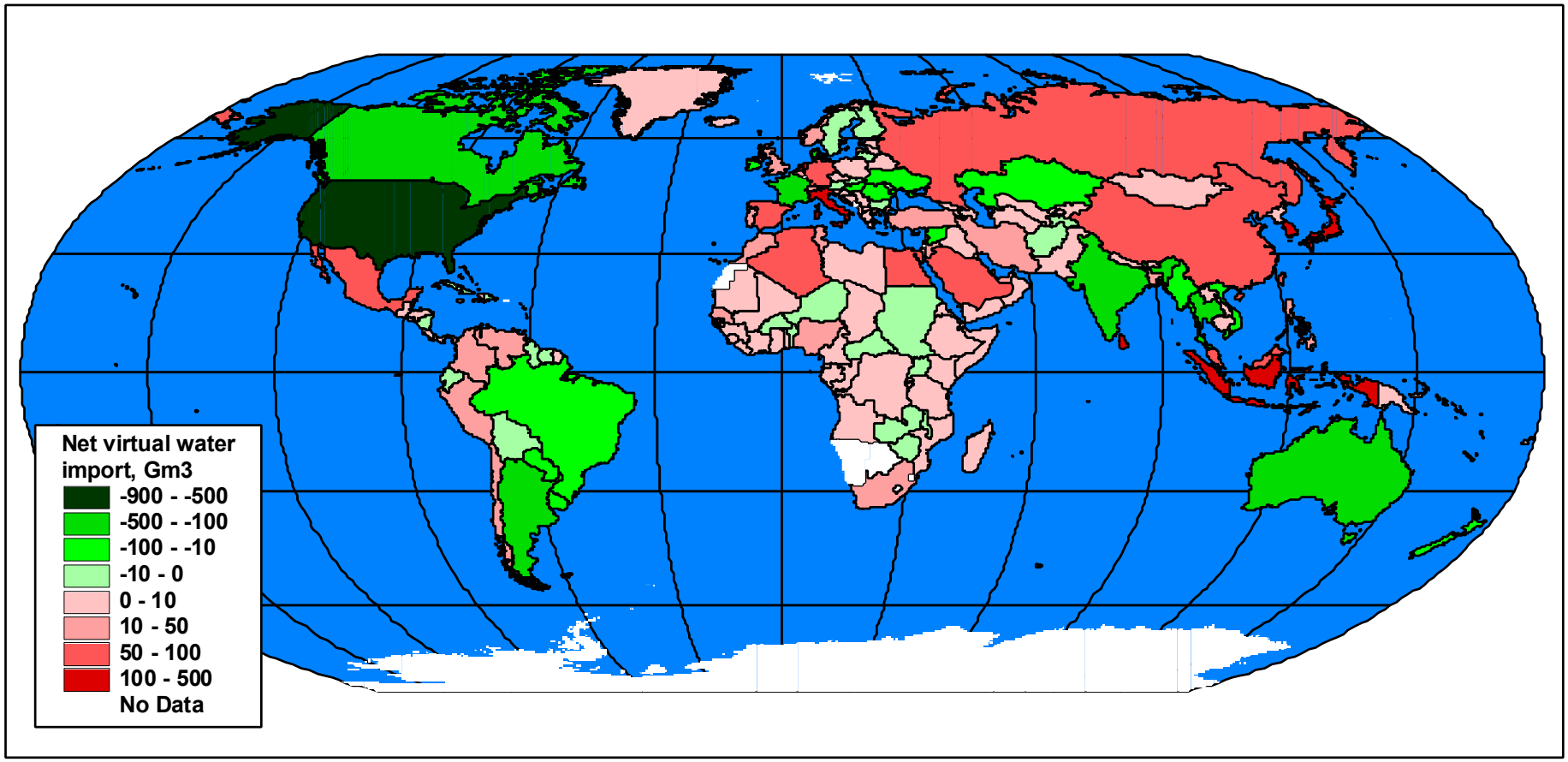


Figure 4.1. Monthly average reference evapotranspiration per country (mm/day) in June. *Source : CHAPAGAIN & HOEKSTRA 2004)*

5. Virtual Water Trade

Making the Best Use of Global Water Resources



Source: HOEKSTRA (2003)

Global virtual water trade: 1,040 x 10^9 m^3/year

- 67% crops, 23% livestock, 10% industrial products (HOEKSTRA 2003)

8. References

CHAPAGAIN, A. K.; HOEKSTRA, A.Y. (2004): Water Footprints of Nations - Volume 1: Main Report. Delft: UNESCO-IHE, Institute for Water Education. http://www.unesco-ihe.org/Project-Activities/a_selection_of_unesco_ihe_s_past_and_present_projects/Virtual-Water-Trade-Research-Programme/Chapagain-A.K.-Hoekstra-A.Y.-2004-.-Water-footprints-of-nations-Volume-1-Main-Report-Value-of-Water-Research-Series-No.-16-UNESCO-IHE [Accessed 23.05.12]

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"Linking up Sustainable Sanitation, Water Management & Agriculture"

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Confederazione Svizzera
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Federal Department of Foreign Affairs FDFA
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