

# The Water Footprint of Selected UK Produced and Consumed Products

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# Structure of Presentation

- **What is water footprinting**
- **Methodology**
- **Interpretation**
- **Current work**



# Virtual Water

- **Virtual (or embedded / embodied) water**
- **Virtual water is the water used to grow a product not the water contained within the product**
- **One litre of milk required 990 litres of water to produce**
- **Introduced to understand how the global trade (in food products) affects global trade in water**

# What is Water Footprinting?

- **A measure of virtual or embedded water**
- **The quantification of all the water used in the supply chain of a product or process**
- **A life cycle assessment of water?**
  - **inventory is not the same as interpretation**
  - **volumetric water footprint is an audit or benchmark**

# What Water Footprinting is Not!

- **An assessment of environmental impact**
- **An assessment of sustainability**
- **Knowing the volume of water required to manufacture a product tells you nothing about the the impact of using that water**

# The Colour of Water

- **Green (rainfall, soil water)**
  - **crop production**
- **Blue (surface water, metered supply)**
  - **irrigation, washing, processing**
- **Grey (recycled, polluted)**
  - **irrigation, washing, processing**

# Not All Water is Equal

- **Physiologically, the same crop grown in different parts of the world requires the same volume of water to reach maturity**
- **In practice, temperature, radiation, humidity and soil conditions mean that crop water requirement varies greatly**
- **Volumetric water footprint of potato grown in:**
  - **Israel – 190 litres/kg**
  - **UK – 74 litres/kg**

# Methodology

- **One established method – volumetric water footprint**
- **All current water footprint values are volumetric water footprints**
- **Volumetric water footprints cannot provide information on the impact of water consumption**
- **The newcomer – stress-weighted water footprint**



# Volumetric Water Footprint (VWF)

- **Incorporates green, blue and grey water**
- **Evapotranspiration is a proxy for plant water requirement and varies with region and climate**
- **The volumetric water footprint is a summation of green, blue and grey water volumes**
- **Reporting volume is the volume used in production**

# Stress-weighted Water Footprint (SwWF)

- **Green water is assumed to be a function of land use and is excluded from footprint**
- **Incorporates blue water (and sometimes grey)**
- **Volumes of blue water are 'normalised' using global and regional stress factors (similar to PAS2050)**
- **Reporting volume is not the volume used in production**
- **SwWFs are smaller than VWFs:**

# A Comparison of VWF and SwWF

Ingredient	Volumetric	Stress-weighted
Dolmio pasta sauce		
Tomato products	149.9	133.9
Sugar	22.9	0.1
Onion	12.0	1.8
Garlic	5.9	0.1
Minor ingredients	3.3	1.9
Peanut M&Ms		
Cocoa derivatives	690.1	4.1
Peanuts	140.2	1.1
Sugar	135.1	0.9
Milk derivates	133.6	5.3
Palm oil derivatives	27.3	0.1
Minor ingrediants	17.8	0.2
Tapioca starch	7.9	0.5

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# Interpretation

- **Volumetric footprints are useful for identifying the volumes of water used in the life cycle of a product**
- **Volumetric footprints are a useful auditing tool if you are paying for the water**
- **Stress-weighted water footprints are useful for understanding the impact of water use**
- **Both require qualitative analysis to understand the social impacts of water use**

# Sustainability

- **The UK imports 62% of its water requirements as virtual water**
- **Production of fresh produce in North Africa is exhausting local water resources**
- **Illegal bore holes in Huelva have damaged biodiversity**
- **Damage is economic, social as well as environmental**
- **Explore the conflict between generation of income versus local food and depletion of water resources**

# Current Work

- **Defra WU0120 ' The water footprint of selected UK produced and consumed products'**
- **UK (winter wheat, sugar beet, potato, strawberry, milk, lamb)**
- **Imported - sugar cane (Swaziland), potato (Israel), strawberry (Morocco/Spain), lamb (NZ)**
- **Start: July 2009; duration 24 months**

# Areas of investigation

**The project has two individual, but linked, areas of investigation:**

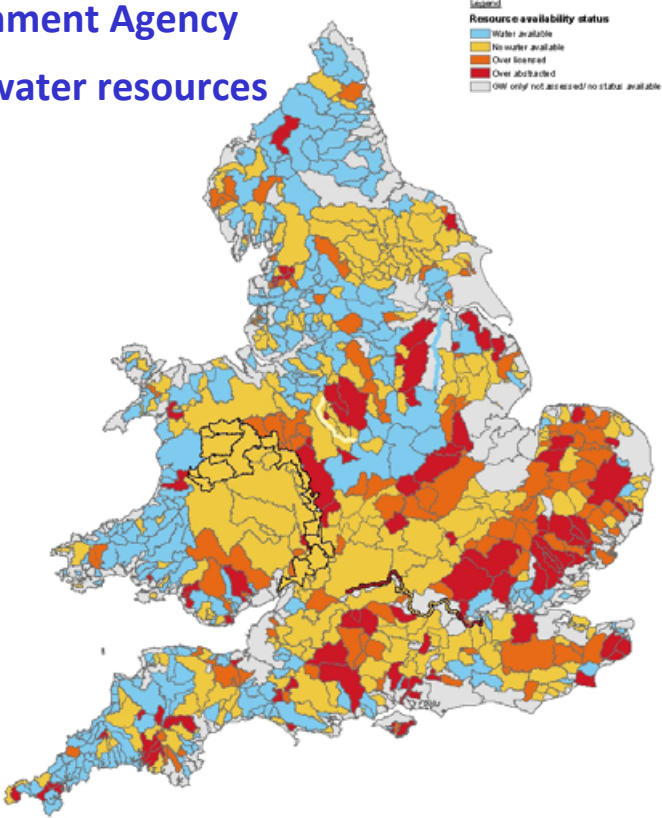
- To determine the water footprint of selected UK produced agricultural commodities and relate the water used in production to current water resources**
- To determine and compare the water footprint of selected food products which can be produced domestically or imported**



# Mapping Water Footprints

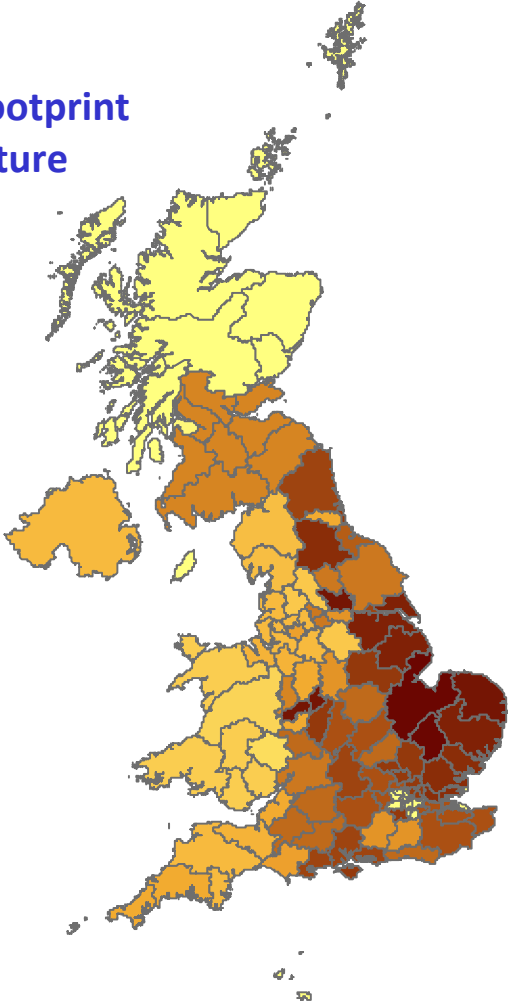
Resource availability status for units of surface water and/or surface water combined with groundwater in completed CAMS March 2008

Environment Agency  
Surface water resources



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Blue water footprint  
of agriculture



# Food Security

- **How does domestic production impact domestic water resources?**
- **How does domestic consumption impact overseas water resources?**
- **If UK production is increased, how will it impact UK water resources and will agriculture lose out in competition for water with people?**
- **Morally, can the UK justify the import of virtual water from water poor countries?**

# Climate Change

- **Will climate change result in increasing domestic production as overseas production diminishes?**
- **Will the UK import more, or less, (virtual) water as a result of climate change**
- **Should the UK take a lead and set limits on the importation of virtual water?**

# Link to DTCs

- **UK data is being collected from within the three DTC catchments:**
  - **Wensum**
  - **Hampshire Avon**
  - **Eden**
- **DTC leaders have taken on a wider co-ordination role than originally envisaged**
- **The relationship between the DTC's, the EA and their catchment officers, Natural England, researchers and local organisations (River Trusts) is muddled and would benefit from a more structured approach.**

# Experience So Far

- **Defra (and WRAP) are currently specifying links to the DTCs in many new projects:**
  - Assessing the status of drainage in uk agriculture: a case study in the demonstration test catchments (FFG 0923)
  - Assessment of the impacts of climate change and changes in land use on future water availability and opportunities for adaptation in farming (FFG0927)
  - Sustainable water for livestock (FFG 0929)
  - Demonstrating the environmental and economic implications of reducing phosphorus excretion in pigs (FFG 0928)
  - Field Experiments on the use of Quality Compost and Digestate in Agriculture (WRAP)
- **DTC leaders will need additional support to enable them to manage the extra work load created by these add-ons.**

**Thank you**

