Global Water Scarcity Conference
Glasgow

Dr ESJ Dollar
Technical Discipline Lead – Water Resources

Integrated Water Resource Planning and Management: A Comparative Review of England & Wales, Australia & South Africa – Where Does Sustainability Fit in the Decision Process?

23 May 2012

MWH®

BUILDING A BETTER WORLD

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

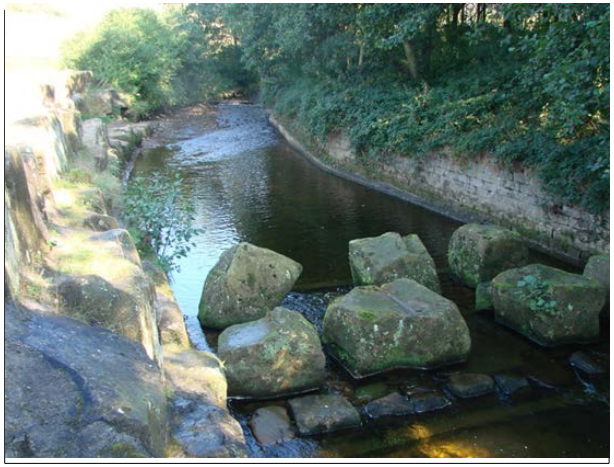
Presentation Outline

- 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?

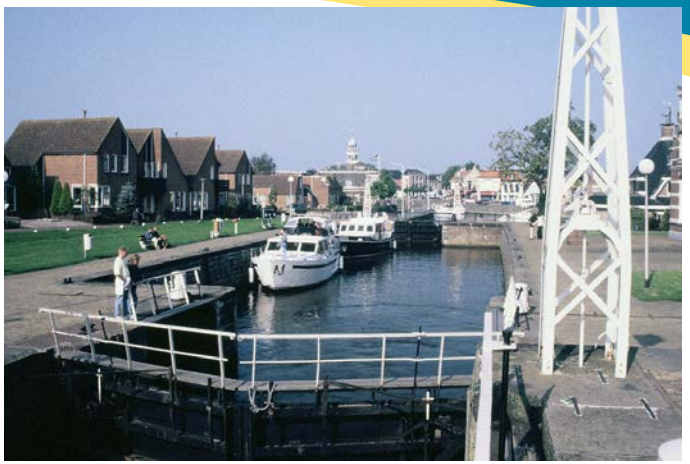
- ‘A process which promotes the coordinated development and management of water, land & related resources in order to maximize the resultant economic & social welfare in an equitable manner without compromising the sustainability of vital ecosystems’ *
- ‘IWRM is a political process & involves conflicts of interest that must be mediated’ *
- ‘Effective governance is crucial for implementing IWRM plans’ *

**GWP definitions*



IWRM - What Is It?

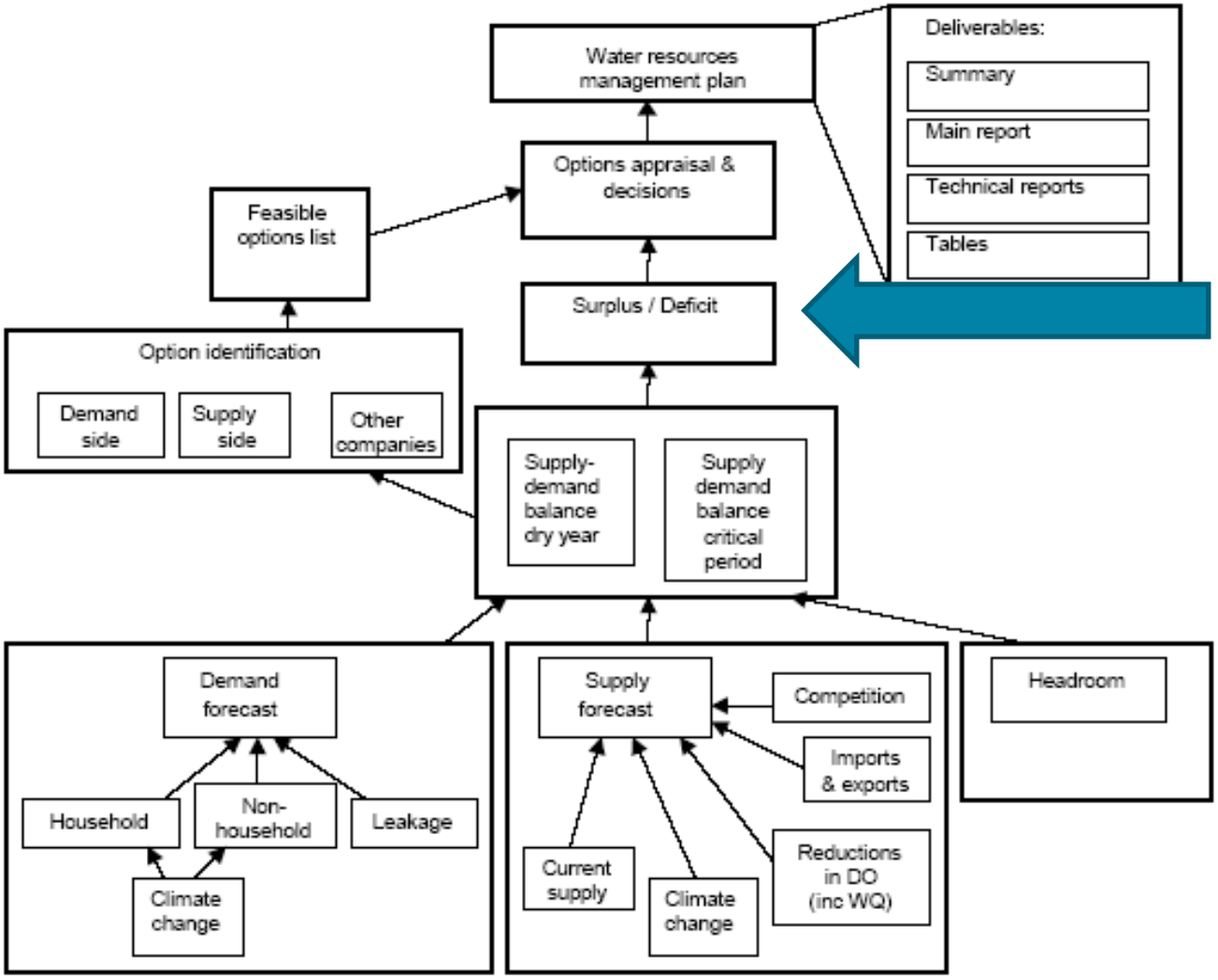
- Goals of IWRM:
  - ✓maximize societal welfare
  - ✓deal with inequality
  - ✓deliver intergenerational equity
  - ✓reduce poverty



IWRM – General Framework

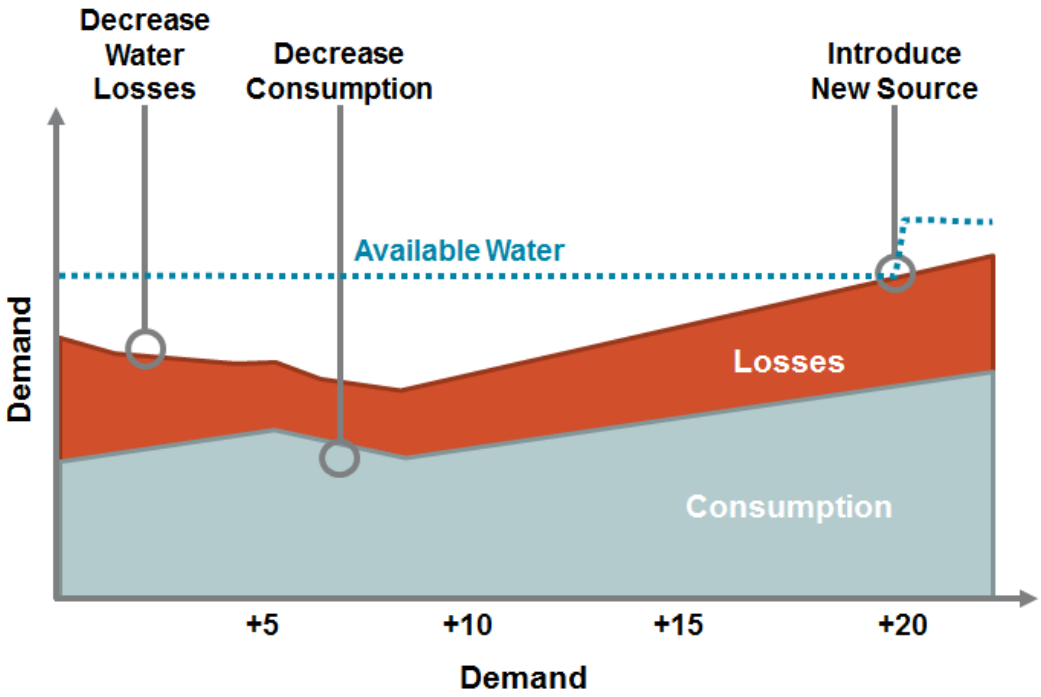
After http://www.gwp.org/The-Challenge/What-is-IWRM/IWRM-pillars/

Water Resource Planning – England & Wales - WRMP



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



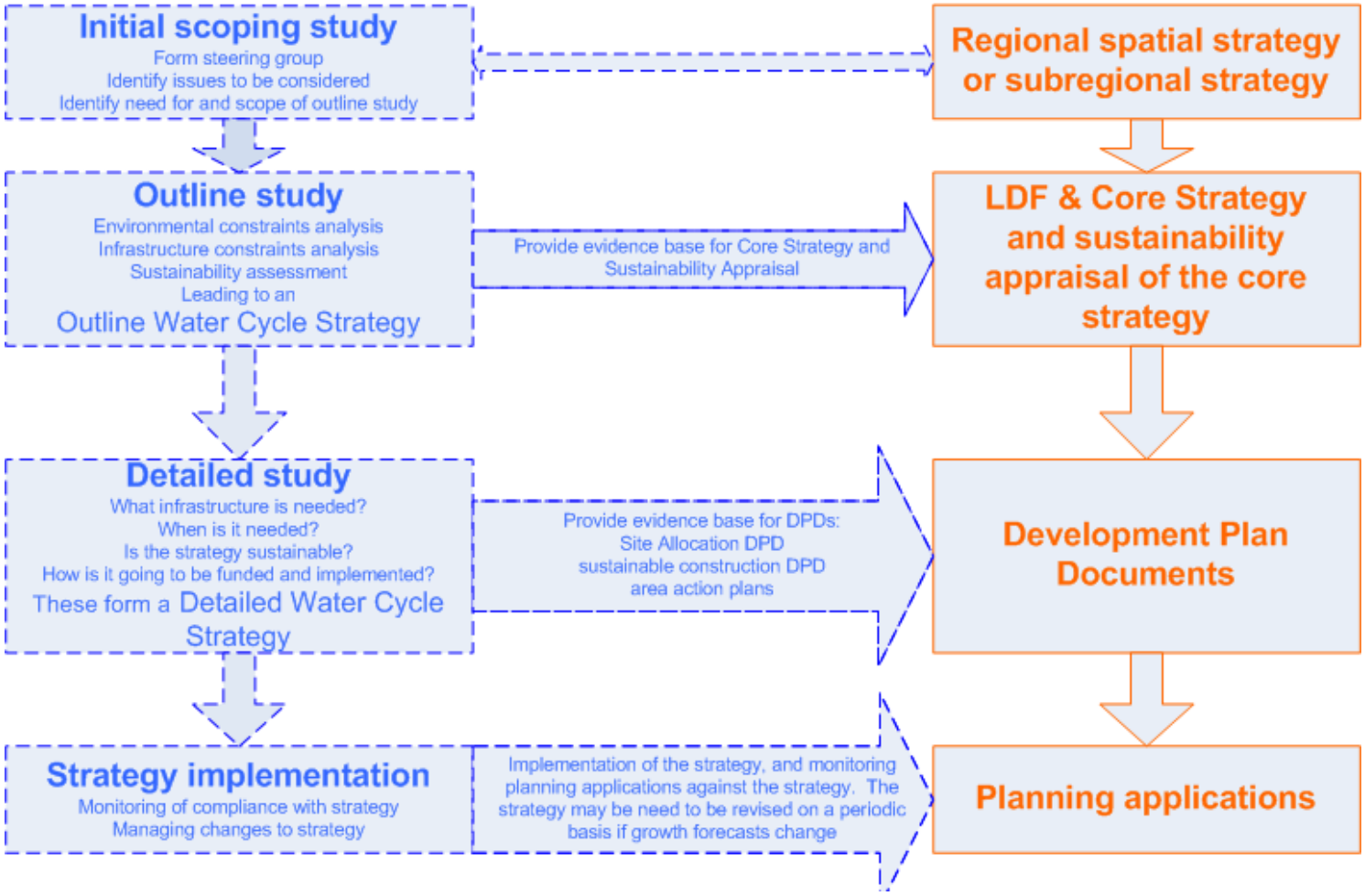
Water Resource Planning – England & Wales

- Sustainability through WFD / RBMP / e-flows
- RBMP – catchment-based approach

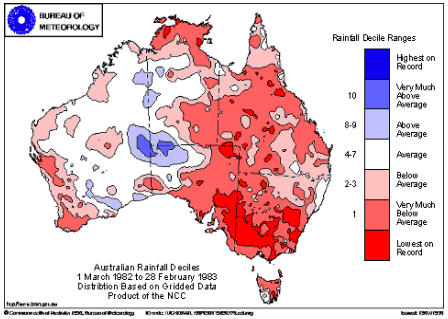
Water Resource Planning – Some Key Issues

- 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

Water Resource Planning – England & Wales – Local Level - Water Cycle Study



IWRP - Australia



STAKEHOLDER INPUT

Demand analysis and forecasts of water demand, wastewater and stormwater flows of water demand, wastewater and stormwater flows

Identification of Catchment Issues

Identification and Coarse Screening of Measures

Screening Criteria (Triple Bottom Line)
- Environmental
- Social
- Economic

Scenario Building/Bundling of Measures

Compatibility/Interaction of Measures

Impact of Scenarios on Infrastructure

Economic Assessment
- Development Costs
- Costs to Customer
- Ongoing Costs to Utility

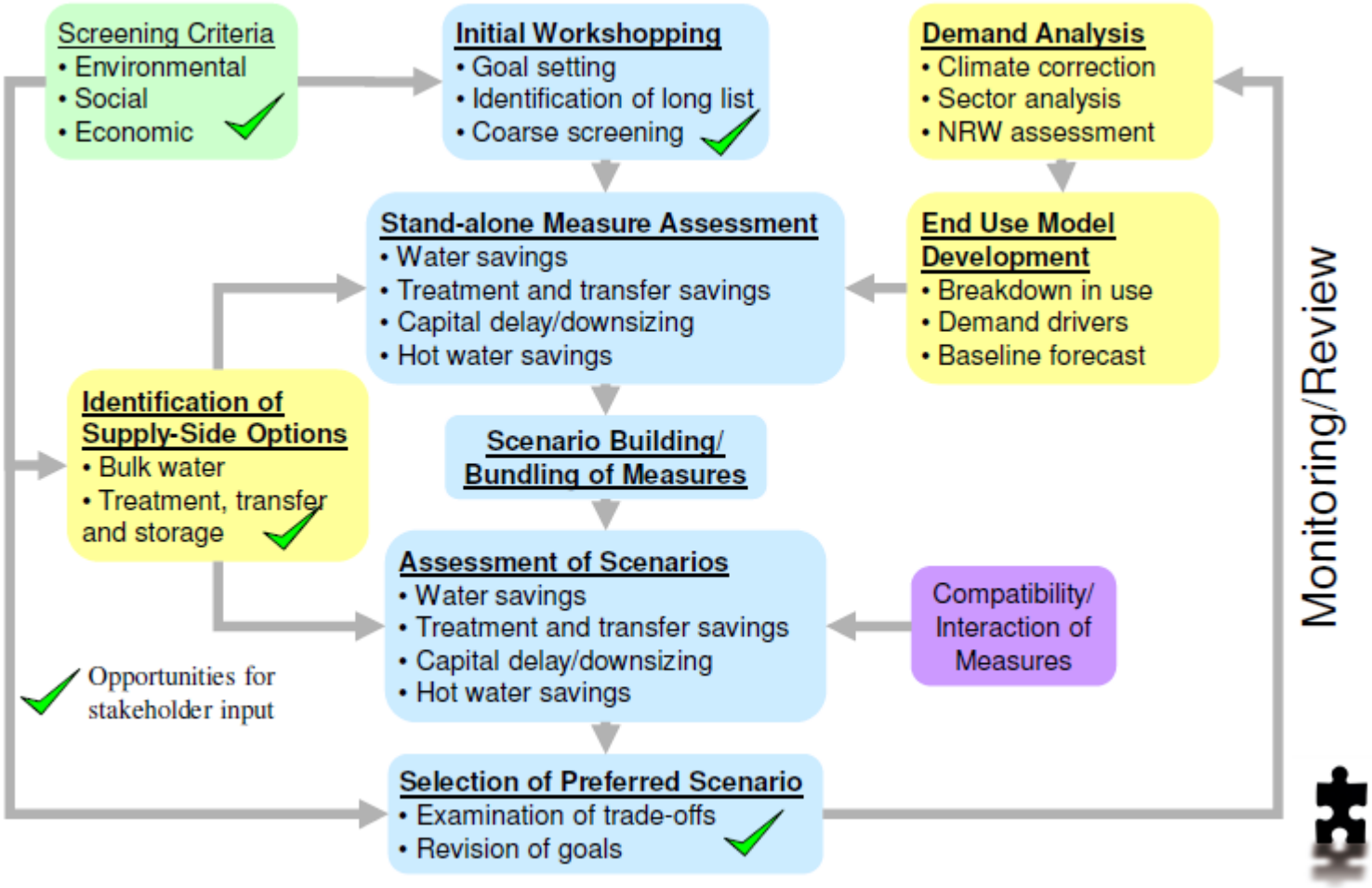
Environmental Assessment
- Impact on Water Demands
- Impact on Site Water Balance
- Impact on Receiving Water Quality

Social Assessment
- Impact on Human Health
- Impact on Lifestyles
- Impact on Household Costs

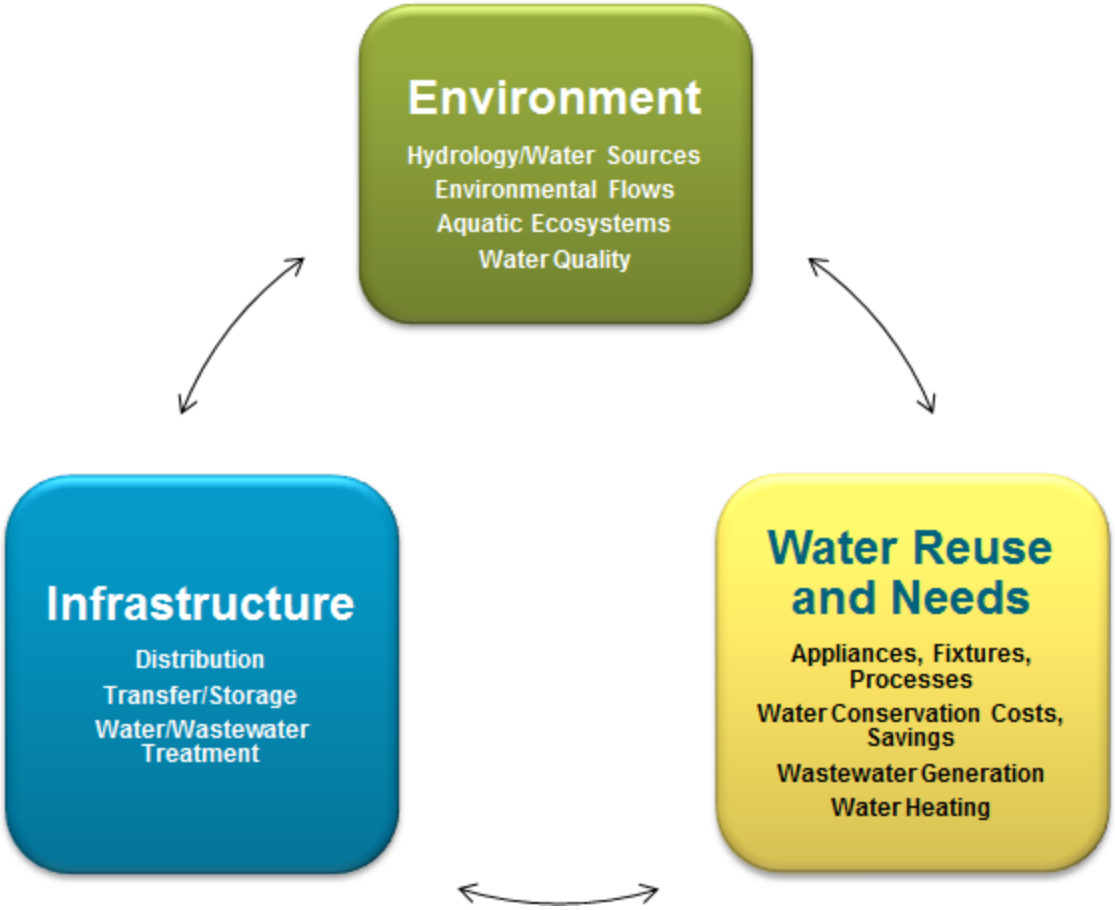
Selection of Preferred Scenario
- Examination of Trade-offs
- Revision of Goals

TBL Assessment of Scenarios

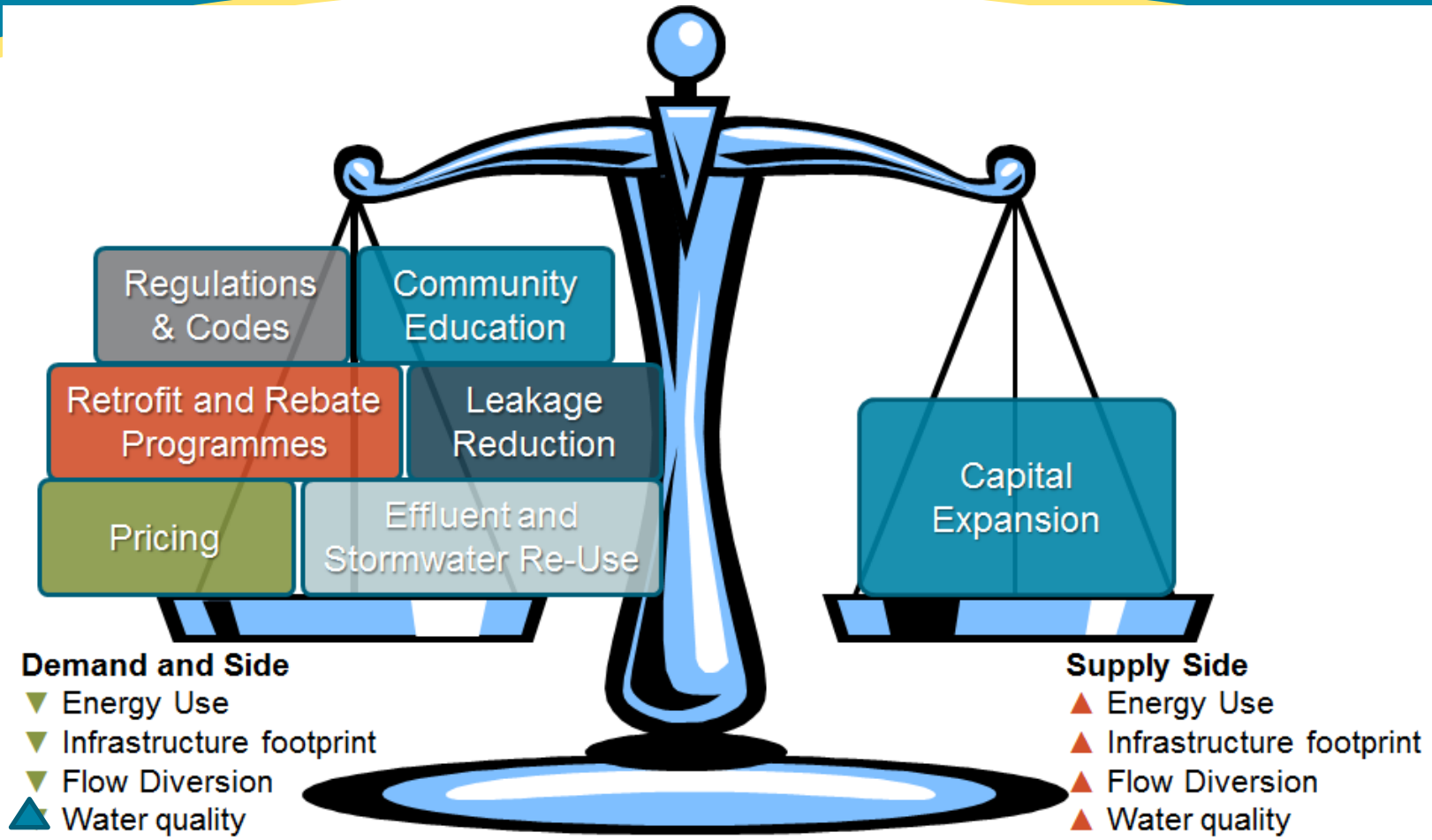
IWRP - Australia



IWRP – Australia

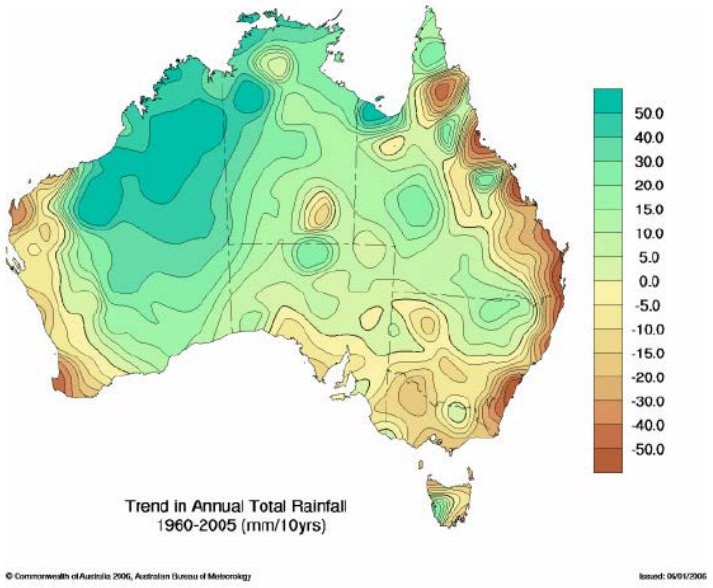


IWRP – Australia – Strong Focus on Demand Management



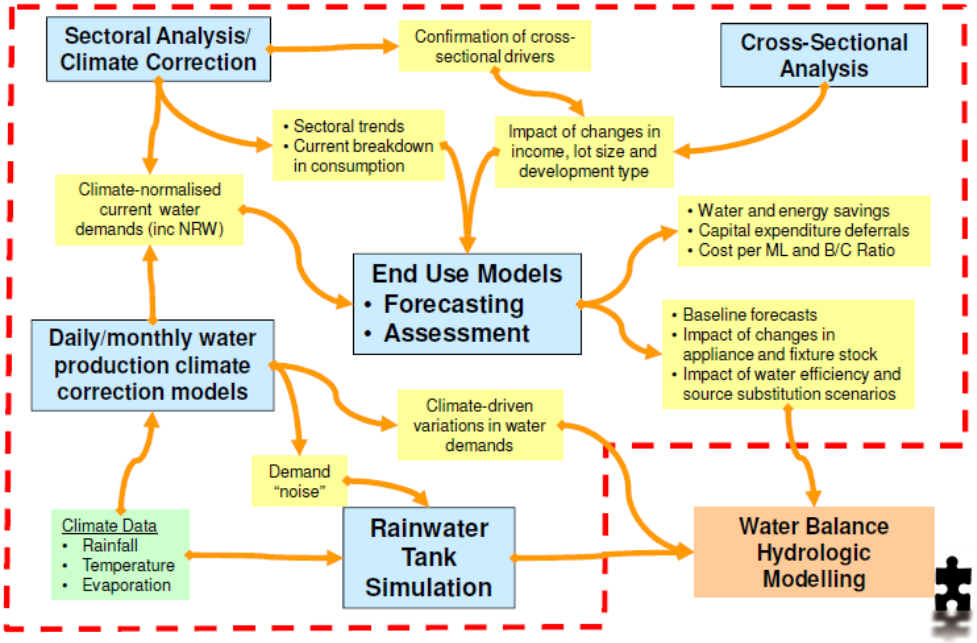
IWRP - Australia

- 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

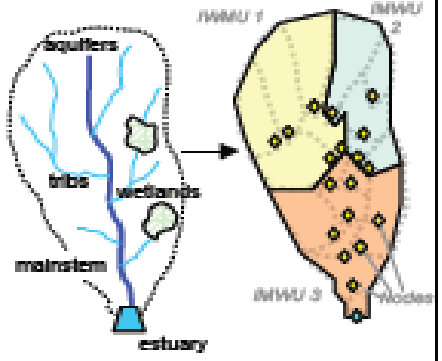
- From concepts to workable planning framework & tools
- Importance of monitoring & research
- Now world leader in demand management – opportunity



IWRM – South Africa - WRCS

1. Delineate the catchment

'Integrated Water Management Units' with nested sub-units ('Nodes')

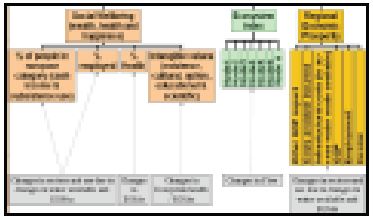


2. Link economic & social value to ecosystem condition & water use

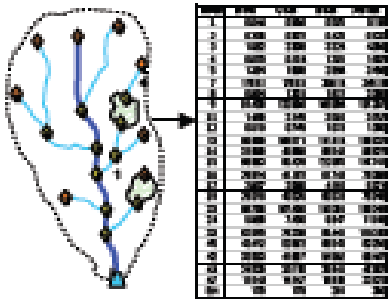
Outcome: a set of quantitative relationships that specify how different levels of

- *water use,*
- *ecological integrity, and*
- *ecosystem goods and services*

affect economic value and social wellbeing.

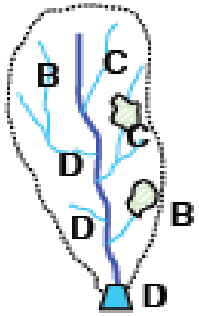


3. Quantify the *Ecological Water Requirements* at each node



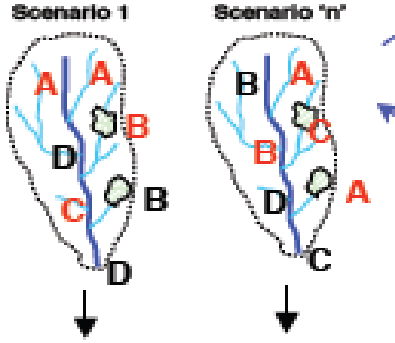
Outcome: Table of EWRs for each node at varying levels of ecological integrity (AB, B, C ,D)

4. Set a 'baseline configuration' for ecological sustainability…



…then generate scenarios.

5. Evaluate scenario implications



Implications

Social, Economic, and Ecological

Implications

Social, Economic, and Ecological

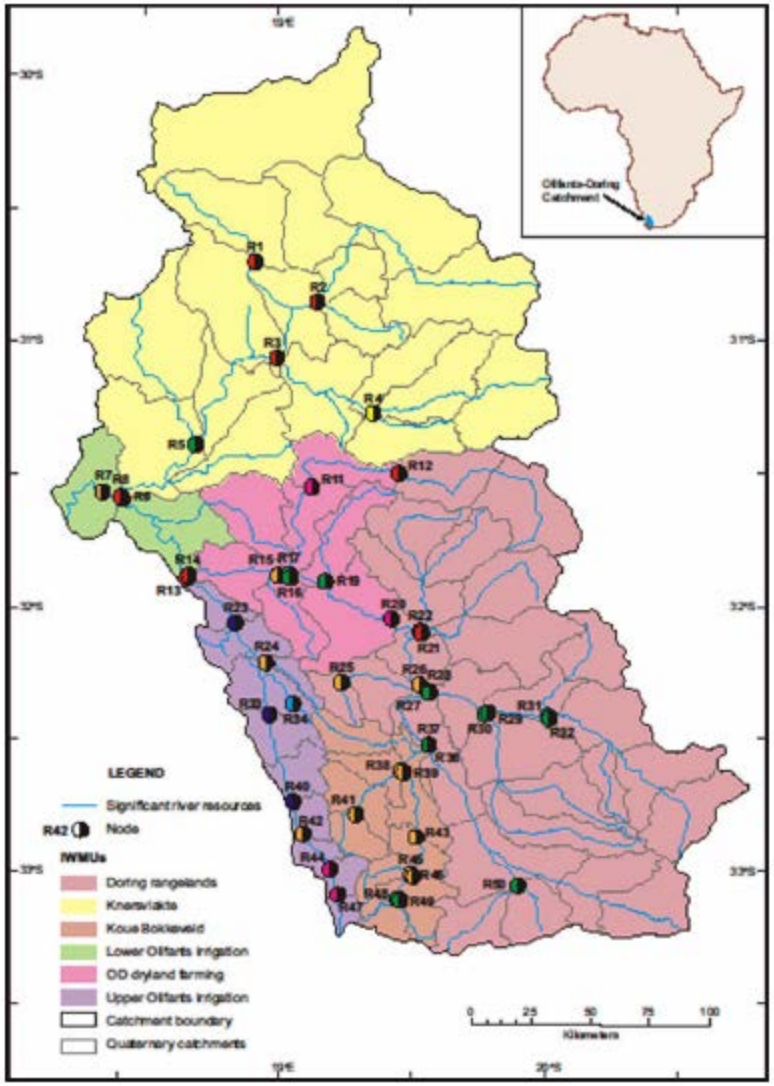
6. Stakeholder workshops

Stakeholders comment on the scenarios and their implications, and may also generate new options for consideration.

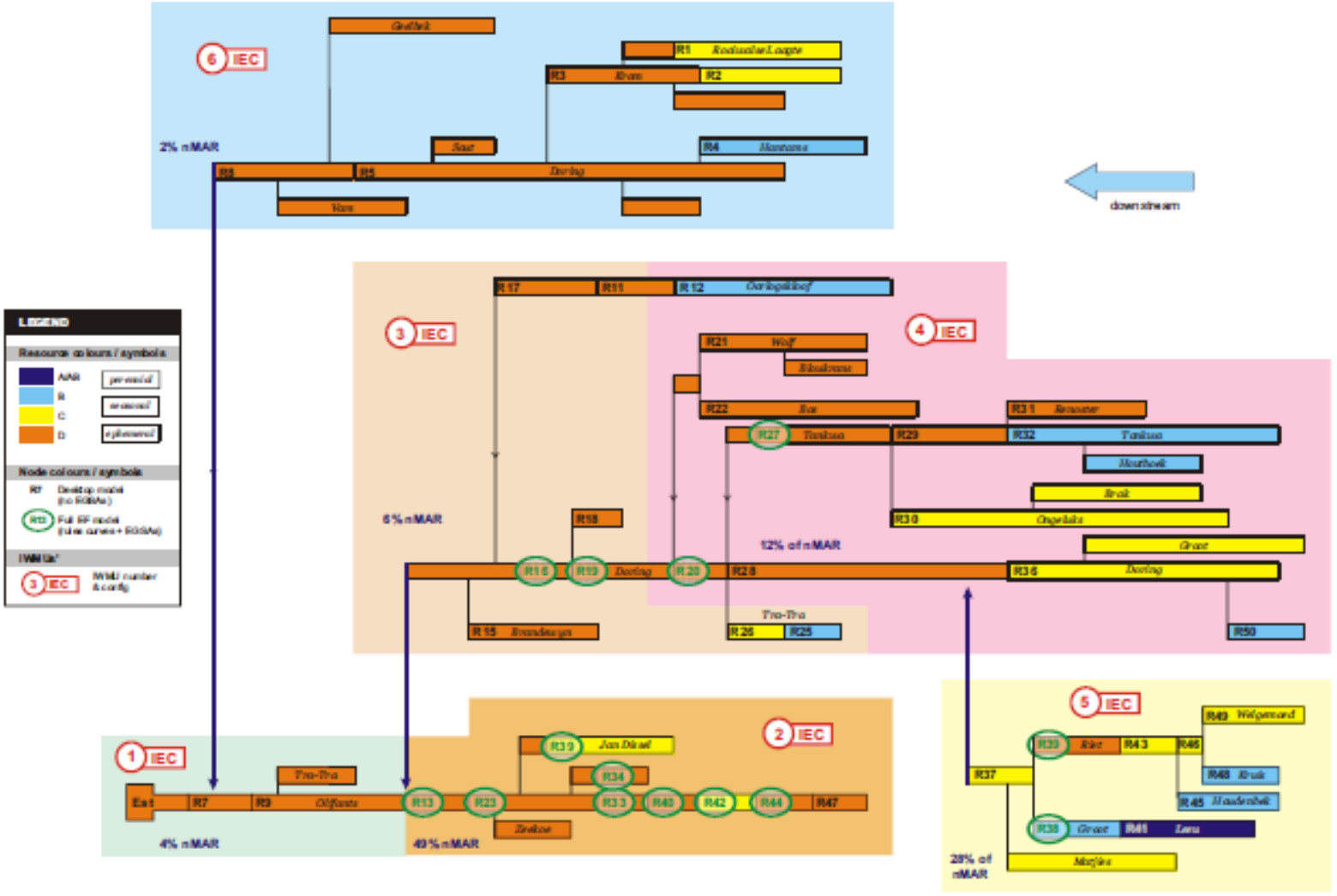
7. Select the preferred configuration of IWMU Classes and Node categories

These become legally binding when published in the Government Gazette

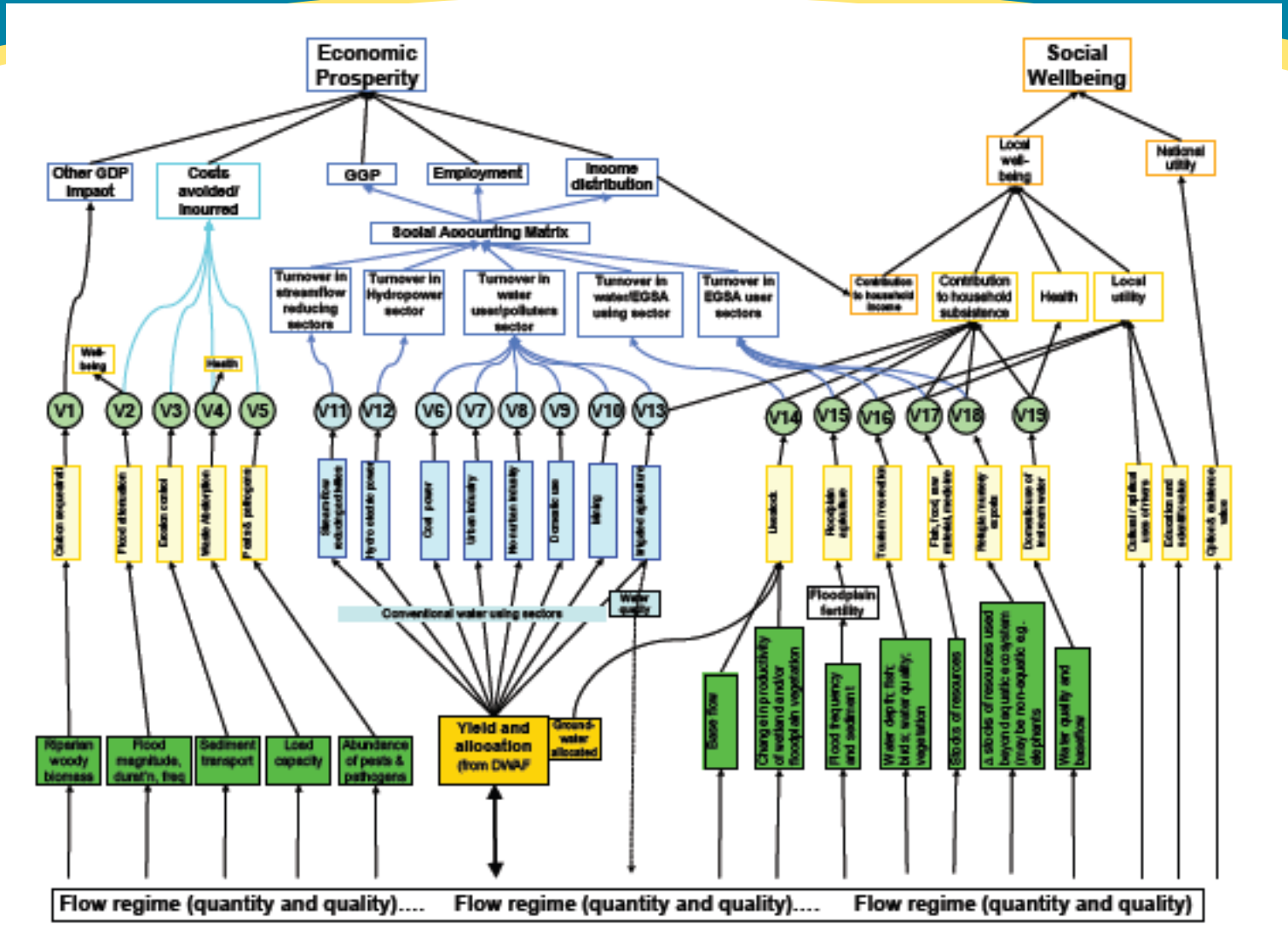
IWRM – South Africa



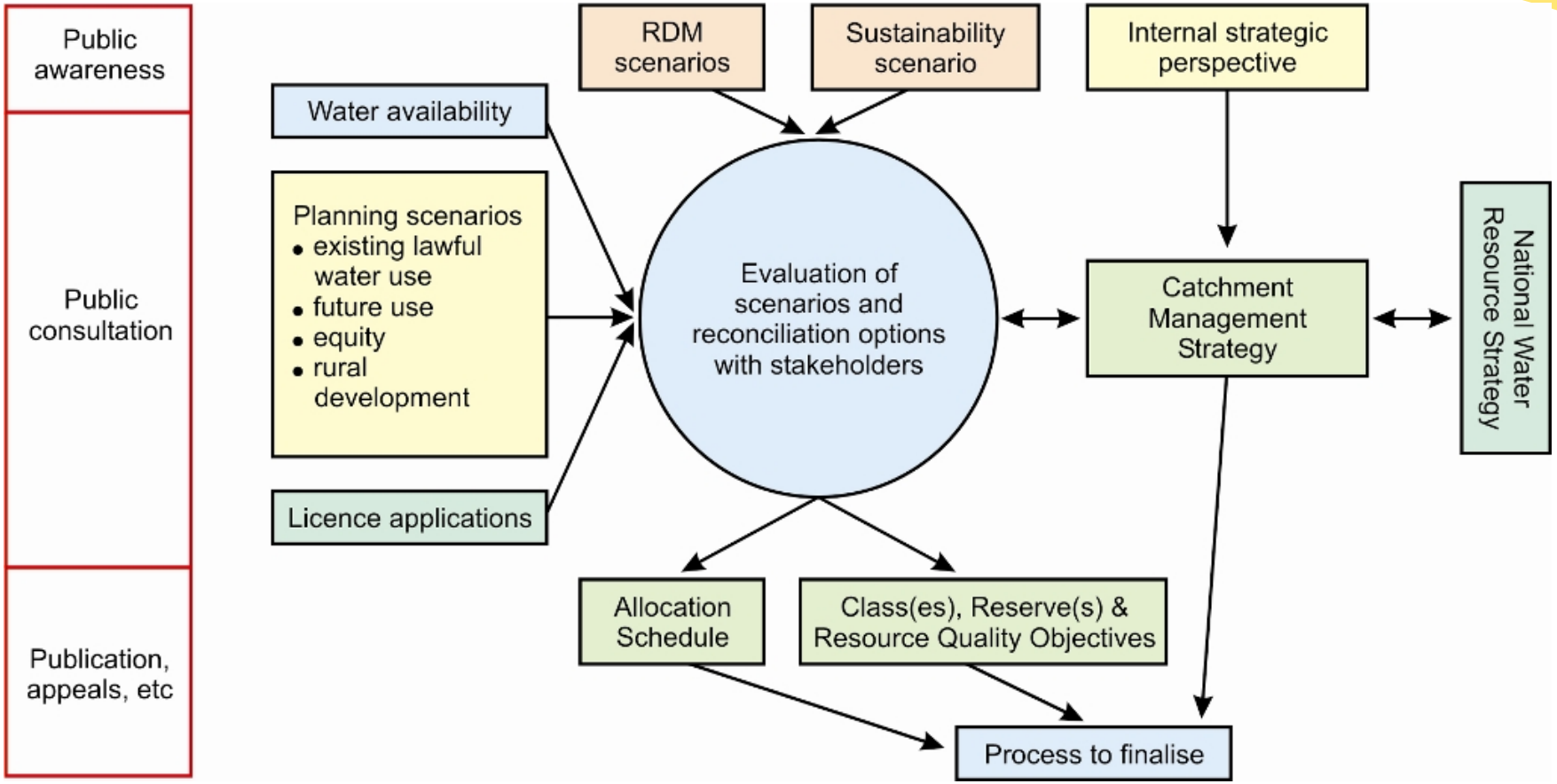
IWRM – South Africa



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

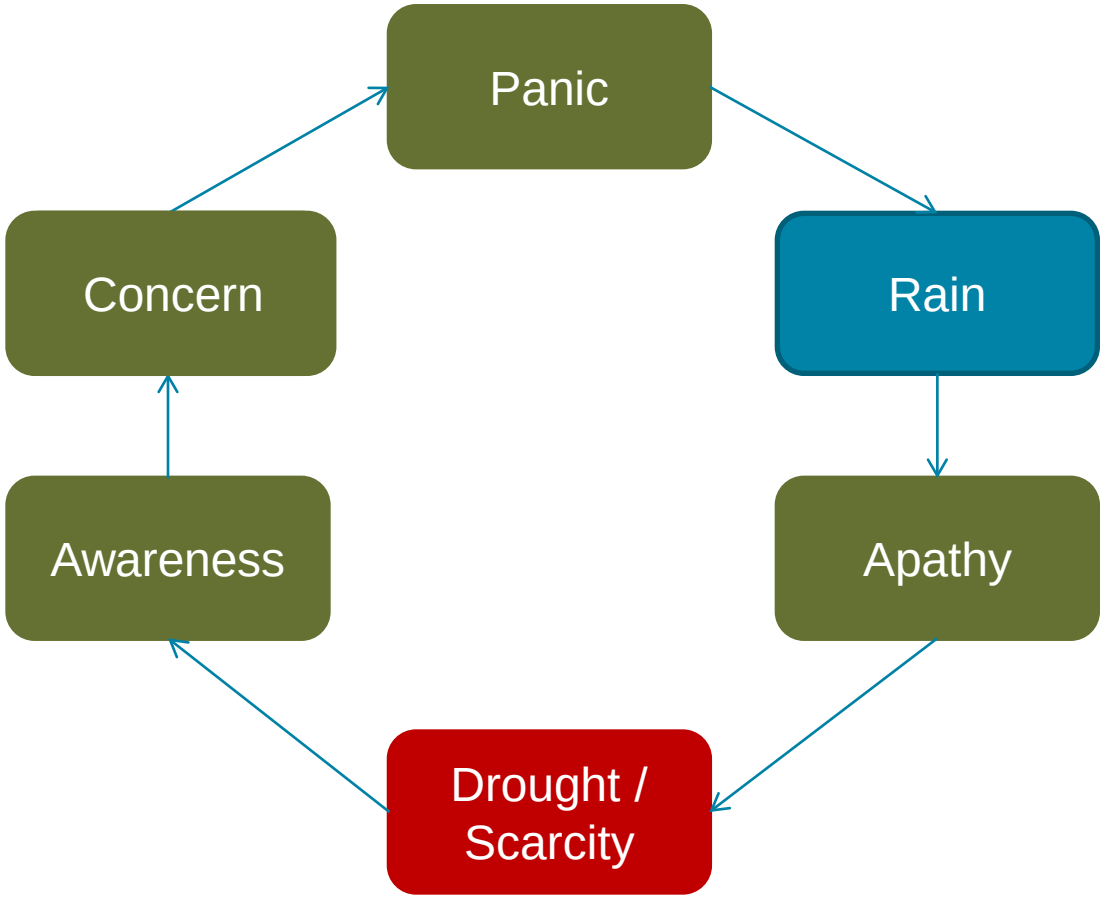
Conclusions – What Are the Key Issues?

- 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



Re-drawn after Lake (2011)

Getting This Right!

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