Managing water resources in Australia – lessons of international relevance to WASH

Professor Nicholas Schofield

CEO, Australian Water Partnership
Outline

• Global water crisis
• Water challenges for WRM and WASH
• WASH & WRM integration - benefits and challenges
• Australian integration case studies
• The Australian Water Partnership
Global water crisis

• A humanitarian crisis
• Also an integral part of a broader ‘global sustainability mega-crisis’
• Good stories exist and progress is being made but threats are escalating
• It’s critical for WASH to understand what’s happening in WRM and for both sides to link
• But integration approaches can be tricky and difficult to implement

freshwater LPI shows a decline of 81 per cent (range: -68 to -89 per cent) between 1970 and 2012
Trend in population abundance for 3,324 populations of 881 freshwater species monitored across the globe between 1970 and 2012 (WWF/ZSL, 2016).

Key
- Freshwater Living Planet Index
- Confidence limits
World Economic Forum - Global Risks 2018

Water has been in the top 5 global risks for ‘impact’ since 2012
WASH & WRM challenges operate at different scales
# Water challenges for WRM & WASH

<table>
<thead>
<tr>
<th>Global challenge</th>
<th>WRM</th>
<th>WASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>Changing rainfall patterns, sea-level rise, melting glaciers</td>
<td>More unpredictable water supply, less habitable conditions</td>
</tr>
<tr>
<td>Extreme climate events &amp; disasters (floods &amp; droughts)</td>
<td>Heat waves, floods and droughts affect billions of people</td>
<td>Overwhelm local water supply &amp; sanitation &amp; whole communities</td>
</tr>
<tr>
<td>Water demand &amp; scarcity</td>
<td>Water demand for power, industry, agriculture and people increasing rapidly leading to physical scarcity</td>
<td>Economic scarcity dominant now</td>
</tr>
<tr>
<td>Water infrastructure developments</td>
<td>Damaging river &amp; wetlands + massive human displacements</td>
<td>Can cause huge changes at community level</td>
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## Water challenges for WRM & WASH

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<td>Land conversion &amp; land use</td>
<td>Alters hydrology and leads to point &amp; non-point pollution</td>
<td>Affects local safety (e.g. landslides) and livelihoods</td>
</tr>
<tr>
<td>Pollution &amp; water quality</td>
<td>Increasing rapidly on a global scale. Some successes in 1st world. Many $$</td>
<td>Most wastewater untreated and polluting downstream users</td>
</tr>
<tr>
<td>Human access to safe drinking water</td>
<td>Emerging solutions at large &amp; small scale</td>
<td>SDG6: 663 million without safe drinking water</td>
</tr>
<tr>
<td>Inadequate sanitation</td>
<td>Emerging solutions at large and small scale</td>
<td>SGD6: 2.3 billion without adequate sanitation</td>
</tr>
<tr>
<td>Biodiversity &amp; ecosystem collapse</td>
<td>Broad scale loss of ecosystem services. Mass extinction event.</td>
<td>Loss of ecosystem services strongly impacting communities</td>
</tr>
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</table>
GLOBAL RESPONSE: SDGs and 2030 agenda

- **SDG6**: Ensure availability and sustainable management of water and sanitation for all

- Water at the core of sustainable development and SDG6 is inextricably linked with all other SDGs

- The Water Goal and targets cover the entire water cycle in an integrated manner

- Practical integrated approaches critical to implementing SDG6

The case for integrating WASH and WRM

• **Interdependence** – most compelling reason for integration, both needed for success

• **Water, poverty and environment are deeply connected** – the poor are the most vulnerable to environmental risk factors such as unsafe water and climate change

• **Human communities living in close proximity to high endemism & biodiversity** tend to be impoverished with little to no access to improved WASH

• Watershed/catchment conservation **sustains freshwater resources on which safe drinking water projects depend**

• Watershed/catchment management is **key to developing climate change and disaster-resilient WASH infrastructure**

• Improving **access to WASH reduces wastewater pollution**

• WASH helps WRM **engage the local community**
Challenges to integrating WASH and WRM

- **Geographic mismatch** between projects
- IWRM is often **too broad** and **all-encompassing to apply at the local level**
- Integrated projects:
  - require **more patience, sophistication, effort, strong relationships across sectors,** and **focus on governance**
  - run the risk of becoming **too large to manage**
  - Require more **complicated technical solutions**
- WASH projects can create momentum – organisations hesitate to divide and dissipate the attention and funding
- **Sector knowledge, language and culture differences**
Australian experience in integration – water challenges

- Climate change threats
- Water scarcity
- Rural town viability
- Population growth
- Pollution
- Declining ecological health
- Extreme weather

Imperatives for Water Reform
OBJECTIVES
Increase productivity & efficiency of Australia’s water use
Ensure the health of river and groundwater systems

IMPROVING ENVIRONMENTAL MANAGEMENT
- Providing water for the environment
- Increasing environmental share in over allocated systems
- Integrating river basin management

TRANSFORMING WATER ALLOCATION
- Establishing secure, tradable entitlements
- Developing water trading & markets
- Undertaking water planning

REFORMING WATER PRICING
- Consumption-based pricing
- Full cost recovery
- Transparent cross-subsidies & their removal where possible
- Varying implementation in urban & rural areas

MODERNISING INSTITUTIONAL ARRANGEMENTS
- Separating water resource management, standard setting, service delivery & regulatory enforcement roles
- Independent price regulation
- Ensuring urban water authorities are sufficiently large & benchmarked to be financially viable & efficient
- Devolution of irrigation water authorities to local bodies that are responsive to irrigators

COMMUNITY & STAKEHOLDER INPUTS

IMPROVING WATER INFORMATION & KNOWLEDGE
- Water metering
- Water registers
- Water accounting
- Monitoring ground- & surface water
- Model development
- Investment in water research

Australian water reform since 1990 (policy-led)
Case Study 1: Murray-Darling Basin – integrated basin planning

Across the whole Basin

Not just stopping at state borders
Case Study 1: Water over-use the main driver

- Sustainable Diversion Limit
- The Basin Plan
- The cap on diversions
- Algal blooms
- Murray Mouth closes
- Disconnected wetlands and floodplains
- Increased salinity

Growth in water diversions

- 1900s
- 1950s
- 1980s
- 2012
- 2019
Case study 1: the MDB integration challenge

**Optimising water allocation between:**
- Critical human water needs
- Irrigated agriculture
- Environment
- Urban
- Hydropower
- Manufacturing

**Taking account of:**
- Climate change and variability
- Groundwater-surface water interactions
- Salinity and water quality
- Cultural, aesthetic, spiritual & recreation needs

**Utilising**
- Master planning (“The Basin Plan”)
- Water plans for all catchments
- Separation of water & land rights
- Water entitlements and allocations
- Water markets
- Sustainable diversion limits
- Environmental watering
- Cultural flows
- Irrigation modernization (for WUE)
- Flow constraints management
- Modelling for management
- Monitoring & compliance
- Stakeholder engagement
Case study 1: Interjurisdictional arrangements

National legislative and regulatory approach

Institutional arrangement
- Australian Gov.
- MDBA
- QLD Gov.
- NSW Gov.
- ACT Gov.
- VIC Gov.

Water Act 2007 and Murray-Darling Basin Plan (MDBP)

Outline how a particular area of the basin will be managed to be consistent with the Murray-Darling Basin Plan.
Case study 1: Environmental Watering
Case study 1: Water use efficiency via better technology

$10\text{ billion}$
Case study 1: Integration through water markets

- Separate water and land rights
- Establish water entitlements for all water users
- Establish a water market
- Provide annual allocation of water against for each entitlement (%) based on water available
- Allow permanent and temporary trading under specified rules
- Products differ in reliability – high/medium/low

Most water trading is in the southern Murray-Darling Basin
Case study 1: Market sets the price

- Moves water to highest value uses
- Allows adaptation to drought – choice to buy or sell
- Frees up market entry and exit
- Government can purchase water for environment

Water stored in dams

Price of water allocations

<table>
<thead>
<tr>
<th>Water applied (estimate, GL)</th>
<th>Revenue* ($m, real)</th>
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<tbody>
<tr>
<td>2005-06 7,370 (6.0 MAF)</td>
<td>53% 5,522</td>
</tr>
<tr>
<td>2008-09 3,492 (2.9 MAF)</td>
<td>21% 4,349</td>
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</table>
Case study 1: Stakeholder engagement

Principles
1. Understand your stakeholders first and their worldviews and agendas
2. Plan it! Pays off to invest in this
3. Start the process as early as possible
4. Communicate and consult often and openly
5. Remember they’re human – not always rational, reasonable, consistent or predictable!
6. Relationships are key - commit energy and time to building trust
7. Simple, but not easy – requires subtle skills such as being empathetic, listening, genuinely caring
8. Compromise when you can. Seek win-wins. Manage the ‘losers’.
9. Understand what success is, manage expectations
10. ‘Sell’ the responsibility to engage and develop stakeholder ownership of the solutions

“NSW and Victoria say move to disallow 18% cut in northern basin target could ‘kill off’ plan”

“Scientists and economists condemn squandering of $4bn on projects that have failed to improve the river’s health”
Case study 2: Perth’s integrated water supply response to climate change

- City most affected by climate change world-wide
- Rainfall and runoff dropped dramatically since 1970s
Case study 2: From dams to groundwater to desal to MAR!

[Diagram showing water supply trends and demand management]

1960
- 92% Dams
- 8% G/ Wolverine

1980
- 65% Dams
- 35% G/ Wolverine

2000
- 38% Dams
- 62% G/ Wolverine

2015
- 17% Dams
- 42% G/ Wolverine
- 4% Desal
- 0% GWR

Groundwater Recharge in Perth
Case Study 3: Alliance for Water Stewardship (AWS) – integrating industry and catchment processes

6-Step process to achieve international standard

Step 1: Leadership
Step 2: Understand site risks and catchment challenges
Step 3: Develop water stewardship plan
Step 4: Implement
Step 5: Evaluate
Step 6: Communicate

4 Outcomes
1) Sustainable Water Balance
2) Good Water Quality
3) Good Water Governance
4) Healthy Important Water-Related Areas
Case Study 3: Alliance for Water Stewardship (AWS) – Indonesia

Field level observations

- No soil cover leading to erosion and loss of soil
- Mixed farming leading to pesticide use for coffee
- Cracks in water storage systems due to drought and lack of knowledge
- Limited use of land for coffee growing
- Depletion of agricultural land as protected forest
- Lack of knowledge on safe use of pesticides and waste management

Technologies at field, sub-catchment & household level

- Gully reclamation to reduce soil erosion and increase water recharge
- Terracing and vegetation strips to reduce quick runoff and soil erosion
- Mulching and soil cover to reduce evaporation
- Cut-off drain to prevent quick runoff and erosion on larger slopes
- Roof water harvesting (can also be plastic tanks) in closed systems
- Plastic lined ponds (instead of cement)

Farm plan including water stewardship principles integrated into GAP

Community plan focusing on water resource protection for improved access to WASH.

AWS Asia-Pacific (www.waterstewardship.org.au)
Case study 4: WaterGuide – using Australia’s experience to tackle water scarcity

Water shortages are occurring in 1/3 of the planet’s watersheds and aquifers
1/2 of the world’s population is affected
3/4 of the world’s irrigated acreage is affected
Case study 4: WaterGuide – six elements of water management

1. Establish a vision and objectives for water management and use
2. Understand water availability and demand over time
3. Allocate water between uses
4. Ensure effective policies and institutions to govern water management and use
5. Develop and sustain water infrastructure and services
6. Enhance efficient water management and use

- Jordan
- Iran
- Mexico
- Senegal
- Philippines
Case study 4: WaterGuide in Iran

Population: 79.11 million

Water availability per capita: 4,449 (l/d)

Number of Ramsar wetlands: 24

Stakeholders:
- Ministry of Energy
- Urmia Lake Restoration Program
- Department of Environment
- Iran Water Resources Management Company
- Ministry of Jihad-e-Agriculture
- Provincial Water Authority

Total annual water use: 93,300 GL

Priority areas for collaboration:
- Environmental water management
- Water trading

Water use by sector:
- Agriculture: 92%
- Domestic: 7%
- Industry: 1%
# International ‘Integration’ Frameworks

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<th>Relevance to WASH</th>
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<tr>
<td>SDGs: new sustainability agenda</td>
<td>SDG6</td>
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<tr>
<td>IRBM: Integrated River Basin Management</td>
<td>Helps understand WASH objectives and impacts at the catchment level</td>
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<tr>
<td>AWDO: Asian Water Development Outlook</td>
<td>Focus on water security with household water access and sanitation as one of 5 pillars</td>
</tr>
<tr>
<td>WWC Roadmaps: to implement SDGs</td>
<td>Comprehensive water management approach – good to be aware of</td>
</tr>
<tr>
<td>IWRM: Integrated Water Resources Management</td>
<td>Well established globally but sometimes hard to make practical for WASH</td>
</tr>
<tr>
<td>Nexus: water-food-energy-envt-climate-Int. Dev.</td>
<td>Paradigm shift to be aware of</td>
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Australian Water Partnership and WASH

**Vision:** “Australia: water partners for development – enhancing the sustainable management of water”

**Mission:** “Make a difference by mobilising Australian water expertise to address demand”
AWP Operational Model
AWP: Myanmar State of Basin Assessment – integrated environmental, social & economic baseline

Environmental

Social

Economic

SOBA packages

1 – Surface water resources
2 – Groundwater & WISDM
3 – Geomorphology & Sediments
4 – Biodiversity & Fisheries
5 – Socio-economics (demographics, sector development, macro economics)
6 – Local Consultations
7 – Ecohydrology & water quality

Ayeyarwady River is the life blood of communities
AWP: Twinning Vietnam – Australia water utilities

= Asset management + water safety plans + non-revenue water + Community engagement + PPPs + WQ technologies + relationships
The Partnership will focus on two parallel projects:

- Building Australia’s world-leading water sensitivity practice into the development of the green field city of Amaravati.
- A pilot project demonstrating how alternative approaches to drainage infrastructure can be retrofitted in the existing city of Vijayawada.
AWP: Leap-frogging the evolution of the ‘water city’ in India
Gender equality and social inclusion across Australia and the Indo-Pacific
Case Study Lessons

• **Case 1: MDB Plan** – markets can optimize across multiple uses and values; ongoing effective stakeholder engagement is critical

• **Case 2: Perth water supply** – water supply options can change radically in short time under climate change and adaptation needs both new and integrated supply options

• **Case 3: AWS** – linking industrial sites to catchments through the global water standard has strong parallels for WASH-WRM integration

• **Case 4: WaterGuide** – shows sophisticated water management can be broken down to simpler steps and smaller scales to match stage of development and specific needs
Thank you for your attention – come visit us at AWP!

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