Sustainable Water Management

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Overview

- Water Environment Federation
- Scope of presentation
- What is sustainability?
- Water management basics
- Drivers for sustainable approaches
- Sustainable water management
- Looking to the future
- Q&A

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Water professionals protecting public health by improving water quality for 81 years

Formed in 1928, the Water Environment Federation® (WEF®) is a not-for-profit technical and educational organization with 36,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world.

WEF and its Member Associations proudly work to achieve our mission of preserving and enhancing the global water environment®.

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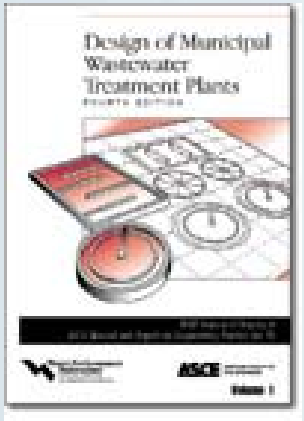
A technical resource to water professionals



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- Sustainability Community of Practice
  - Sustainable Utilities
  - Sustainable Watersheds
  - Industrial / Corporate Approaches
  - Stormwater & Green Infrastructure
  - Energy & Climate Change
- Conferences
  - Sustainability 2008
  - Cities of the Future 2010
  - Energy & Climate Change 2011
- Sustainable Water Infrastructure initiatives

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Sustainable Water Management: Scope

Image: Water for People

Image © Cameron Davidson

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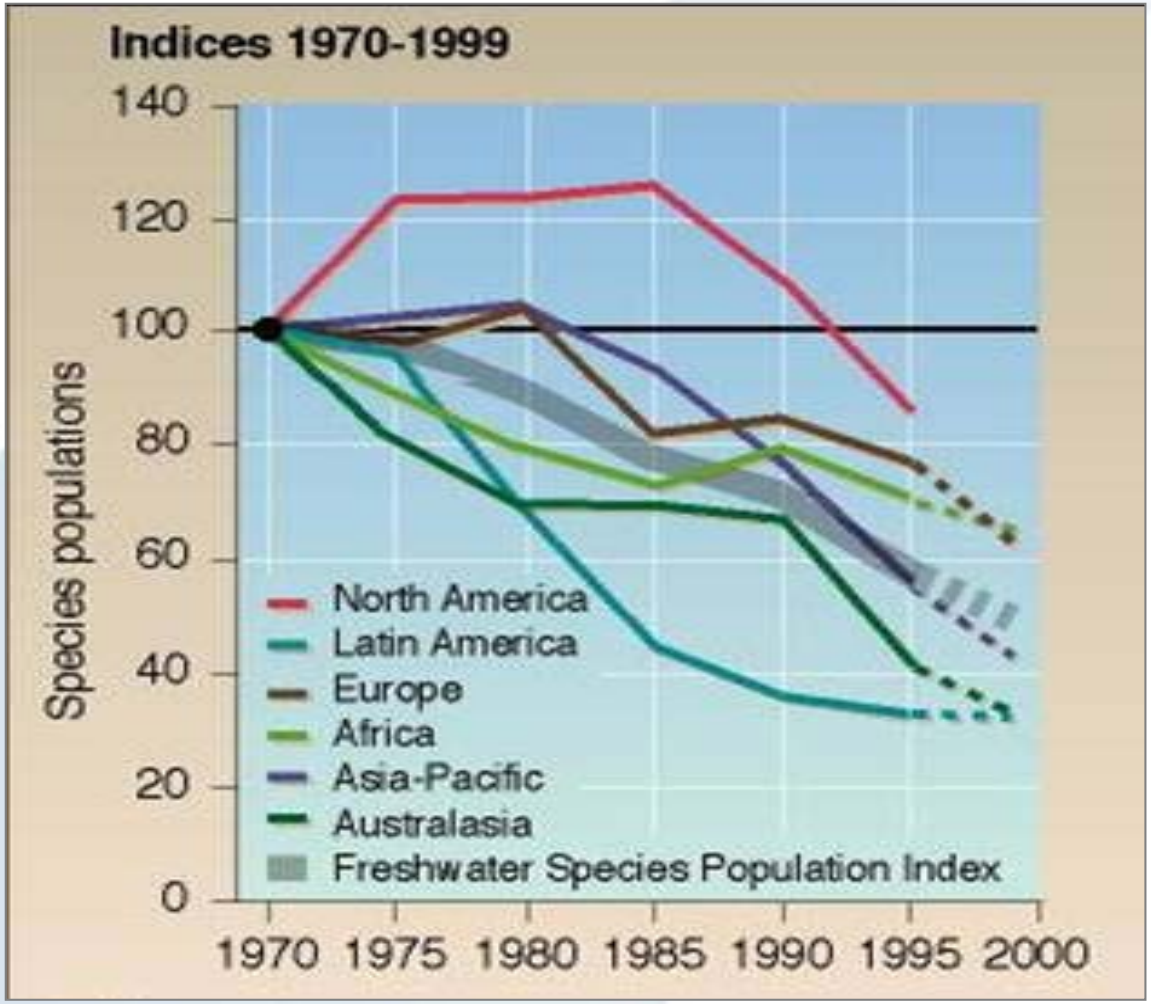
Sustainable Water Management: Scope



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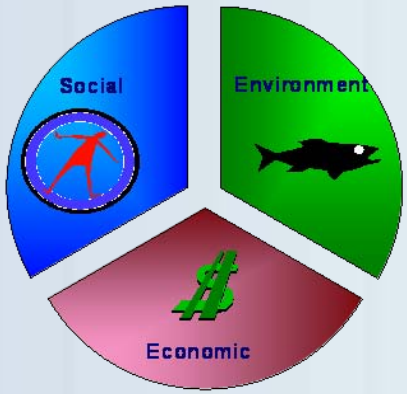
Source: World Resources Institute

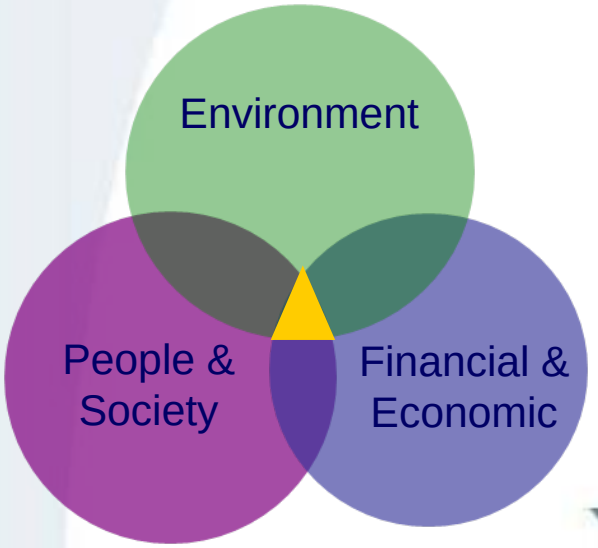
What is Sustainability?

- Brundtland Commission Report of the UN World Commission on Environment and Development (1987)

  "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

- Triple Bottom Line





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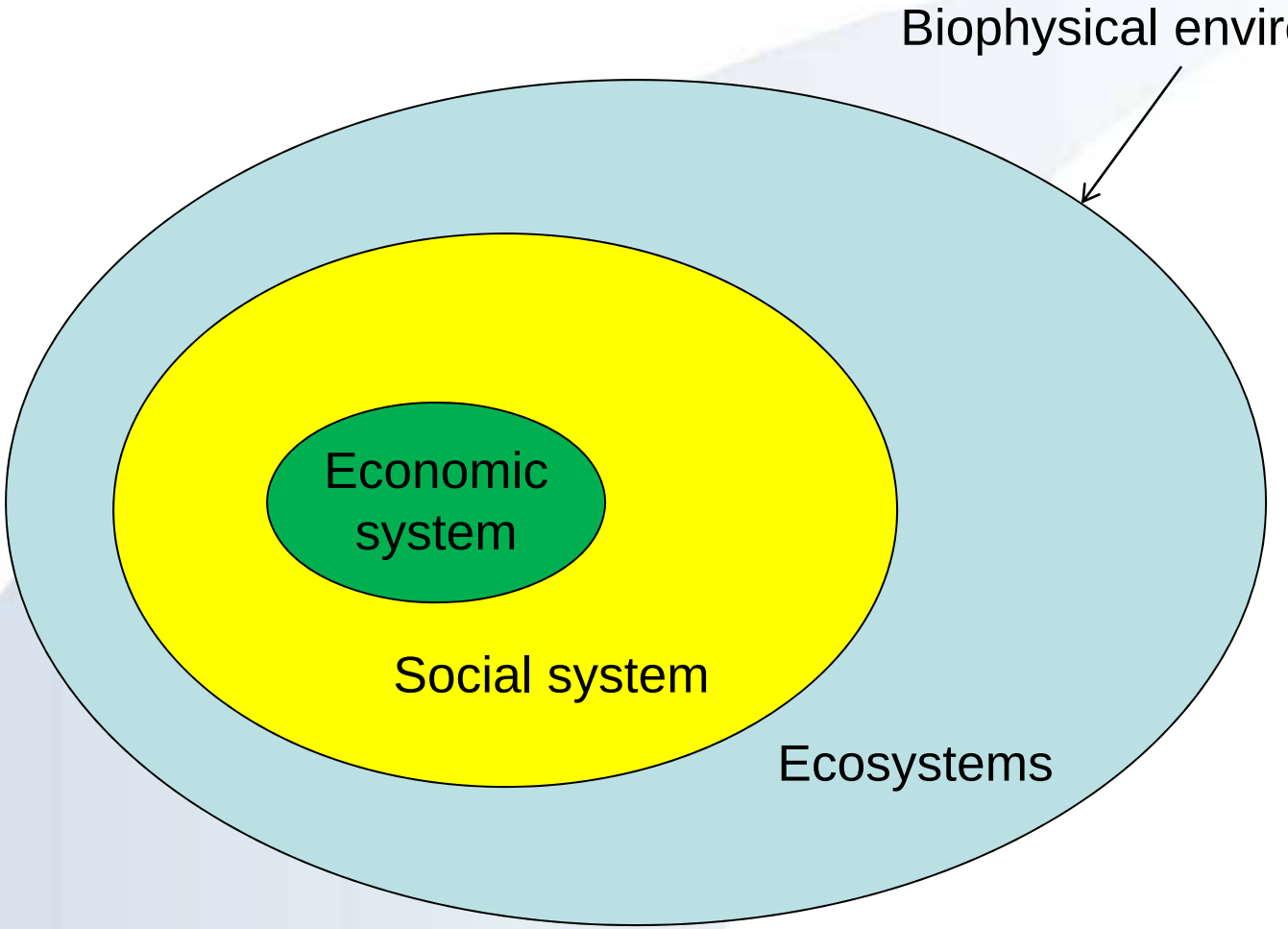
What is Sustainability?



Concept adopted from Wells, SWRR, 2005

What is Sustainability?

- Water quality
- Water quantity
- Utility sustainability
  - Resource consumption

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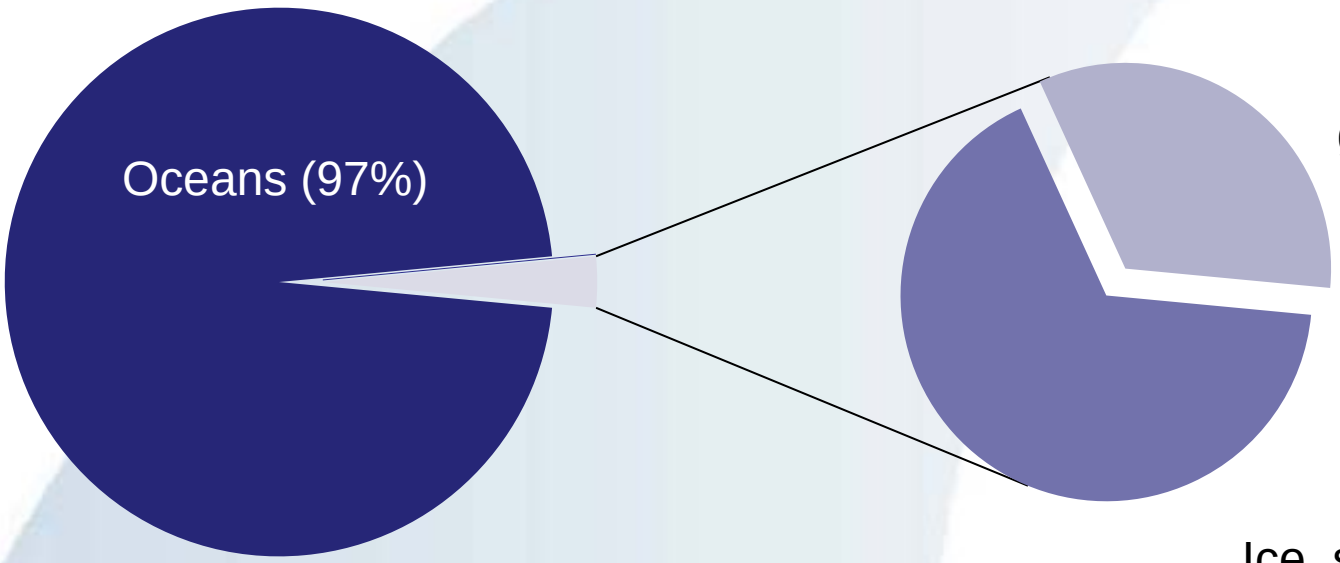
Water Management Basics



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Water Management Basics

Water treatment & distribution

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Water Management Basics

Wastewater collection & treatment

Drivers for Sustainable Approaches

photo credit James Thomas, from Cleveland Press Collection, Cleveland State University Library

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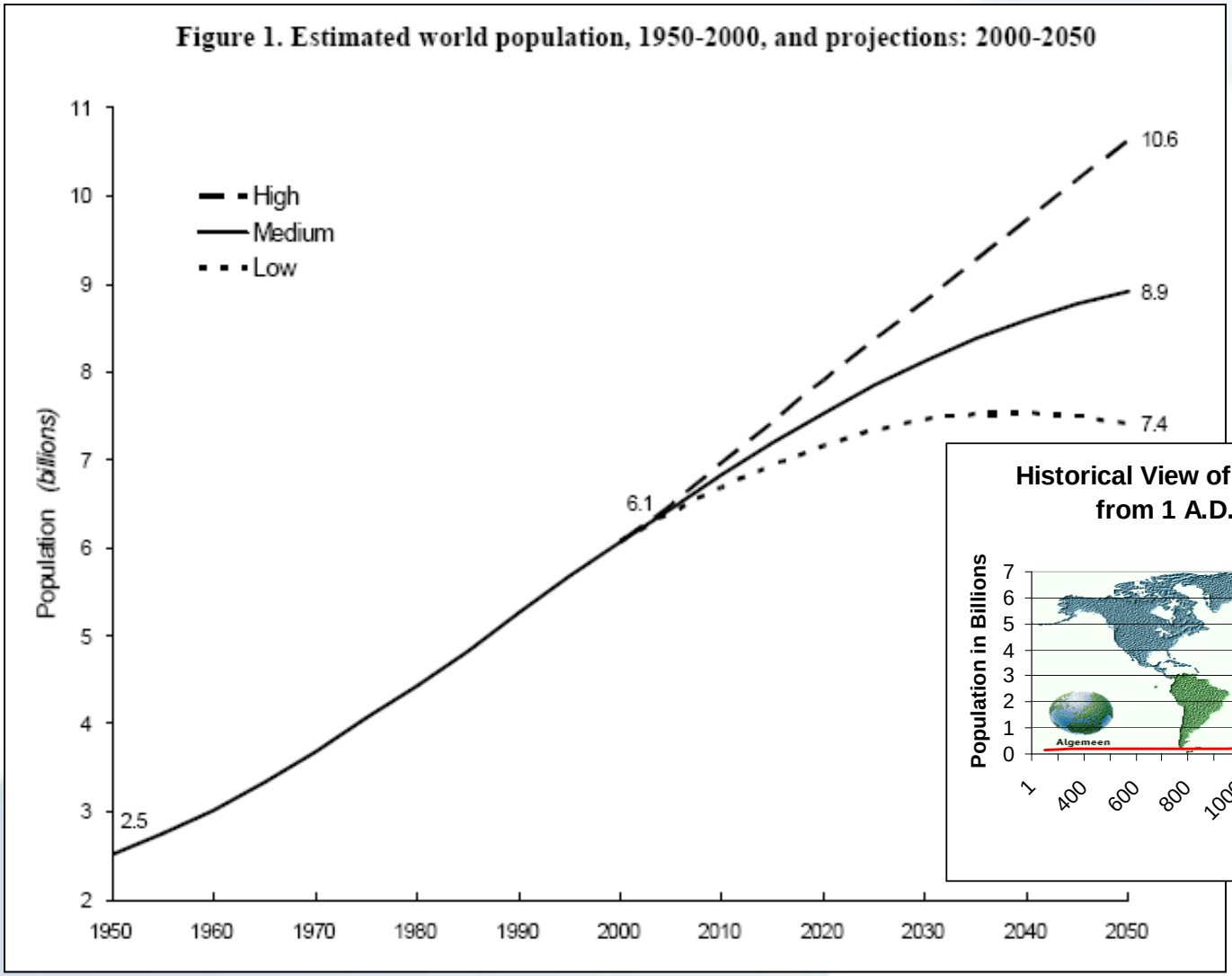
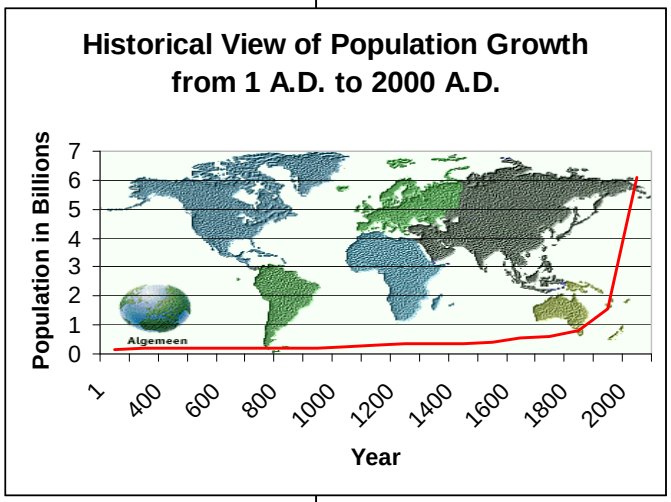
Drivers for Sustainable Approaches: Global Population Growth





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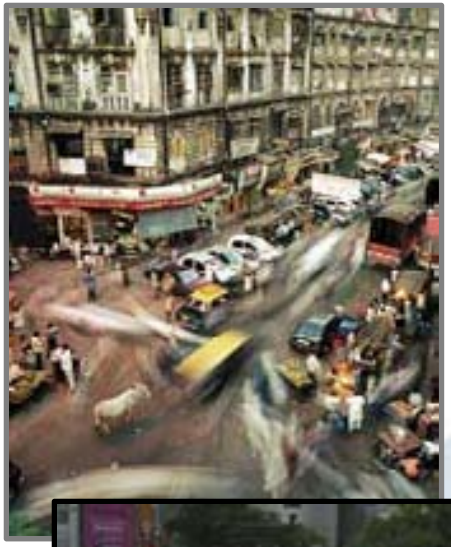
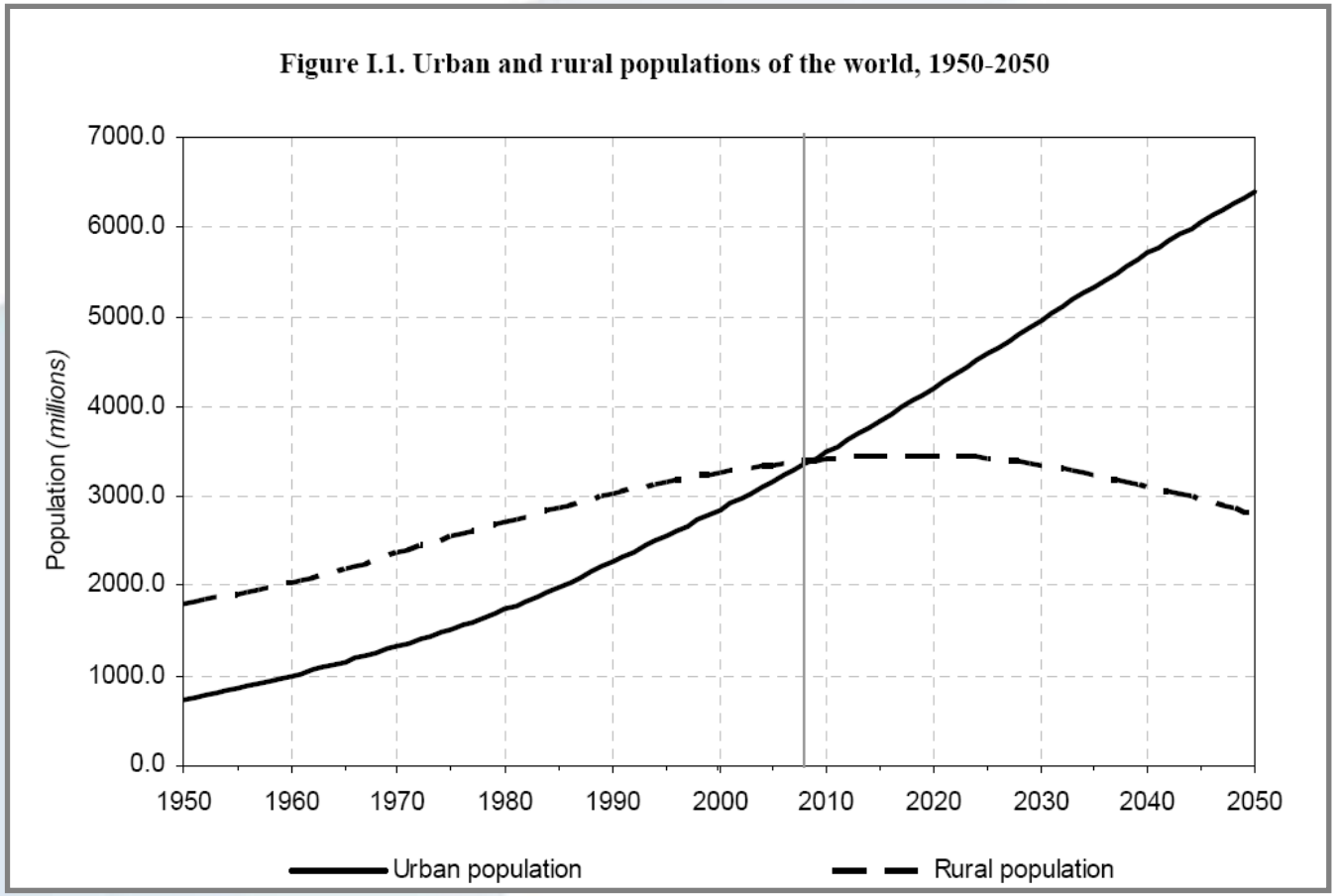
Source: UN, 2004

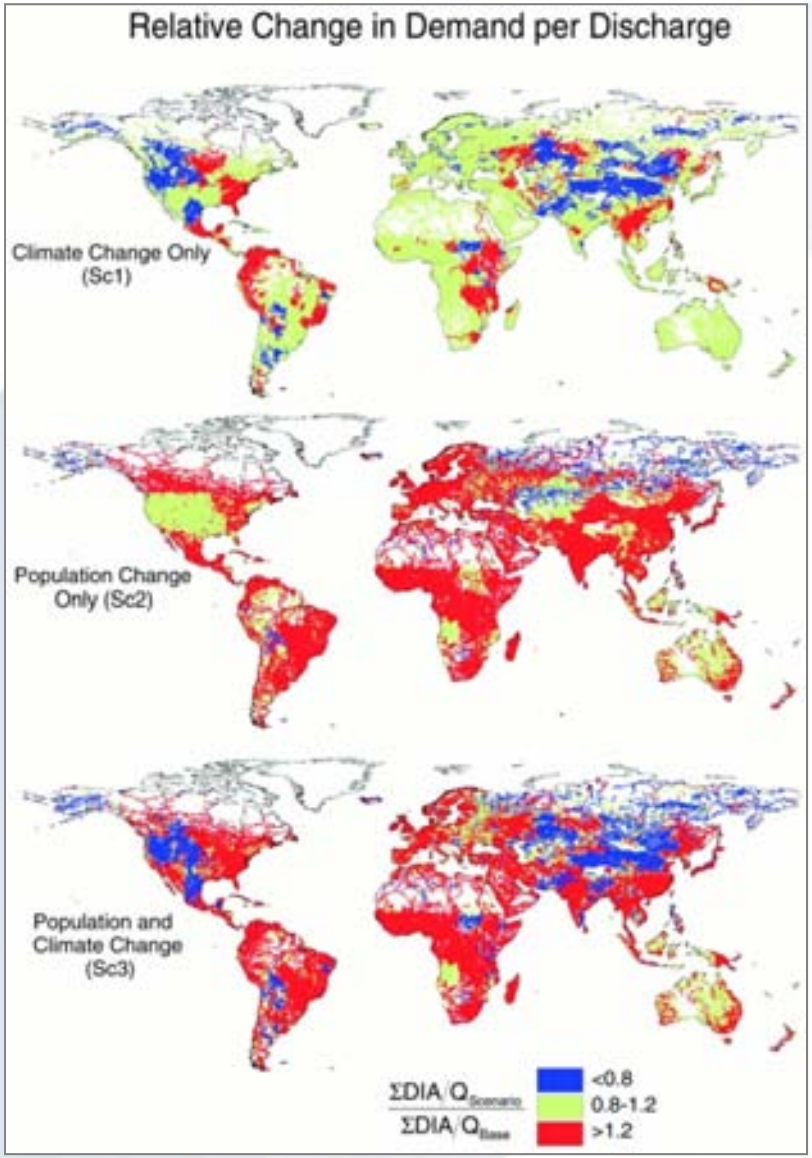
Drivers for Sustainable Approaches: Urbanization





Source: U.N. FPA and DESA

Drivers for Sustainable Approaches: Climate Change



Source: Vorosmarty, et al (2000)

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Drivers for Sustainable Approaches: Aging Infrastructure

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Drivers for Sustainable Approaches: Microconstituents

- Endocrine disrupting compounds (EDCs)
- Pharmaceuticals and personal care products (PPCPs)

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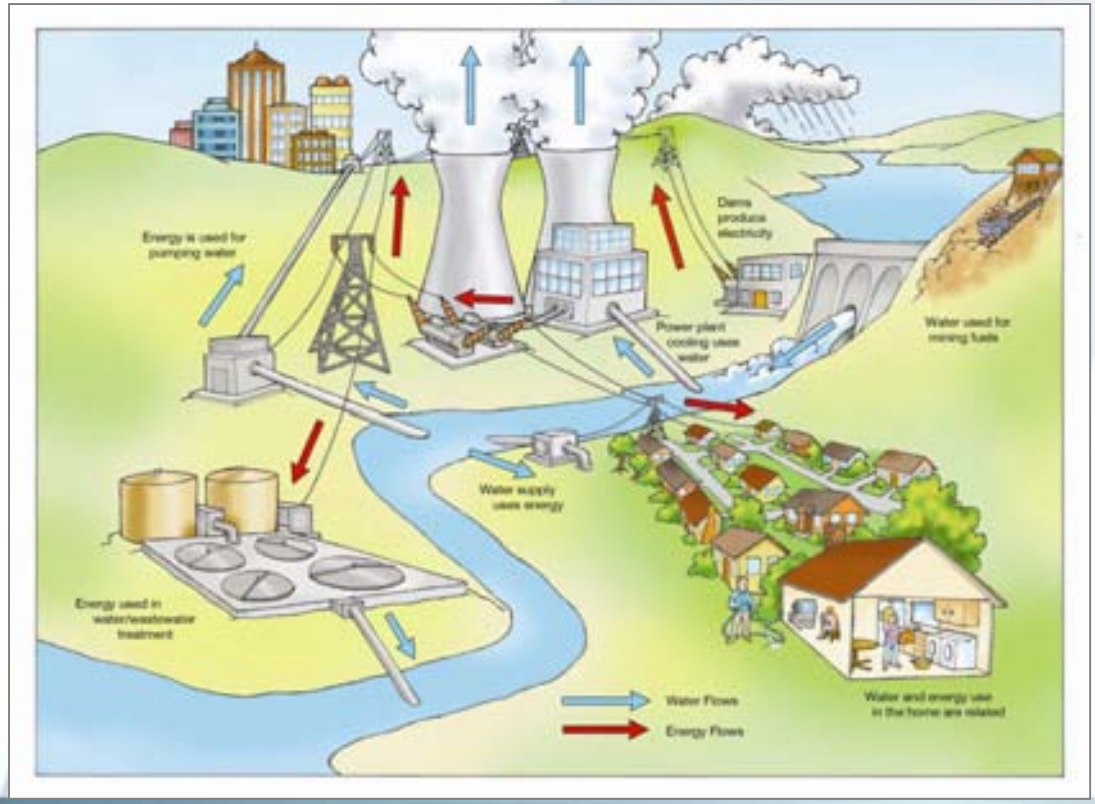
Photo: Sciencedaily.com and NPS.gov

Drivers for Sustainable Approaches: Resource Limitations - Energy

3% of all energy in the US used for water and wastewater treatment, distribution, and collection



Energy-Water Nexus

Source: DOE

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Drivers for Sustainable Approaches: Resource Limitations - Nutrients

Source: Greateryellowstone.com

© CJA Bradshaw, Flickr

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Sustainable Water Management?

Source: NASA

Source: Laura Rauch/AP File

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Sustainable Water Management?

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Source: ajc.com

Sustainable Water Management?

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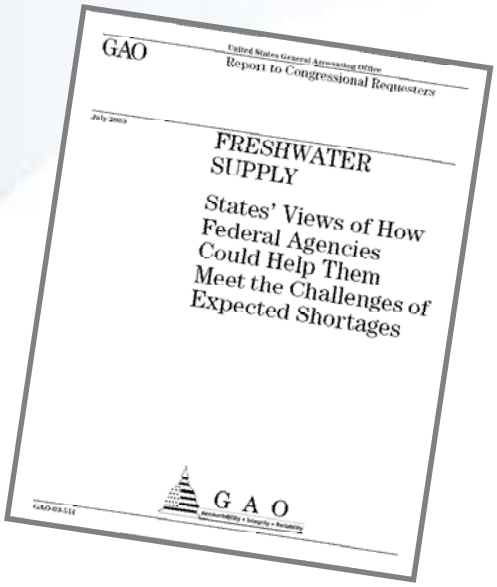
Source: ajc.com

Sustainable Water Management?

- GAO: 36 states expect water shortages in the next 10 years
- California
  - Water conveyed 400 miles from northern to southern CA
  - Development curtailed due to insufficient water supplies


GAO

United States General Accounting Office

Report to Congressional Requesters

July 2003

FRESHWATER SUPPLY

States' Views of How Federal Agencies Could Help Them Meet the Challenges of Expected Shortages

GAO

Photo source: creativegreenius

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Sustainable Water Management: Energy Conservation & Recovery

Source: ASA

Offset $3.5M/yr in electricity & $1M/yr natural gas

$2M/yr excess renewable energy + RECs & GHG offsets

Source: EBMUD

Source: WERF

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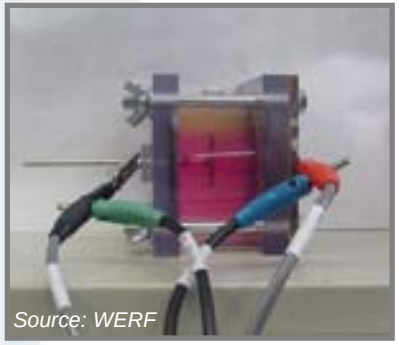
Sustainable Water Management: Energy Conservation & Recovery

- Biogas / energy production & offset
- Renewable energy
- Microbial fuel cells
- Heat exchange in sewers


Source: ASA


Source: NJ Wind


Source: NJAmWater


Source: WERF

Source: Rabtherm

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Sustainable Water Management: Nutrient Recovery

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Ostara photos courtesy: www.ostara.com

Sustainable Water Management: Reuse

Water source → Water treatment → Water use → Wastewater treatment → Receiving waters

stormwater →

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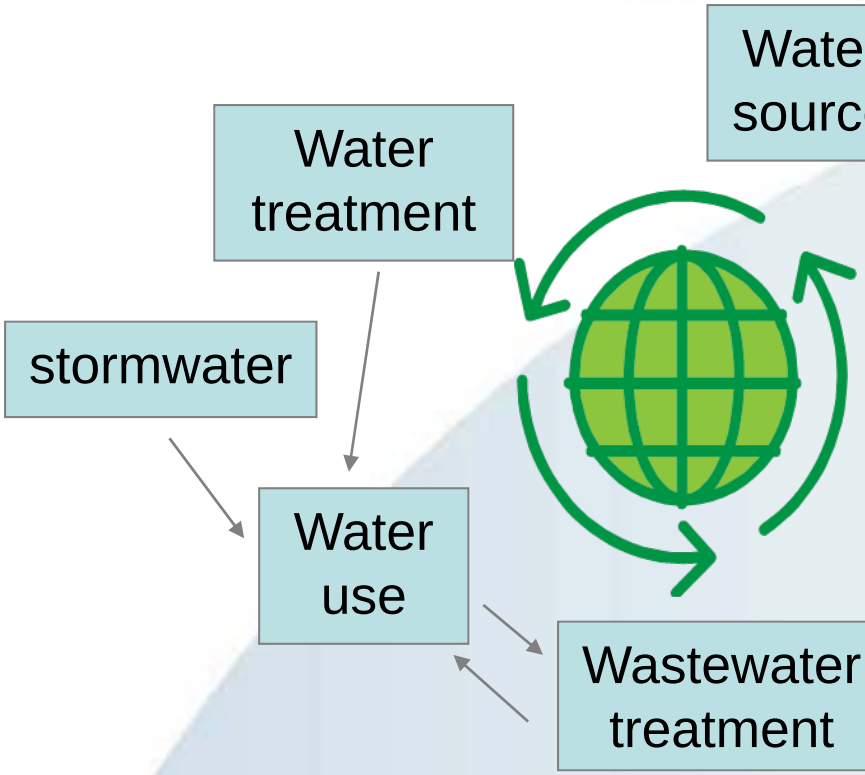
Sustainable Water Management: Indirect Reuse




Source: NPR


Source: Pennant Hills Golf Club

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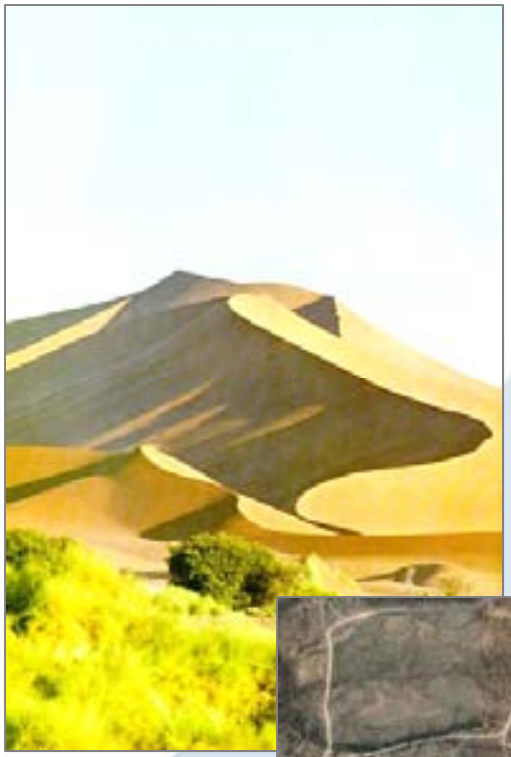
Sustainable Water Management: Direct/Indirect Reuse



Singapore's "4 National Taps"

1. Local catchment water
2. Imported water
3. **NEWater**
4. Desalinated water

Namibia photos courtesy: J. Barnard, WEFTEC.09

Sustainable Water Management: Decentralization

Solaire, NYC

source:http://www.dailycommercialnews.com/images/archivesid/29908/130.jpg

Dockside Green, Victoria, BC

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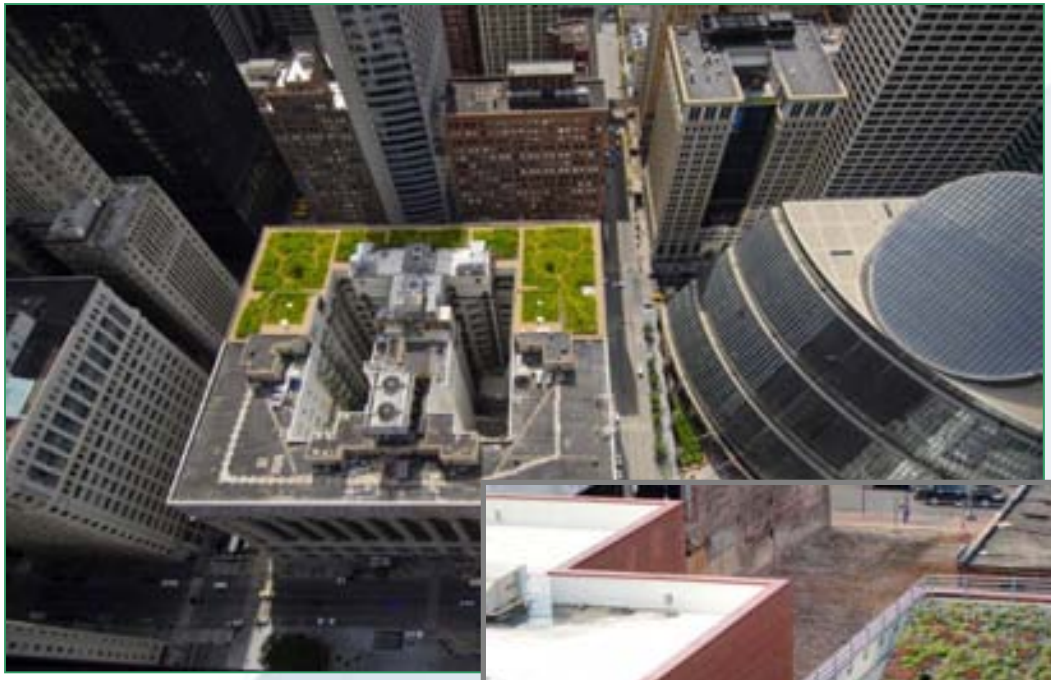
Sustainable Water Management: Green Infrastructure



Source: Mulvaney, Lanyon, WEFTEC.08

Source: ASLA

Infiltration Planter
Source: City of Portland, OR

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Looking to the future

- Resource Consumer → *Resource Producer*
- Distributed systems
- Integrated infrastructure
  - Smart meters / water grid

Source: EBMUD

Source: http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-8926ENW.pdf

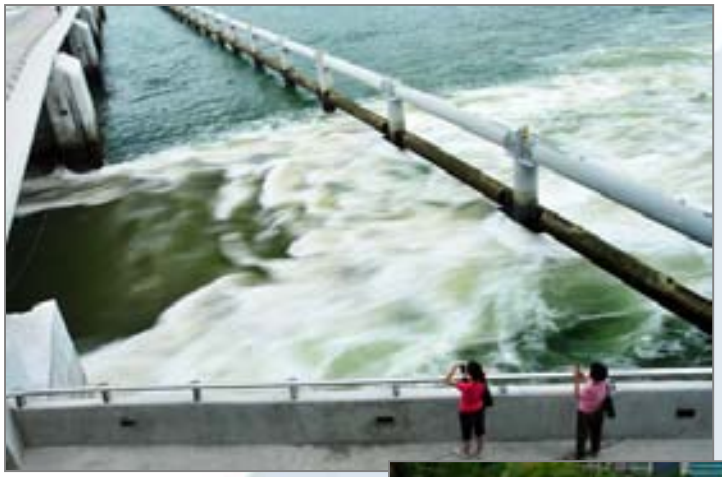
Looking to the future

- Green infrastructure
- Energy or Carbon neutrality

Source: masdar.com

Looking to the future

- Integrating social aspects



Source: PUB

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What is Sustainability?

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- Utility sustainability
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Questions?

www.wef.org

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