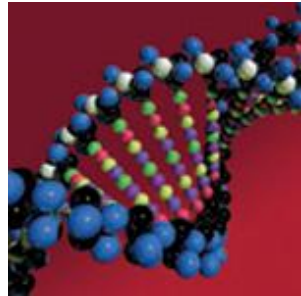


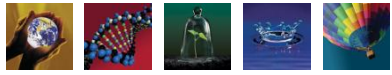
# WATER FOOTPRINTING



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# Overview

- Water stewardship
- Water footprinting
- Water services





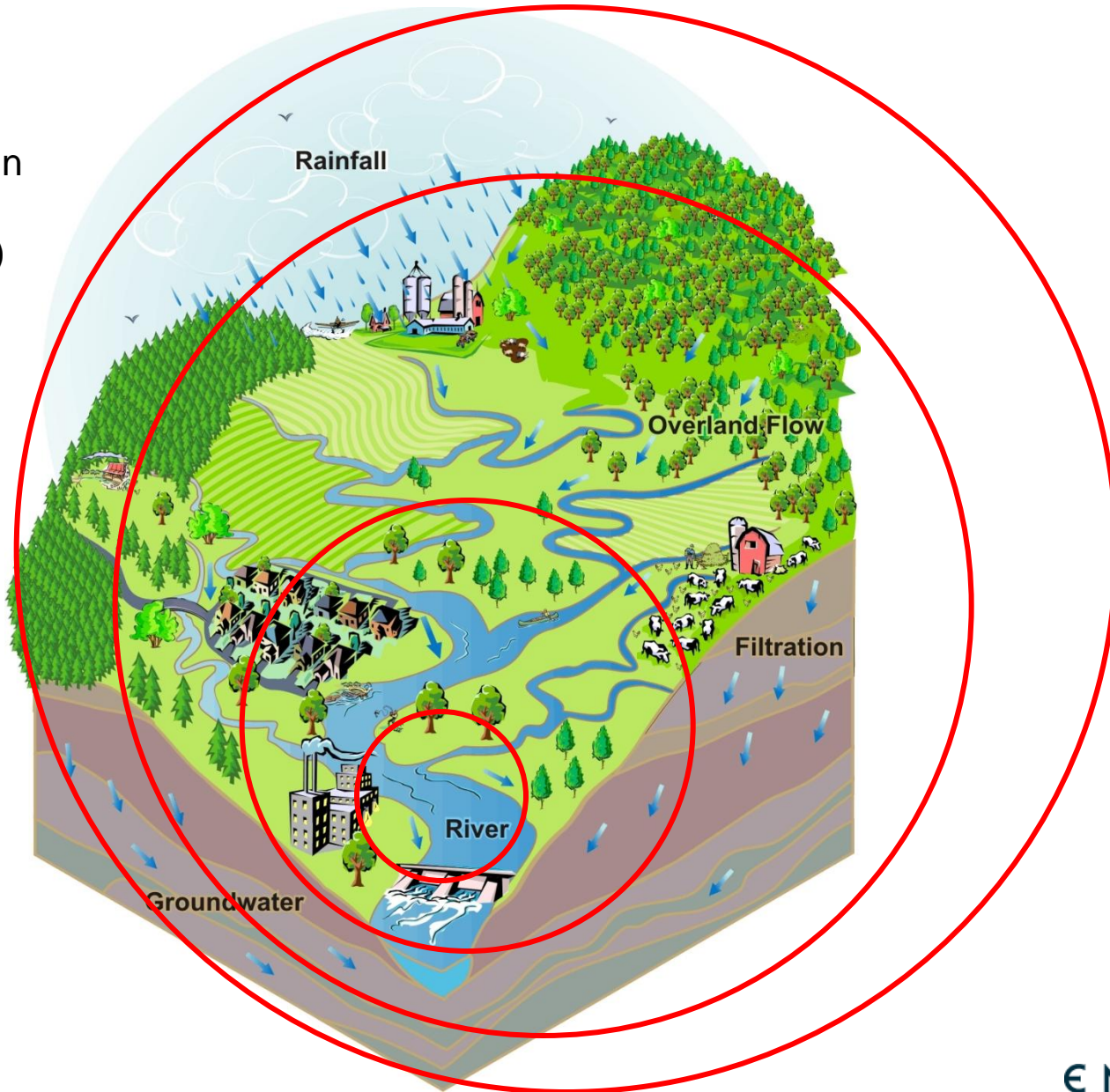
# Water Stewardship

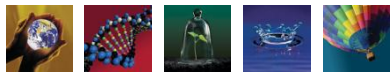
Life Cycle  
(Supply Chain  
+ Producer  
+ Consumer)

Watershed

Community

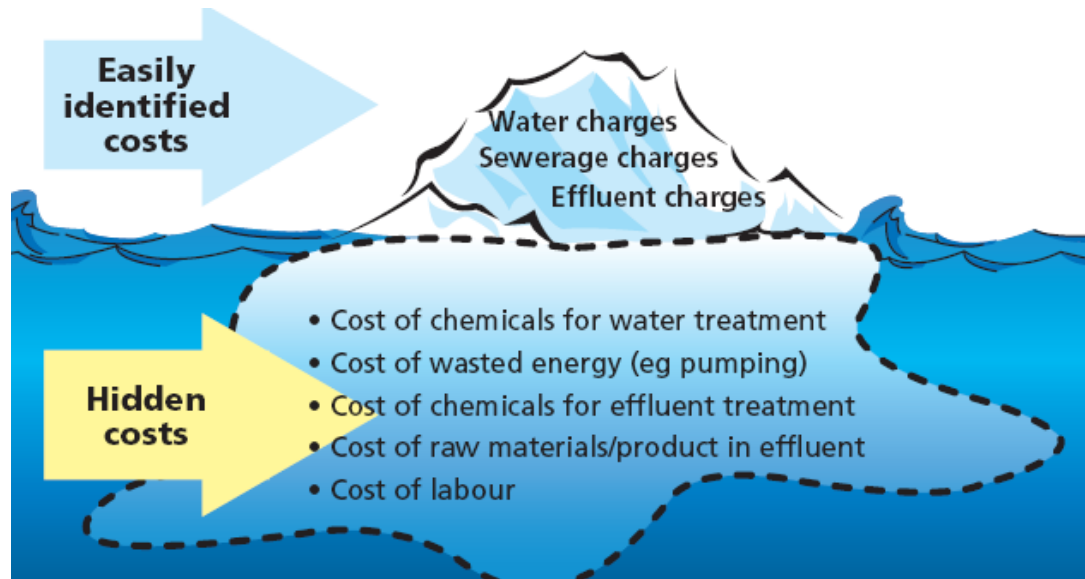
Plant





# Historical Water Management

- Changes in use driven by internal costs
  - Source reliability and extent of treatment required
  - Water efficiency assessments to control costs



- Watershed management via regulatory protection and actions by NGOs





# New Drivers

- Growing expectation of corporate responsibility
- Corporate environmental stewardship initiatives
  - Sustainability
  - Green manufacturing
  - Life cycle analysis, total cost of ownership
  - GHG management
- Community awareness of watershed as a resource
- New metrics for water stewardship
  - Footprinting, embedded water/virtual flows, neutrality
- Increasingly competitive demand for water use





# Water Footprint - Beverages (L/L)



1,100



900



850



300



100





# Water Footprint – Goods (L/kg)



16,000



16,600



16,000



11,000



5,500

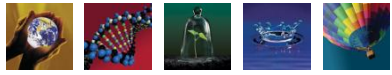




# Water Footprinting

- Very recent concept, still in development
- University of Twente, Water Footprint Network
  - “*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.*
  - Water use is measured in terms of water volumes consumed (evaporated) and/or polluted per unit of time.*
  - A water footprint can be calculated for any well-defined group of consumers (e.g. an individual, family, village, city, province, state or nation) or producers (e.g. a public organization, private enterprise or economic sector).*
  - The water footprint is a geographically explicit indicator, not only showing volumes of water use and pollution, but also the locations.”*
- How to account for water being a local issue?
- Water footprint vs. relative watershed stress?
- Are carbon footprint lessons transferable?





# A Certification Process?



Established 2008



- Over the next few years the Alliance members will work with water authorities, industries, local communities and environmentalists to establish a voluntary certification program for water managers and users based on the following:
  - International standards developed through an equitable, transparent, science-based, multi-stakeholder process.
  - Verification to determine whether these standards have been met.
  - A global brand that allows managers, users and organizations to demonstrate their compliance with or support for water stewardship.
  - Training and education to promote achievement of water stewardship.”

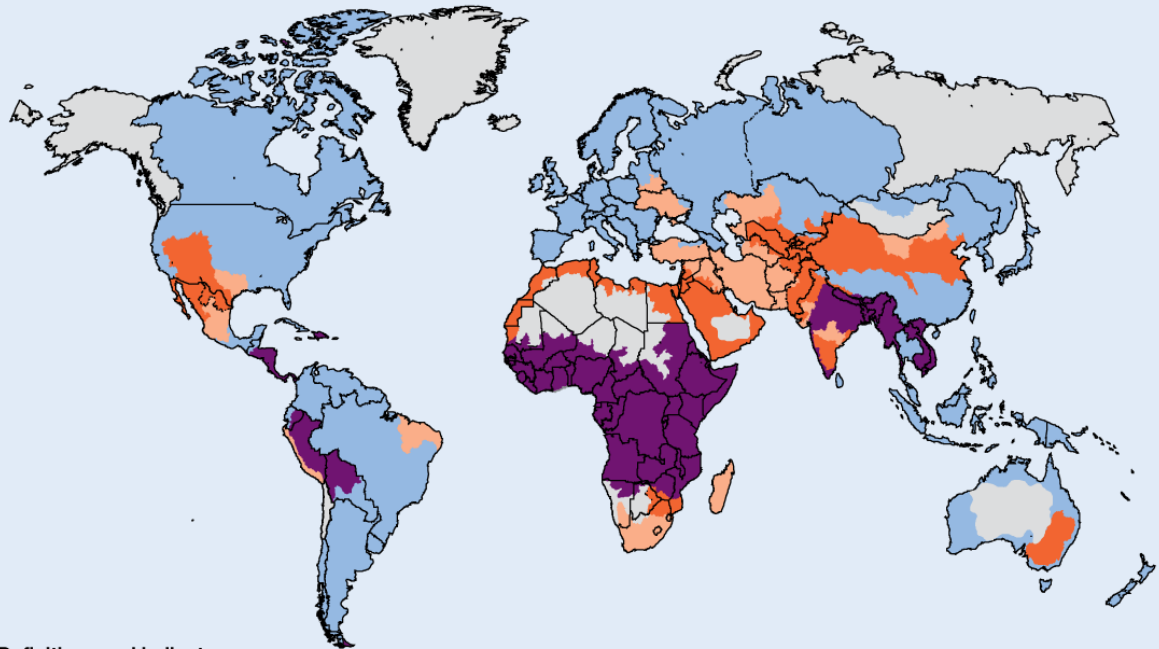
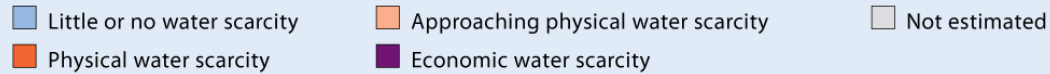




# Water Scarcity for Human Supply

map 2

## Areas of physical and economic water scarcity



### Definitions and indicators

- *Little or no water scarcity.* Abundant water resources relative to use, with less than 25% of water from rivers withdrawn for human purposes.
- *Physical water scarcity (water resources development is approaching or has exceeded sustainable limits).* More than 75% of river flows are withdrawn for agriculture, industry, and domestic purposes (accounting for recycling of return flows). This definition—relating water availability to water demand—implies that dry areas are not necessarily water scarce.
- *Approaching physical water scarcity.* More than 60% of river flows are withdrawn. These basins will experience physical water scarcity in the near future.
- *Economic water scarcity (human, institutional, and financial capital limit access to water even though water in nature is available locally to meet human demands).* Water resources are abundant relative to water use, with less than 25% of water from rivers withdrawn for human purposes, but malnutrition exists.

Source: International Water Management Institute analysis done for the Comprehensive Assessment of Water Management in Agriculture using the Watersim model; chapter 2.

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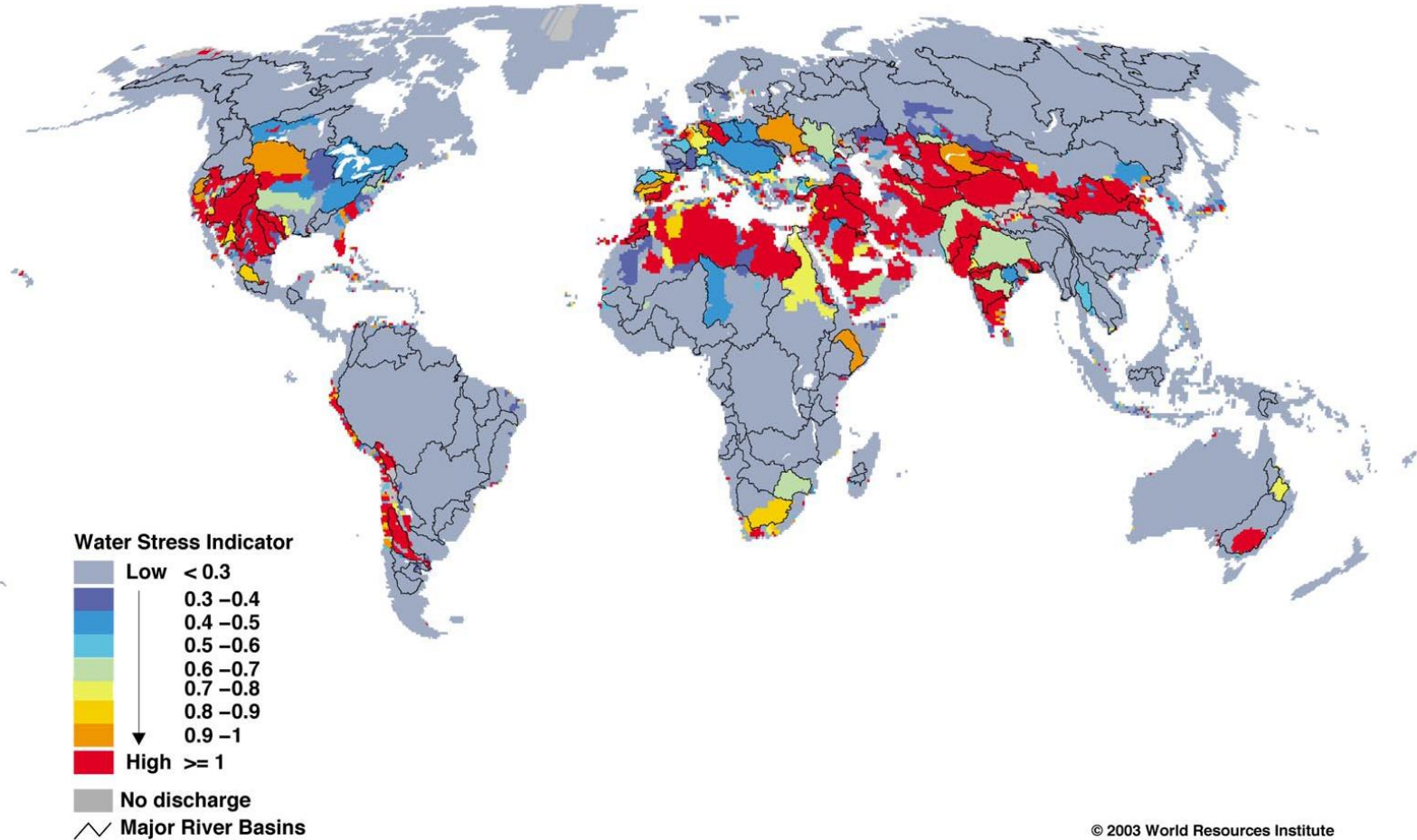


Source: Areas of physical and economic water scarcity. (2008). In *UNEP/GRID-Arendal Maps and Graphics Library*.

ENVIRON



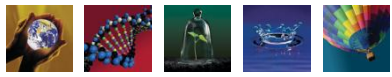
# Environmental Water Scarcity



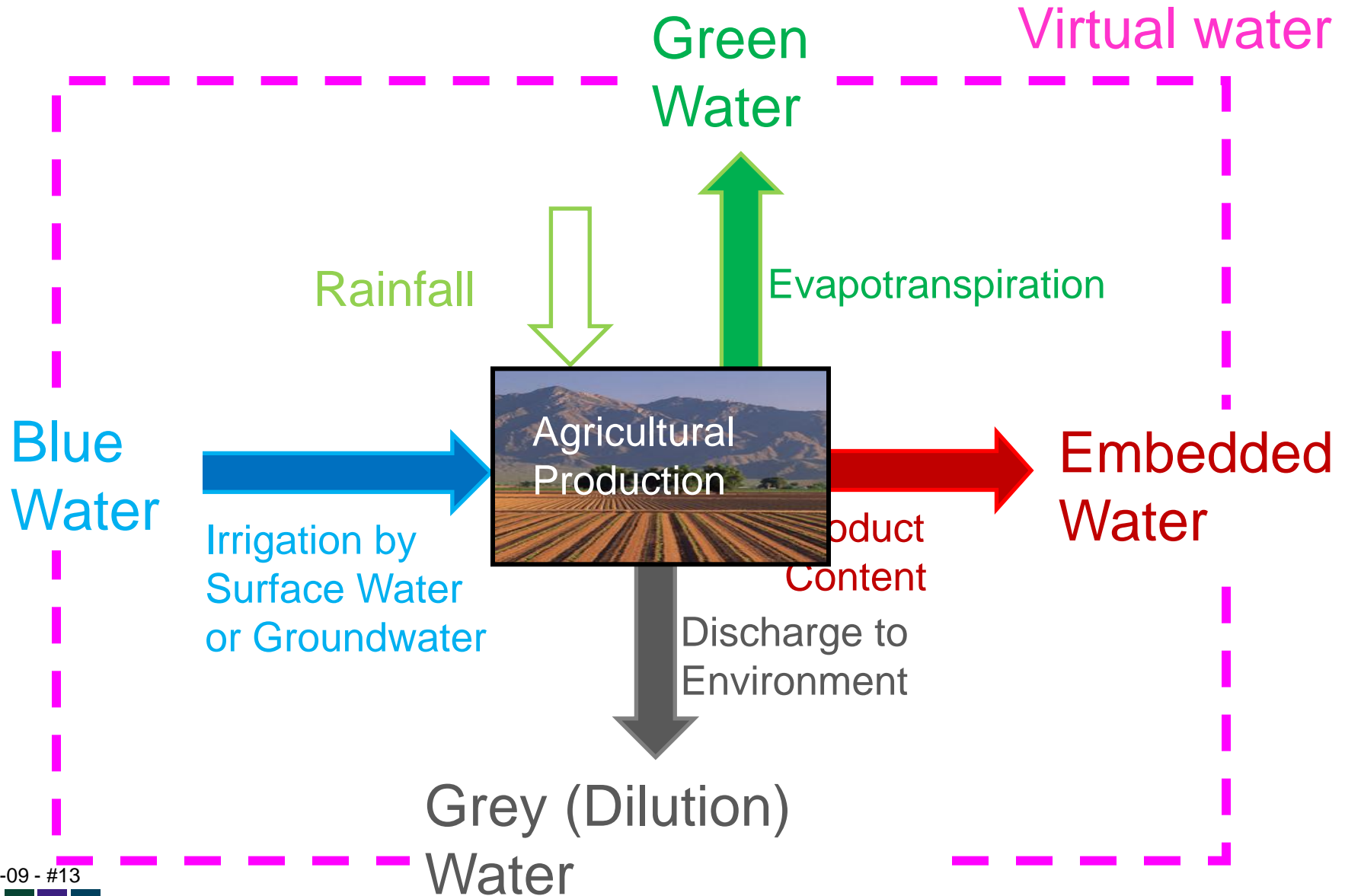
Source: Watersheds of the World CD: Global Maps. Water Resources eAtlas. Map 16 - Environmental Water Scarcity Index by Basin. (IUCN, IWMI, The Ramsar Convention Bureau, and WRI). 2003.

Environmental water scarcity (represented as a water stress indicator on the map), refers to cases where the amount of water removed from the system puts the ecosystem at risk.





# Water Footprint for Agriculture

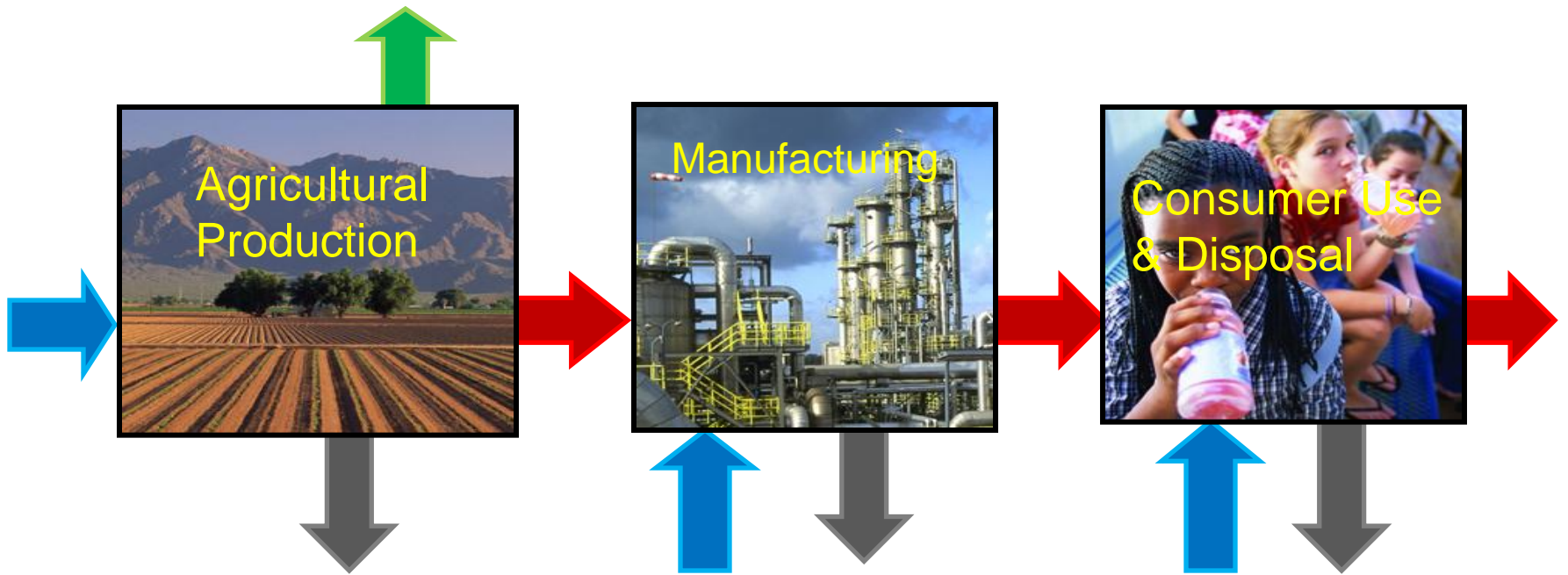


# Water Footprint in a Life Cycle

Producer

Processor

Consumer



Indirect

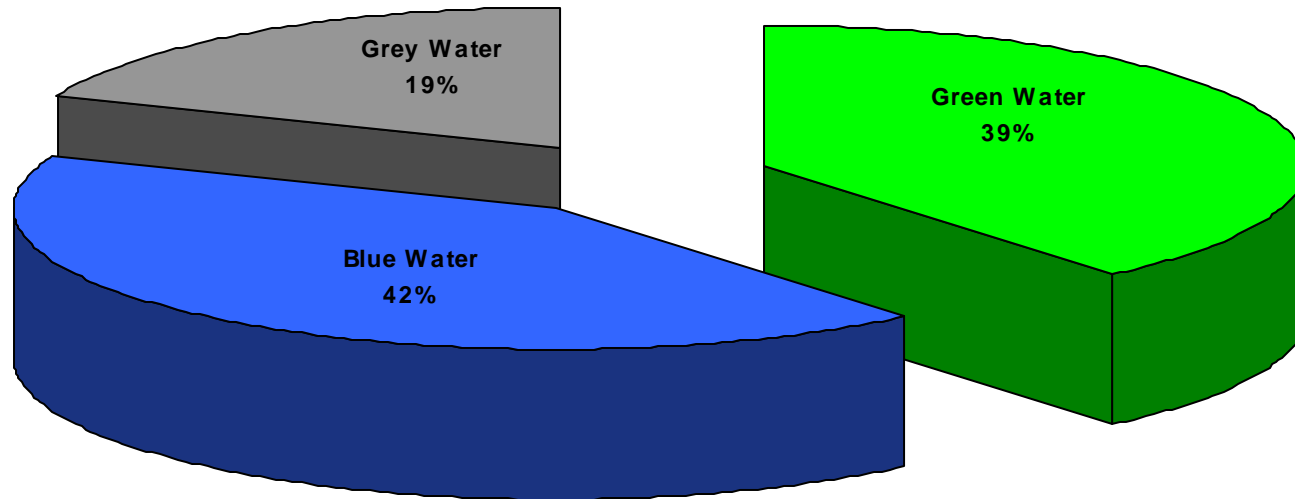
Direct

Indirect





# Example Total Water Footprint – Cotton Production + Processing

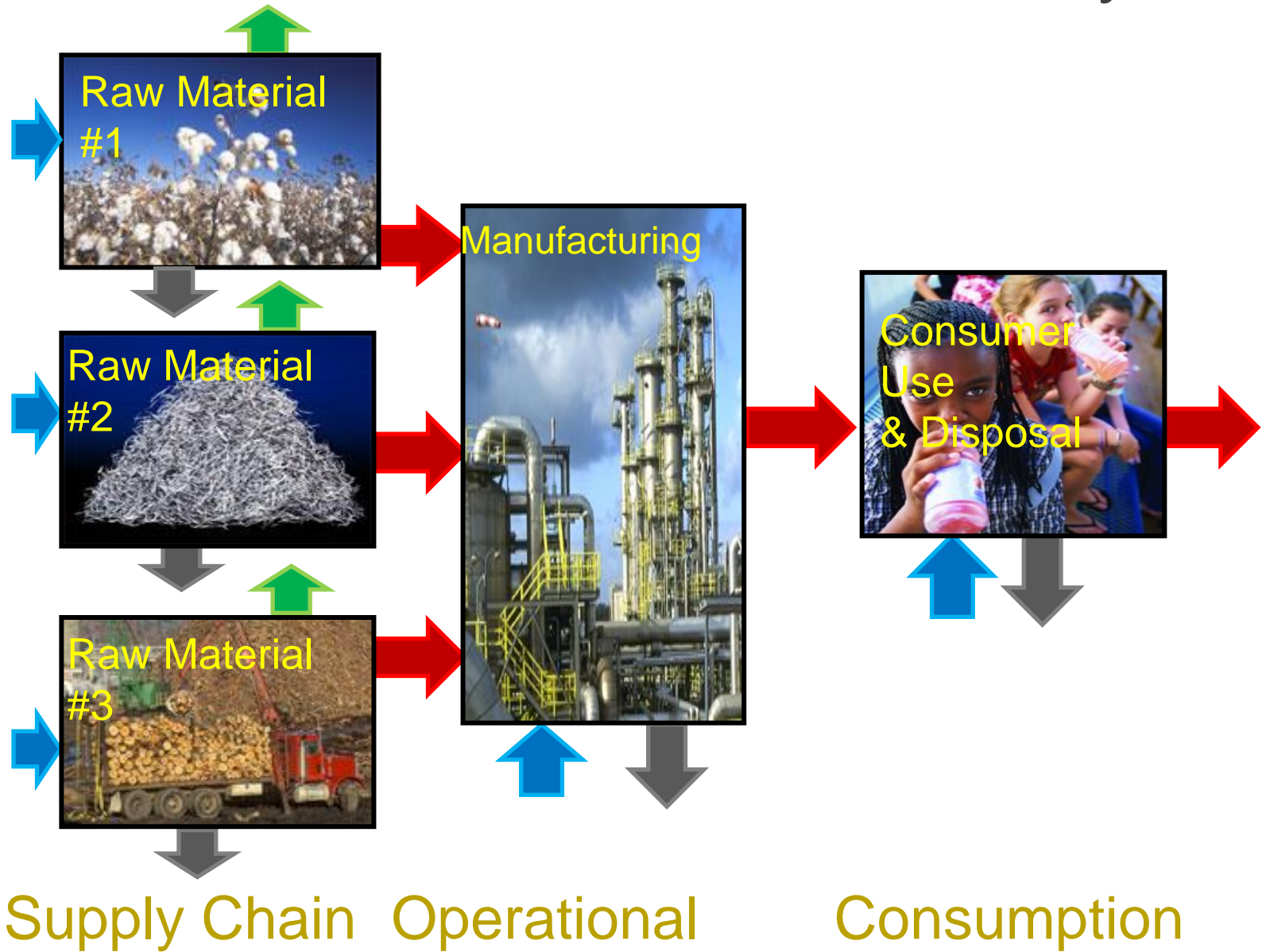


Source: The water footprint of cotton consumption: An assessment of the impact of worldwide consumption of cotton products on the water resources in the cotton producing countries. A.K. Chapagain, A.Y. Hoekstra, H.H.G. Savenije, R.Gautam. Ecological Economics 60 ( 2 0 0 6 )





# Where to Draw the Boundary?





# Operational Water Footprints for Leading Beverages (L/L product)



1.83



1.77

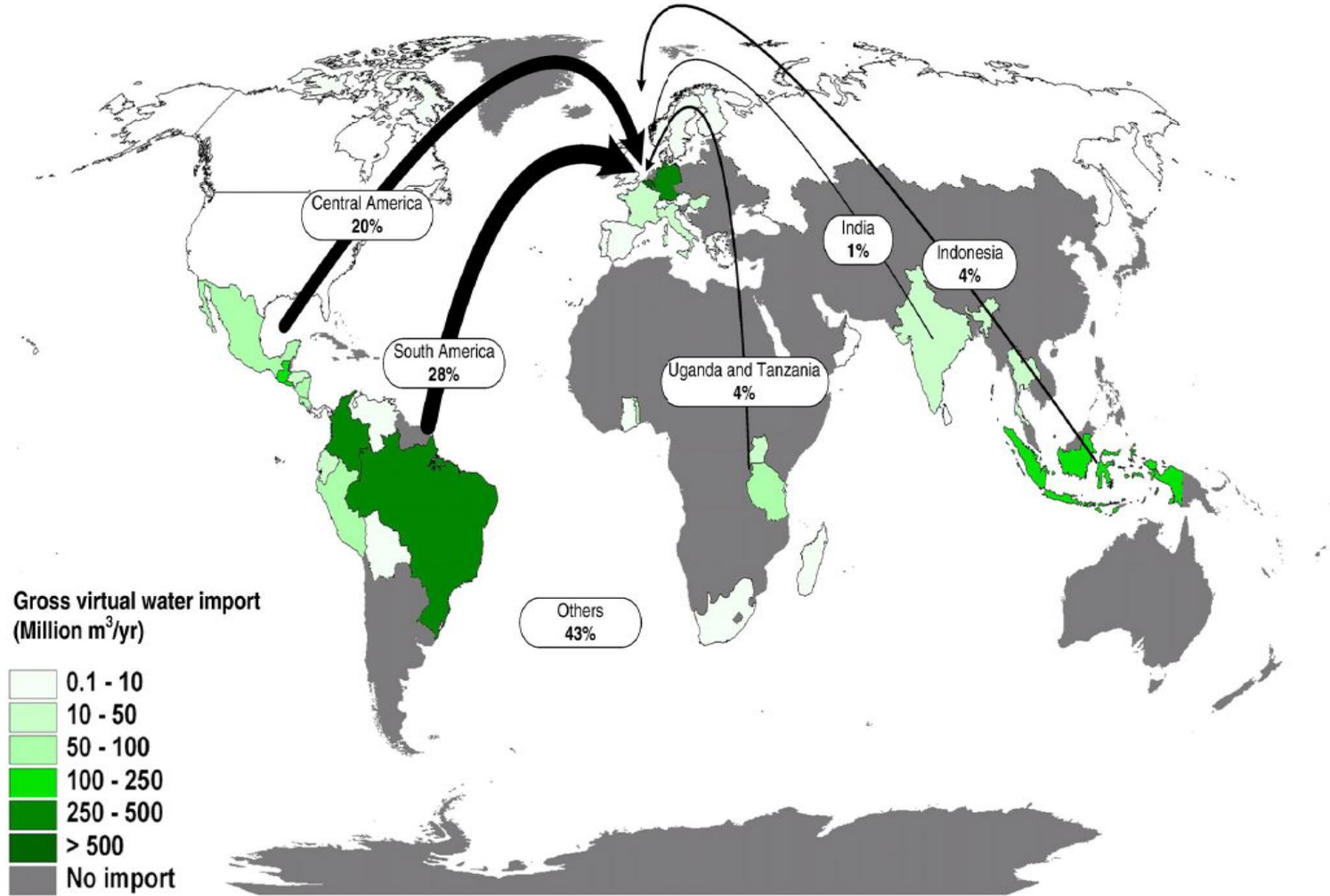


1.4





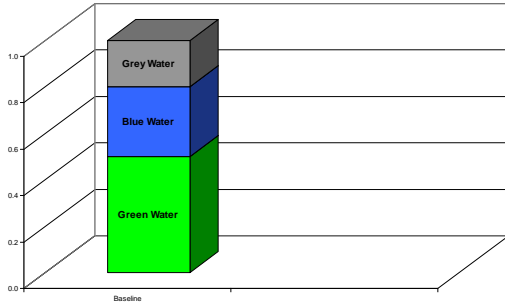
# Virtual Water e.g. Coffee Consumption in the Netherlands





# Watershed Neutrality

Benchmarking & Baseline Footprint



Water Efficiency Assessments



Water Risk Reduction Strategy



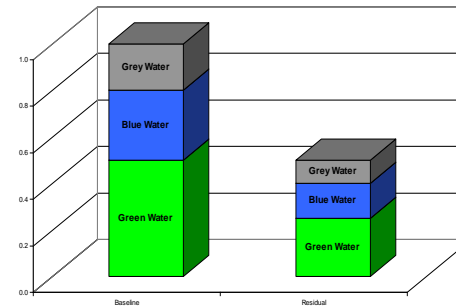
“Reasonable Reductions” in Use



Neutrality = Offset Residual Footprint



“Reasonable Investments” (via Water Services)



Residual Footprint

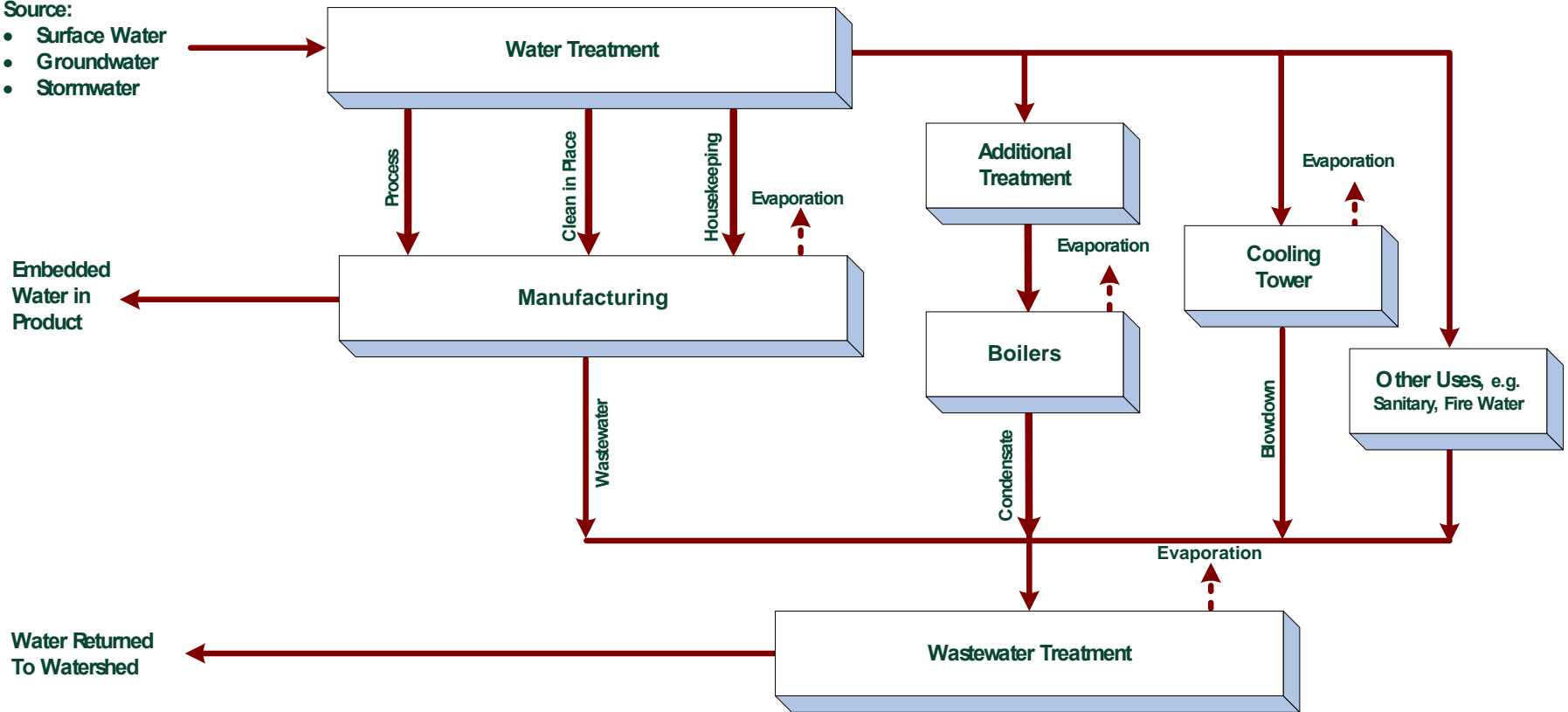




# Internal – Efficient Water Use

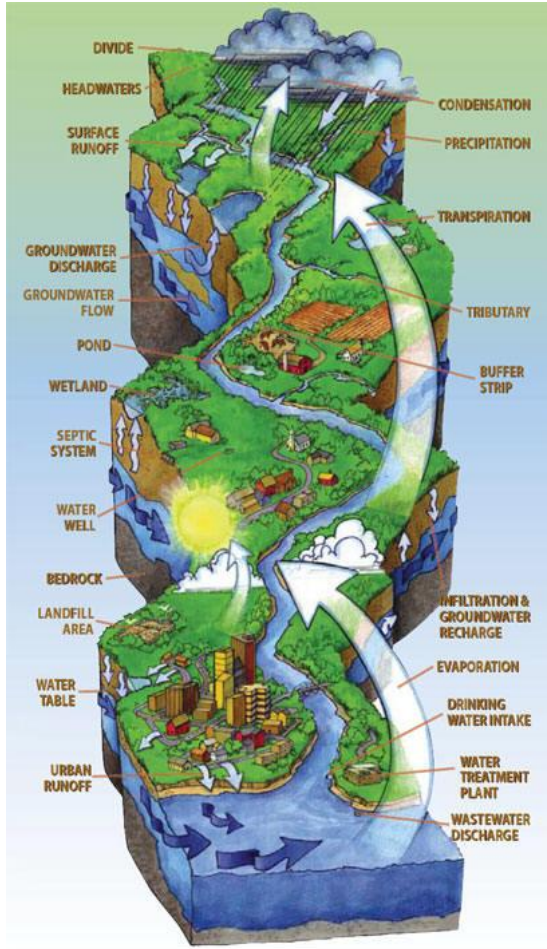
Source:

- Surface Water
- Groundwater
- Stormwater





# External – Watershed Stewardship



- Historically a watershed provided benefits considered free to society
  - Flood control
  - Water supply
  - Soil retention, soil formation
  - Nutrient regulation
  - Waste treatment
  - Aesthetics
  - Scenic landscapes
  - Cultural



# Ecosystem Services

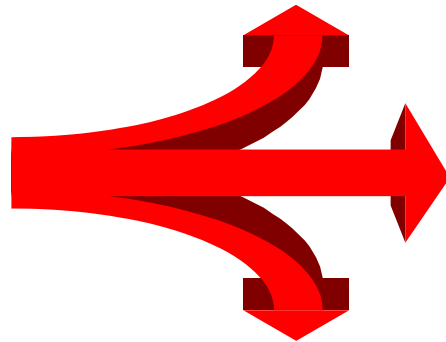
Because ecosystems provide benefits we value, they provide a "service" to people, hence the term "ecosystem services"

Ecosystem

Ecological



- Nesting Area for Birds
- Breeding Area for Fish
- Sediment Stabilization
- Water Quality Enhancement
- Many Others



Direct Human Uses

(e.g., Recreational, Commercial)



- Consumptive Uses
- Bird Watching
- Fishing
- Drinking Water
- Commercial Fishing

Passive Use



- Existence value
- Aesthetic value
- Preservation of diversity
- T&E species





# Investing in Water Services

## ■ Why?

- Community sustainability goals
- Engagement in watershed (source) management
- “Accounting” mechanisms to recognize contribution
- May be lower cost than in-plant options



## ■ How?

- Identify local needs/ opportunities
- Engage with stakeholders
- Find opportunities for stewardship
- Payments for conservation (easements, water rights, wetland banking)
- Invest in water efficiency land use (LID)
- Invest in water efficient agriculture



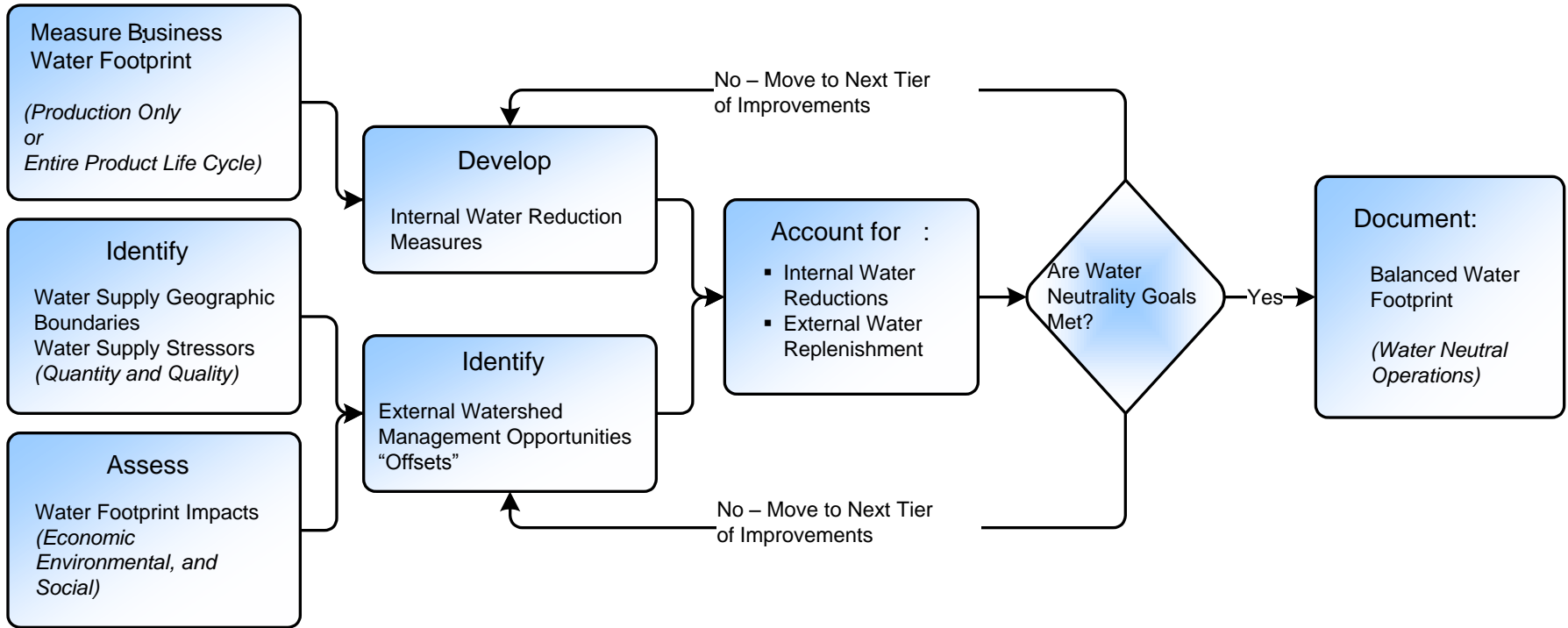
# Water Services - Valuation

- Services from flood control to climate management, provide valuable benefits to society
- Financial incentives to preserve watershed services reduce the likelihood of loss of function
- Market-based approaches are a cost-effective method to achieve environmental goals and sustain working and natural landscapes



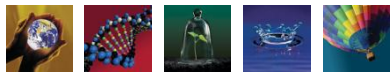


# Is Water Neutrality A New Integrated Framework for Water Stewardship?



Water Neutrality expands the definition of operations impact, through water footprinting, but also allows “credit” for contributions to watershed management.



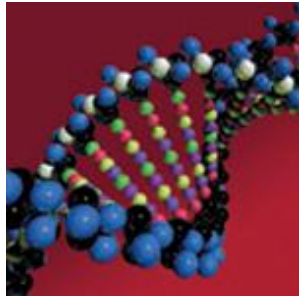


# Summary

- Defining a water footprint
  - Boundaries, direct vs. indirect (commodity), green/grey
- Benchmarking
  - Baseline use
  - Water stress mapping
- Neutrality
- Ecosystem services
  - What? When? How?
  - Valuation process
- Lessons from carbon?
- Certification
  - Scientific and policy basis



# WATER FOOTPRINTING



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