



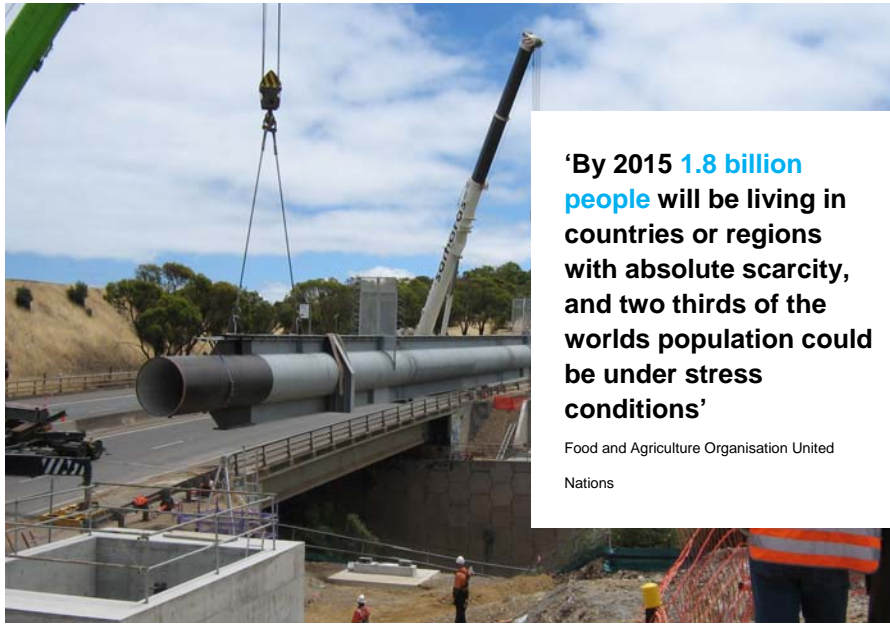
Peak Water: Resilience and Climate Change

Jennifer Schooling
14 July 2010

Definitions

Developed from the concept of Peak Oil (M King Hubbert et al), however oil is essentially non-renewable and water is renewable. The water cycle renews natural stocks

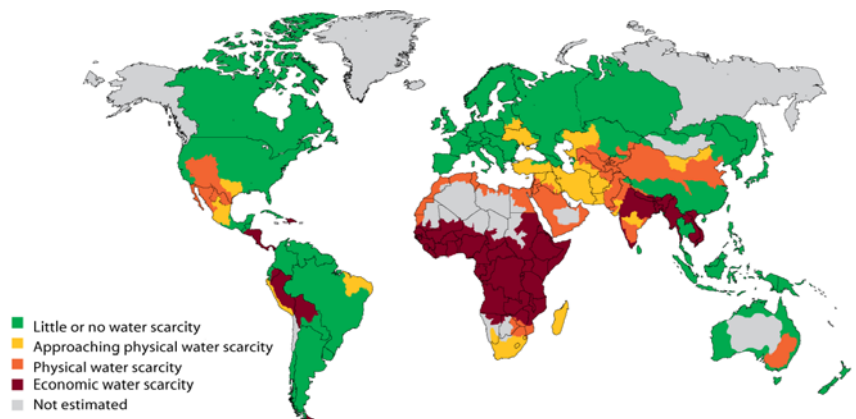
- **'Peak Water'** is reached when globally the rate at which water demand is higher than the rate at which it is replenished
- Sustainably managed water resources are coming under increasing pressure
- **'Water Stress'** occurs when demand exceeds available supply , or when poor water quality restricts its use
- **'Water Scarcity'** occurs when natural climatic factors limit availability of water, such as high evapo-transpiration or low precipitation.
- Both Water Stress and Water Scarcity can be induced by economic or political constraints which prevent adequate development of water resources.



'By 2015 1.8 billion people will be living in countries or regions with absolute scarcity, and two thirds of the worlds population could be under stress conditions'

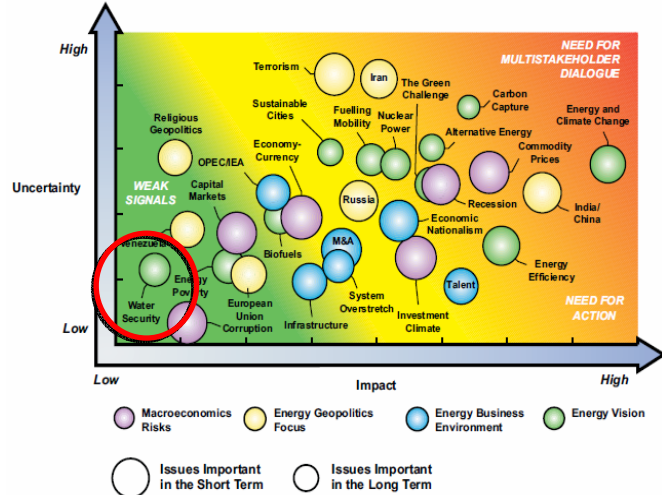
Food and Agriculture Organisation United Nations

Climate change will influence what we do and where



Data: based on Comprehensive assessment of Water Management in Agriculture 2007

Water is moving up political agendas

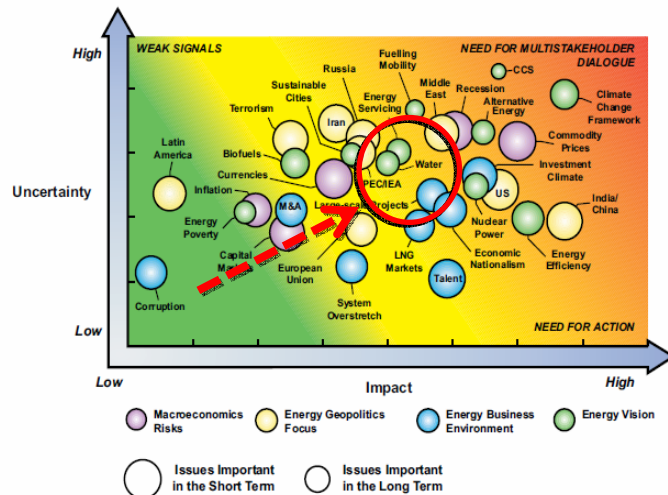


Source: World Economic Forum Energy Industry Issue Map 2007/2008.

PEAK WATER: RESILIENCE AND CLIMATE CHANGE
The Royal Society

ARUP

Water is moving up political agendas



Source: World Economic Forum Energy Industry Issue Map 2008/2009.

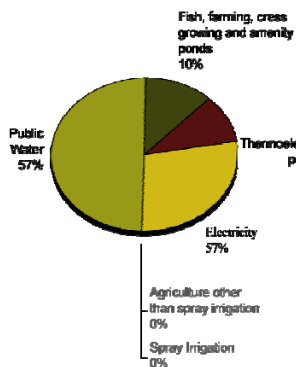
PEAK WATER: RESILIENCE AND CLIMATE CHANGE
The Royal Society

ARUP

Total water withdrawals

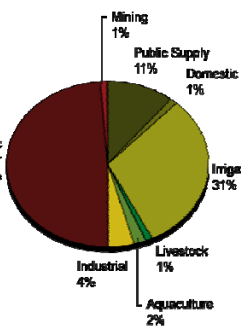
ENGLAND AND WALES

Ofwat 2007 data



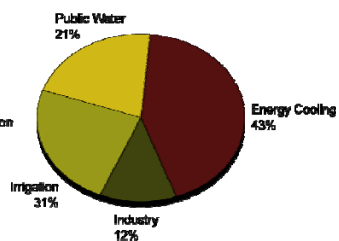
UNITED STATES

U.S. Geological Survey 2005 data



EUROPEAN UNION

European Environment Agency data, 1997-2002



PEAK WATER: RESILIENCE AND CLIMATE CHANGE
The Royal Society

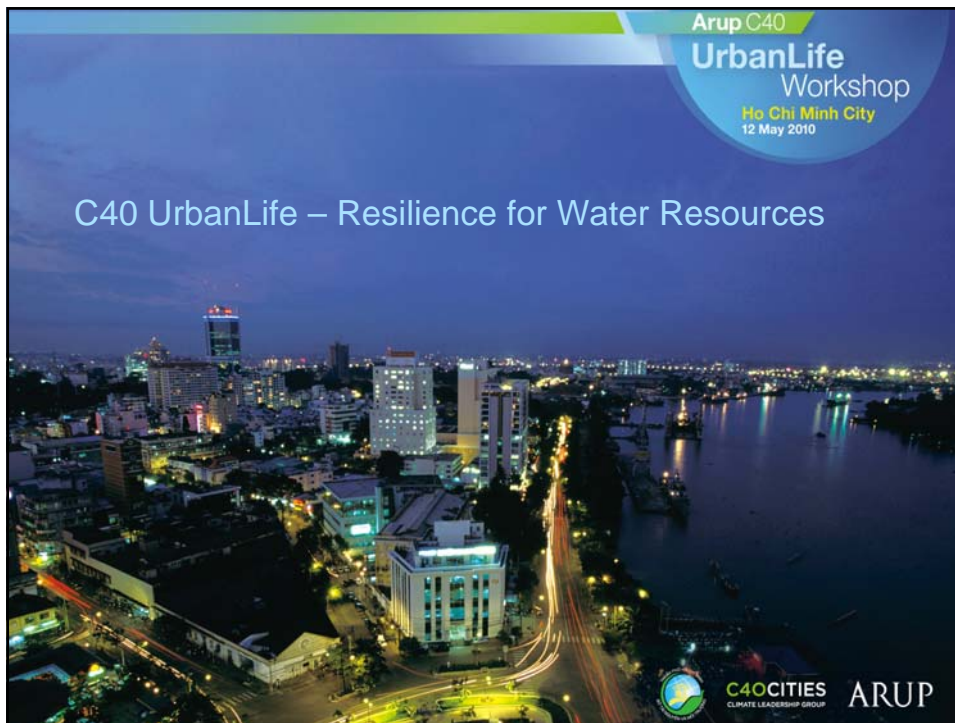
ARUP

Sustainable management is essential



PEAK WATER: RESILIENCE AND CLIMATE CHANGE
The Royal Society

ARUP



C40 resilience in Ho Chi Minh city

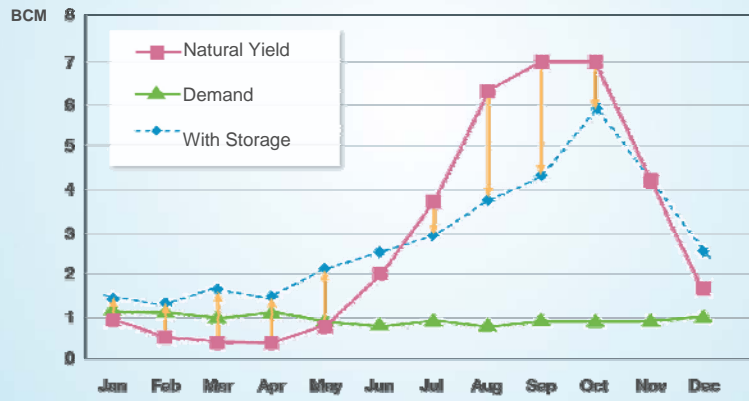
- Transfer of knowledge through Clinton C40 Initiative
- UK resilience thinking applied to Ho Chi Minh City
- Issues particularly identified with ‘Too Much’ and ‘Too Little’ water



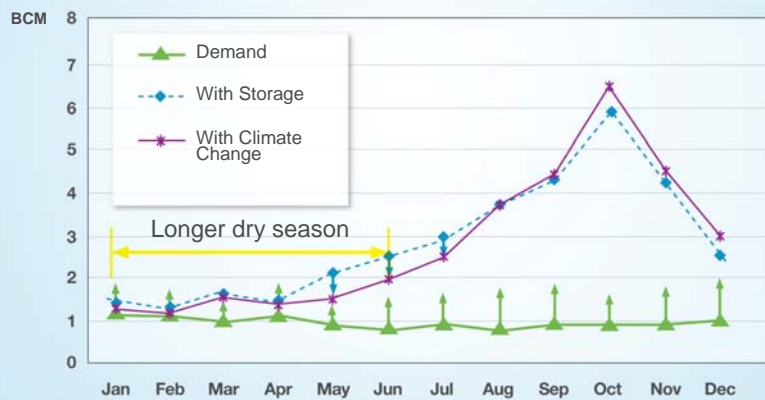
Saigon Times 13th May 2010

Impact of Basin Storage on Annual Yield distribution

Source: Irrigation and river basin management: options for governance and institutions. by Mark Svendsen

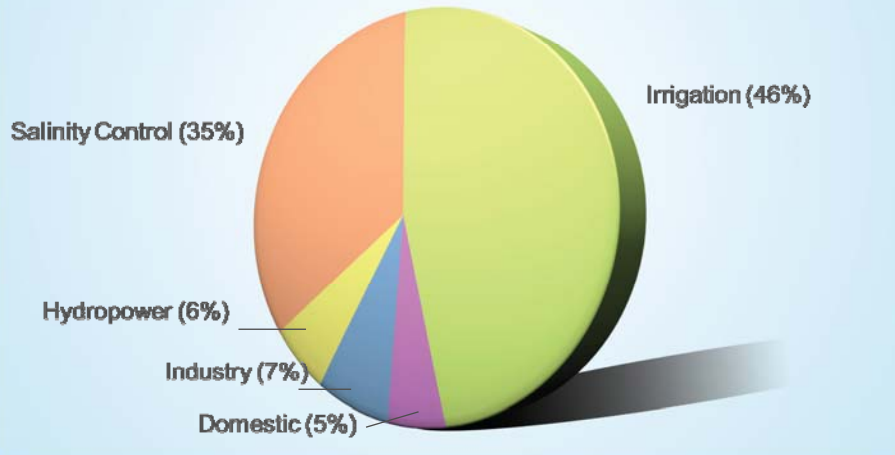


Impact of a Longer Dry Season and Increasing Demand



Gross Water Demand in the Dong Nai Basin

Source: Irrigation and river basin management: options for governance and institutions. by Mark Svendsen



What Better Demand Management Might Mean for Ho Chi Minh City

Industry

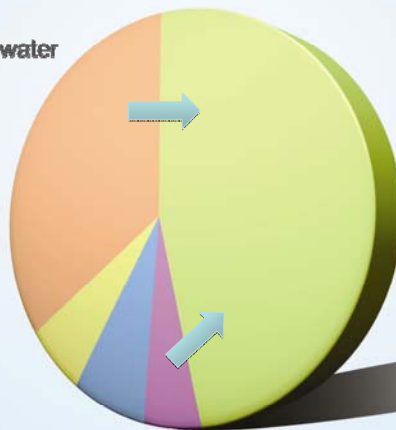
- Conserving groundwater resources

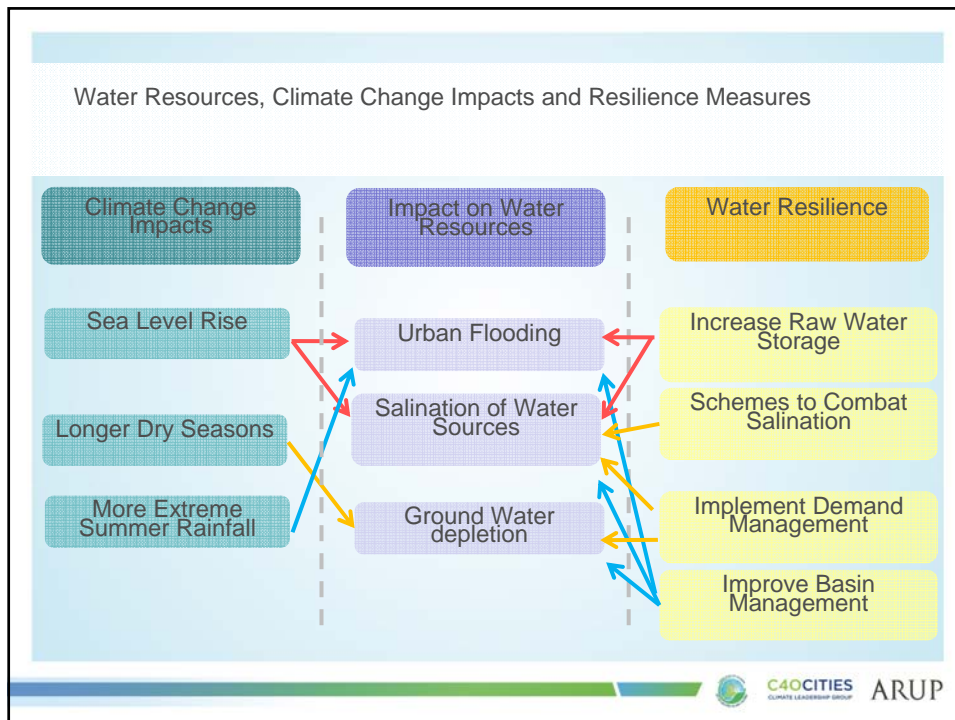
Domestic

- High value potable water will supply a larger population

Irrigation

- more water for other higher value uses
- more effective salinity control

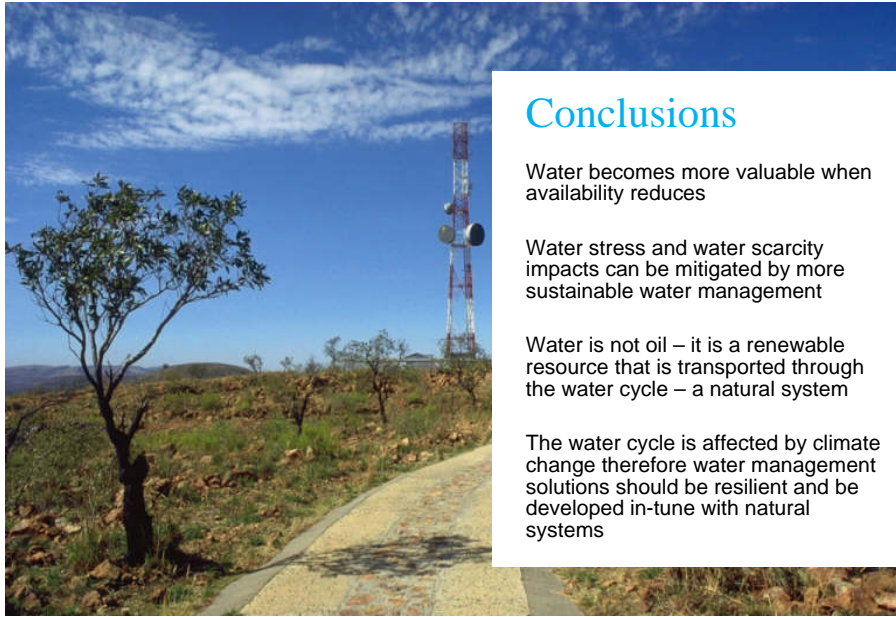




The 'softpath' for water

(after Palaniappan and Gliek 2009)

1. Focusing on ensuring water for human needs
2. Focusing on ensuring water for ecological needs
3. Matching the quality of water needed with the quality of water used
4. Matching the scale of the infrastructure to the scale of the need
5. Ensuring public participation in decisions over water
6. Using the power of smart economics



Conclusions

Water becomes more valuable when availability reduces

Water stress and water scarcity impacts can be mitigated by more sustainable water management

Water is not oil – it is a renewable resource that is transported through the water cycle – a natural system

The water cycle is affected by climate change therefore water management solutions should be resilient and be developed in-tune with natural systems