
23 May 2012
Initial Thoughts

• Is water scarce in a physical sense (supply shortage) or is it available but should be better used?

• Is it about Integrated Water Resource Management / Planning (IWRM/P)?

• Pressure & competition requires improved management:
  – competing sectors
  – transboundary waters
  – harmonizing different demands / reconciling trade-offs
Presentation Outline

- Water scarcity & IWRM
- England & Wales – planning process, WFD / RBMP / WCS
- Australia - IWRP
- South Africa - IWRM
- Where does sustainability fit in?
- What are the critical issues?
IWRM – What Is It?

• ‘A process which promotes the coordinated development and management of water, land & related resources in order to maximize the resultant economic & social welfare in an equitable manner without compromising the sustainability of vital ecosystems’ *

• ‘IWRM is a political process & involves conflicts of interest that must be mediated’ *

• ‘Effective governance is crucial for implementing IWRM plans’ *

*GWP definitions
• Goals of IWRM:
  ✓ maximize societal welfare
  ✓ deal with inequality
  ✓ deliver intergenerational equity
  ✓ reduce poverty
How Do We Balance Supply & Demand?

- Option 1 – decrease losses
- Option 2 – decrease consumption
- Option 3 – introduce new sources
- Option 4 – All of the above
Water Resource Planning – England & Wales

• Sustainability through WFD / RBMP / e-flows
• RBMP – catchment-based approach
Water Resource Planning – Some Key Issues

- Non-stationarity in supply & demand:
  - can’t use past system behaviour to predict future (CC)
- Changing nature of drought:
  - over reliance on 1976?
  - are there sustainability thresholds to aquatic ecosystems and ecosystem services?
  - impact of licensing?
- Water trading / licensing / who makes decisions on how much can be taken?
- Data & research
  - long-term data
  - ecosystem services
  - drought – impacts & planning

Initial scoping study
- Form steering group
- Identify issues to be considered
- Identify need for and scope of outline study

Outline study
- Environmental constraints analysis
- Infrastructure constraints analysis
- Sustainability assessment
- Leading to an Outline Water Cycle Strategy

Detailed study
- What infrastructure is needed?
- When is it needed?
- Is the strategy sustainable?
- How is it going to be funded and implemented?
- These form a Detailed Water Cycle Strategy

Regional spatial strategy or subregional strategy

LDF & Core Strategy and sustainability appraisal of the core strategy

Provide evidence base for Core Strategy and Sustainability Appraisal

Development Plan Documents

Provide evidence base for DPDs:
- Site Allocation DPD
- Sustainable construction DPD
- Area action plans

Strategy implementation
- Monitoring of compliance with strategy
- Managing changes to strategy

Implementation of the strategy, and monitoring planning applications against the strategy. The strategy may be need to be revised on a periodic basis if growth forecasts change

Planning applications
Screening Criteria
- Environmental
- Social
- Economic

Initial Workshopping
- Goal setting
- Identification of long list
- Coarse screening

Stand-alone Measure Assessment
- Water savings
- Treatment and transfer savings
- Capital delay/downsizing
- Hot water savings

Demand Analysis
- Climate correction
- Sector analysis
- NRW assessment

End Use Model Development
- Breakdown in use
- Demand drivers
- Baseline forecast

Opportunities for stakeholder input

Scenario Building/
Bundling of Measures

Assessment of Scenarios
- Water savings
- Treatment and transfer savings
- Capital delay/downsizing
- Hot water savings

Compatibility/
Interaction of Measures

Selection of Preferred Scenario
- Examination of trade-offs
- Revision of goals

IWRP - Australia
IWRP – Australia

Environment
- Hydrology/Water Sources
- Environmental Flows
- Aquatic Ecosystems
- Water Quality

Infrastructure
- Distribution
- Transfer/Storage
- Water/Wastewater Treatment

Water Reuse and Needs
- Appliances, Fixtures, Processes
- Water Conservation Costs, Savings
- Wastewater Generation
- Water Heating
IWRP – Australia – Strong Focus on Demand Management

- Regulations & Codes
- Community Education
- Retrofit and Rebate Programmes
- Leakage Reduction
- Effluent and Stormwater Re-Use

Demand and Side:
- Energy Use
- Infrastructure footprint
- Flow Diversion
- Water quality

Supply Side:
- Energy Use
- Infrastructure footprint
- Flow Diversion
- Water quality

Capital Expansion
IWRP - Australia

- Total system simulation
- Understanding:
  - demand drivers & climate correction
  - drought / low flows
  - trends
  - aquatic ecosystem stress
- Forecasting & cost-effectiveness of demand management
- Approach design process with the goal of sustainable water management – sustainability throughout the design process
- Stakeholder input throughout the process
IWRP – Australia

- From concepts to workable planning framework & tools
- Importance of monitoring & research
- Now world leader in demand management – opportunity
IWRM – South Africa - WRCS

1. Delineate the catchment
   ‘Integrated Water Management Units’ with nested sub-units (‘Nodes’)

2. Link economic & social value to ecosystem condition & water use
   Outcome: a set of quantitative relationships that specify how different levels of
   - water use,
   - ecological integrity, and
   - ecosystem goods and services
   affect economic value and social well-being.

3. Quantify the Ecological Water Requirements at each node

4. Set a ‘baseline configuration’ for ecological sustainability...

5. Evaluate scenario implications
   Scenario 1
   Scenario ‘n’

6. Stakeholder workshops
   Iterative process
   Stakeholders comment on the scenarios and their implications, and may also generate new options for consideration.

7. Select the preferred configuration of IWMU Classes and Node categories
   These become legally binding when published in the Government Gazette
IWRM – South Africa
IWRM – South Africa
After Dollar et al. (2010)
Where Does Sustainability Fit In the Decision Process?

- **England & Wales:**
  - through WFD / RBMP – GES / P targets
  - accounting for carbon
  - focus is on restoration

- **Australia:**
  - focus on demand management
  - e-flows
  - stakeholders

- **South Africa**
  - through classification
  - Reserve met before allocation
  - focus on equity
Conclusions – What Are the Key Issues?

• Water scarcity central to IWRM / P
• IWRM / P requires:
  – information / data (past & future)
  – tools (soc., econ., ecol., integration)
  – costs & benefits (systems level & equal weighting, soc., econ., ecol.) for current & future trade-offs
  – supply & demand (current & future)
  – whole river basin / ecosystem approach
  – e-flows (whole flow regime)
  – scenario-based
• Ecosystem services / payment for ecosystem services
• Robust planning process
• Devil in the detail
Conclusions – What Are the Key Issues?

• Avoid process improvements with no real sustainability improvements – importance of monitoring & adaptive management
• Focus on urgent, critical issues – different countries have different priorities
• Water is grossly undervalued
Hydro-Illogical Cycle

- Panic
- Concern
- Awareness
- Rain
- Apathy
- Drought / Scarcity

Re-drawn after Lake (2011)
Getting This Right!

General Framework for IWRM

After http://www.gwp.org/The-Challenge/What-is-IWRM/IWRM-pillars/