Adaptation to Climate Change

Case Study

Sustainable Development Goal 6

"Ensure availability and sustainable management of water and sanitation for all"

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- *Introduction*: Increasing population growth competition for resources, has produced water scarcity and reductions in water quality.

- *Case Study*: Adaptation to change in review of

diminishing water supply and quality

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- *Key issues*

- Integrated Water Resource Management (IWRM)
- Climate variables
- Changing Trends
- Existing capacities to cope
- Constraints of Adaptation
- Adaptive strategies
- Policies

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- *Learning Objectives*
- To recognise the role of the Integrated Water Resources Management (WRM) as defined by the Global Water Partnership (GWP)
- To recognise the **climate variables** that may be subject to change and cause impacts on the supply of freshwater
- To recognise the **changing trends** of the climate variables and their potential impacts
- Discuss existing capacities to cope
- List at least three major constraints of adaptation
- Identify what **policies** will promote the implementation of these strategies both globally and within Australia

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- *Contents*
  - *Integrated Water Resources Management (IWRM)*
    - A process of governance (Rahman & Harris, 2005)
    - Three basic aims
    - Enabling the Environment
    - Assisting in institutional development
    - Managing development of tools

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- Climate Variables

Those subject to change and cause impacts on the supply of freshwater may include:

i. Unpredictable frequency of rainfall
ii. Increasing duration and volume of rainfall
iii. Evapotranspiration
iv. Increasing global temperatures
v. Concentration increase of GHGs
vi. Increase in cyanobacteria populations (van der Linder, L. et al.)

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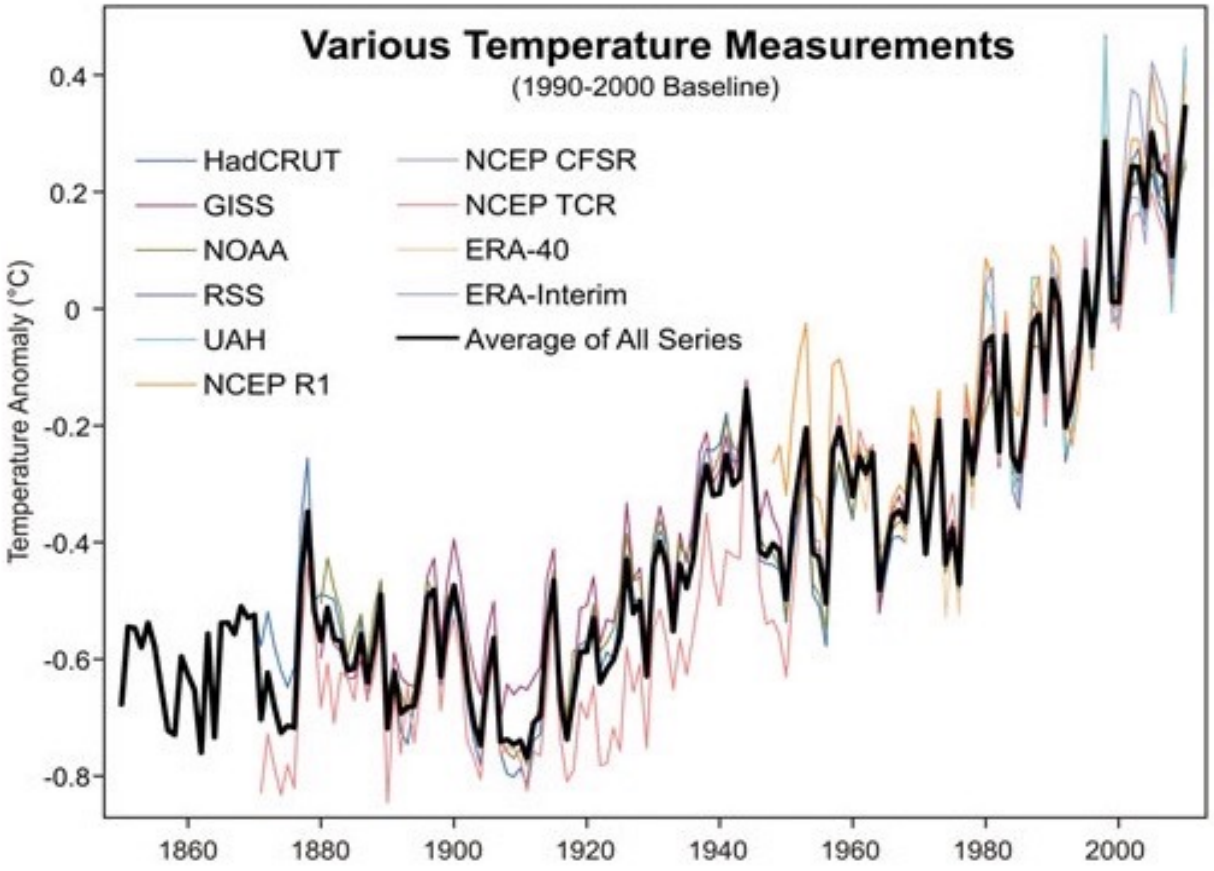

Source: Cook, J. (2011, p.2)

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- Changing Trends
- More areas of dramatically increasing heat stress (Australia Institute, 2019)
- Stress relief through wastewater recycling reducing reliance on reservoirs
- Greater cooperation and agreements between countries regarding shared water sources

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- Existing capacities to cope
- Improving efficiency of irrigation (Qureshi, et al., 2011)
- Improved hygiene and sanitation
- Increased availability of medical services, particularly with reference to airborne diseases such as malaria and dengue
- In developing countries, use of oral rehydration salts and/or chlorination tablets for drinking water

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- Constraints of Adaptation
- Climate information – uncertainties abound
- Climate conditions
- Trading volumes
- Water allocation
- Water entitlement
- Government policy changes

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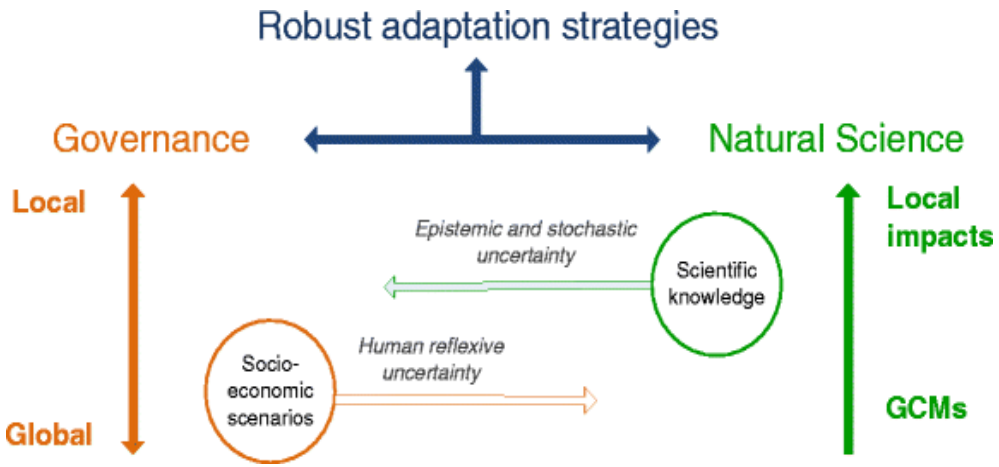
- Adaptive strategies
- Improved climate education and information – Van Pelt & Swart, 2011, p. 3840)



- Interactions of science and governance at different scales for knowledge of robust adaptation strategies

  (ibid. p. 3840)

- Increasing water productivity

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- Adaptive strategies *(continued)*

- Water storage
- Culverts and levees
- Water purification
- Desalination plants
- Pricing

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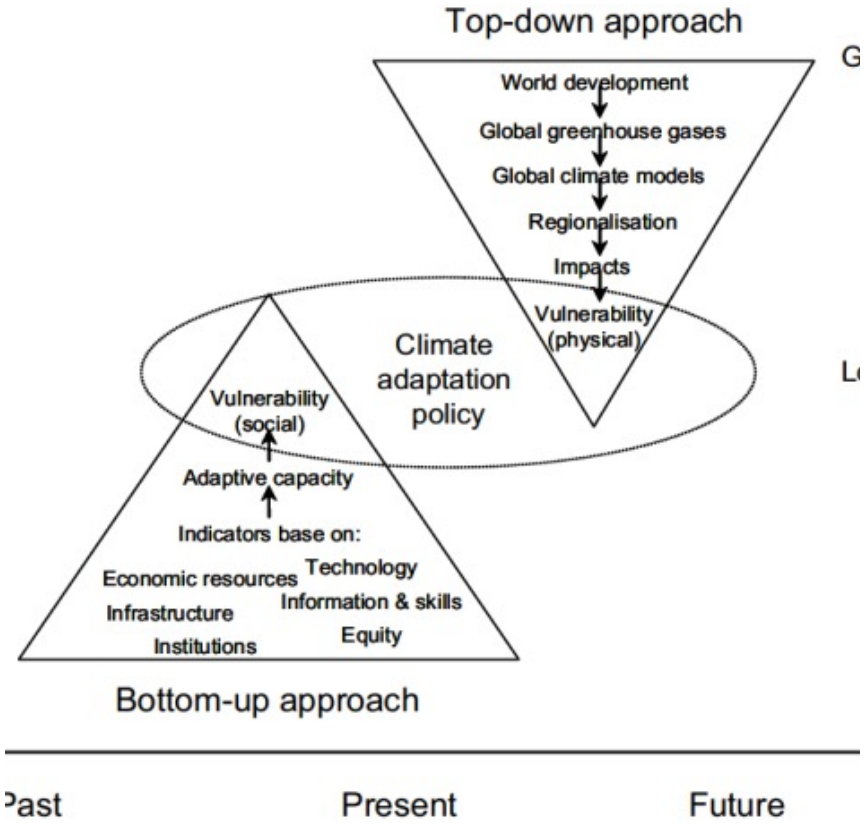

- Policies
- Increased cooperation between top down and bottom up approaches – in short, the convergence of academic and practical conclusions/concerns (Raiser, K. 2014)

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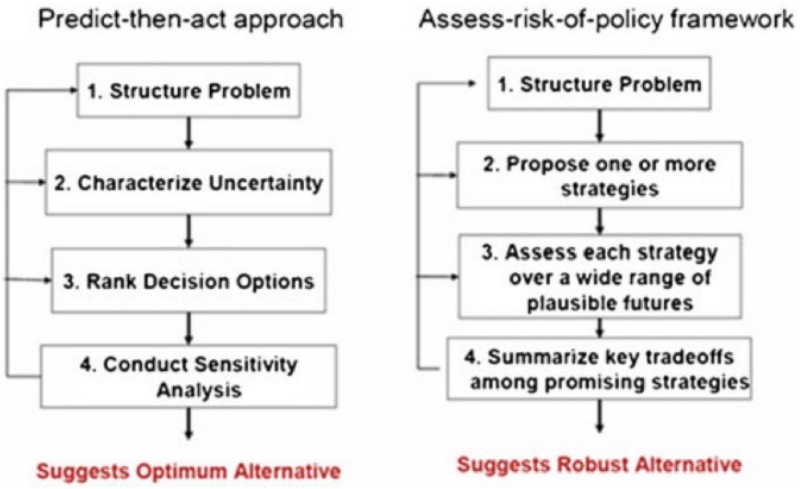
- Policies *(continued)*
- Targeted investments in all sector
- "Assess risk of policy" framework versus a "Predict-then-act" approach: two approaches to uncertainty (Dessai et al. (2009)



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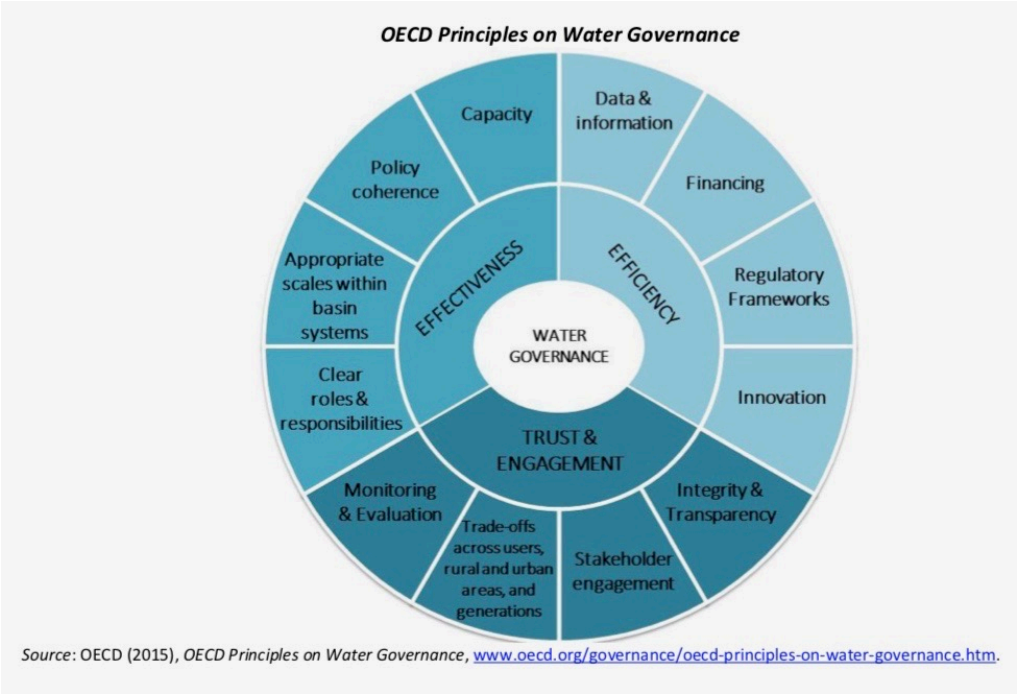
iv. More informed and stronger governance –

- Definition of Stronger Governance
- The OECD Water Governance Indicator Framework aims (OECD, 2015).



Source: OECD (2015), *OECD Principles on Water Governance*, www.oecd.org/governance/oecd-principles-on-water-governance.htm.

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Specifically in Australia, the principles supporting a system of governance is driven by ecologically sustainable development involving adherence to five fundamental principles:

- Comprehensive application
- Comprehensive involvement
- Total systems integration
- Information availability
- Principle of enforceability (ed. Hussey and Dover, 2008, p. 114)

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Summary

- The Integrated Water Resources Management process consolidates action towards the recognition and response to our rapidly changing climate.
- This recognition is via the accumulating data produced indicating trends and giving direction to future strategies for adaptation and mitigation of the issues arising from changing climatic patterns
- Even with optimal response there still remain major constraints for positive adaptation
- These constraints are studied through data obtained, modelling and consideration of both science and social policies. Clearly, knowledgeable leadership is required.

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