Future-Proofing Integrated Water Resources Management: Taking an iterative approach to developing resilience frameworks

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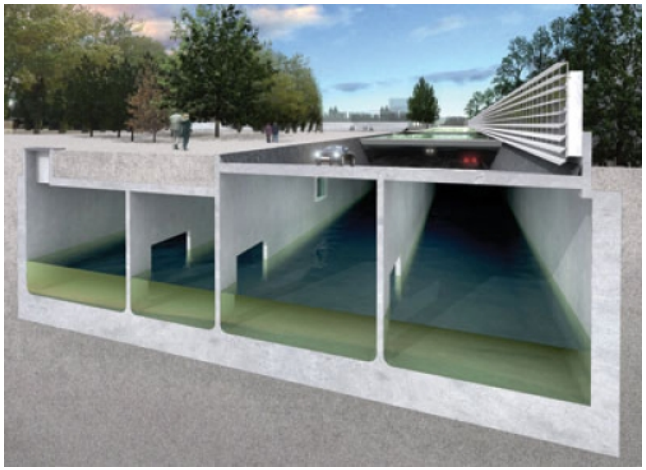

How can we change the horizon of our adaptation techniques to incorporate approaches which support resilience?

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- The hydraulic paradigm and IWRM
- Water security, IWRM and future proofing
- Building ‘resilient communities’
- Assessing three resilience frameworks
- IWRM, the post-hydraulic and resilience
- Initiating a conversation

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The hydraulic paradigm and IWRM

The '**hydraulic paradigm'** is characterised as:

"state based resource regulation of surface water with the ultimate objective of ensuring cheap water availability for economic growth"

(Sauri and Moral 2001:351)

Yet we face dynamic changing water conditions.

2015 marks the end of the United Nations' Decade for Action: Water for Life – sustainability replaces delivery as a focus.

UN WATER

WATER FOR LIFE
2005–2015

Is the era of 'cheap' potable water in developed countries over? What will this mean for IWRM?

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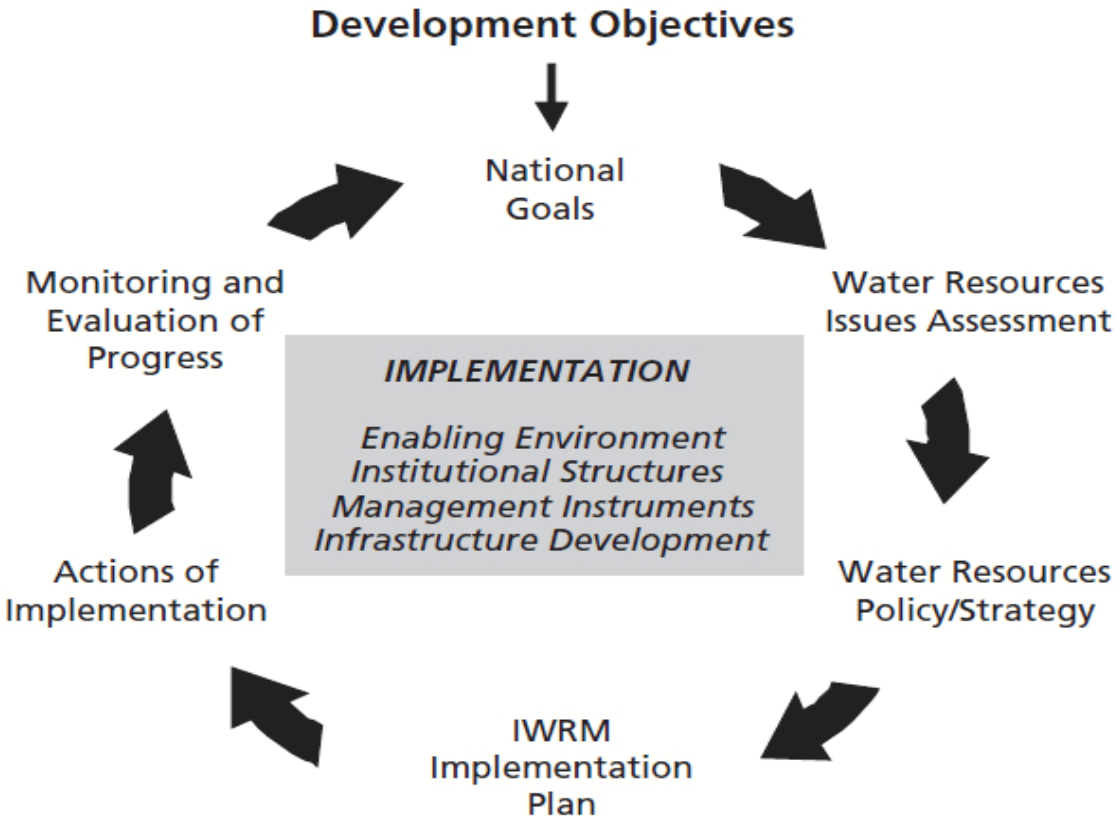
Classic IWRM framework



derived from the United Nations Department of Economic and Social Affairs (UNDESA) 2014

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Drawbacks of the classic IWRM approach within the hydraulic paradigm

Resources: Large capital works, large bureaucratic institutions

Silo mentality: technical/institutional focus ignores political impacts on societies

Evaluation: problems of verification of impact of IWRM approaches

Expertise: scientific knowledge hierarchy v lay knowledge

Regulatory: complex and open to contradictory aims and overlapping areas of jurisdiction

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Hallmarks of sustainable IWRM

- Devolved management
- Low tech approaches small capital investment
- Local solutions for specific catchments
- Recognising eco systems services
- Reducing demand promoting efficiency
- Social equity around water provision
- Centralised over view to co-ordinate infrastructure
- Accepting complexity

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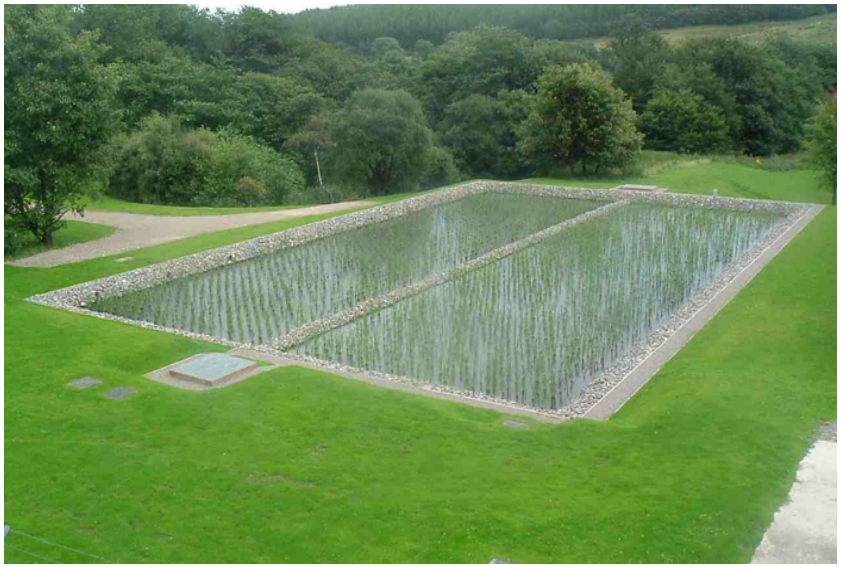
Water security, IWRM and future proofing

Is this long term resilience or short term adaptation?



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Building 'resilient communities'

Championed by the UN and in the UK through the Civil Contingencies Act 2004

Resilience:

'**The ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration or improvement of its essential basic structures and functions'.** IPCC 2012:563

Can we become resilient to the unknown?

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Ten characteristics of a resilient system

1. A high level of **diversity in groups** performing different functions in an ecosystem.

2. **Effective governance and institutions** which may enhance community cohesion.

3. The inevitable existence of **uncertainty and change** is accepted.

4. There is **community involvement** and the appropriation of local knowledge.

5. Preparedness activities aim not at resisting change but **preparing to live with it**

6. A high degree of social and economic **equity.**

7. The importance of **social values and structures** is acknowledged

8. The **non-equilibrium dynamics of a system** are acknowledged.

9. Continual and effective **learning** is important.

10. Resilient systems take a **cross-scalar** perspective of events and occurrences.

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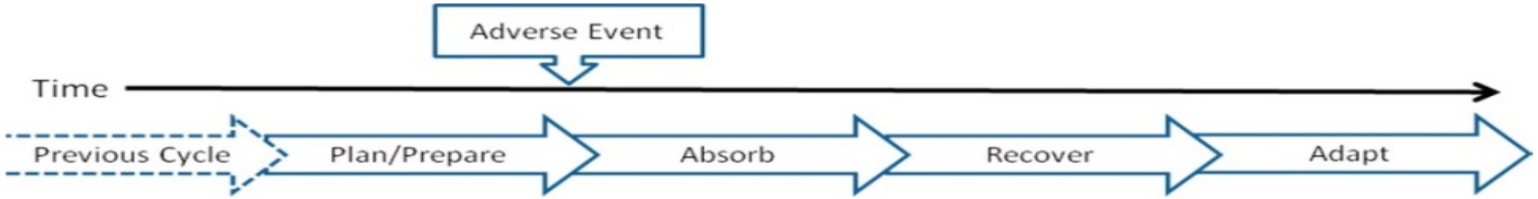
An humanitarian/post-disaster relief resilience matrix



	Plan/Prepare	Absorb	Recover	Adapt
Physical	• State and capability of equipment and personnel, network structure	• Event recognition and system performance to maintain function	• System changes to recover previous functionality	• Changes to improve system resilience
Information	• Data preparation, presentation, analysis, and storage	• Real-time assessment of functionality, anticipation of cascading losses and event closure	• Data use to track recovery progress and anticipate recovery scenarios	• Creation and improvement of data storage and use protocols
Cognitive	• System design and operation decisions, with anticipation of adverse events	• Contingency protocols and proactive event management	• Recovery decision-making and communication	• Design of new system configurations, objectives, and decision criteria
Social	• Social network, social capital, institutional and cultural norms, and training	• Resourceful and accessible personnel and social institutions for event response	• Teamwork and knowledge sharing to enhance system recovery	• Addition of or changes to institutions, policies, training programs, and culture

Linkhov et al 2013

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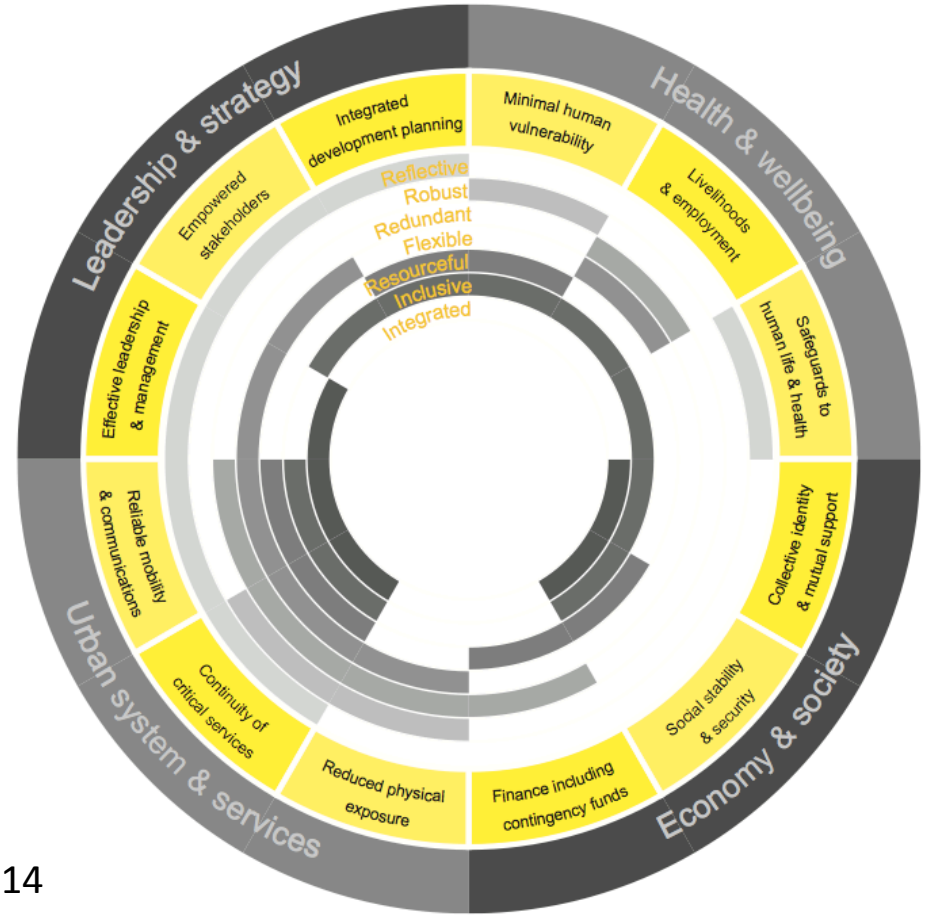
City resilience framework



Arup International/
Rockefeller Foundation 2014

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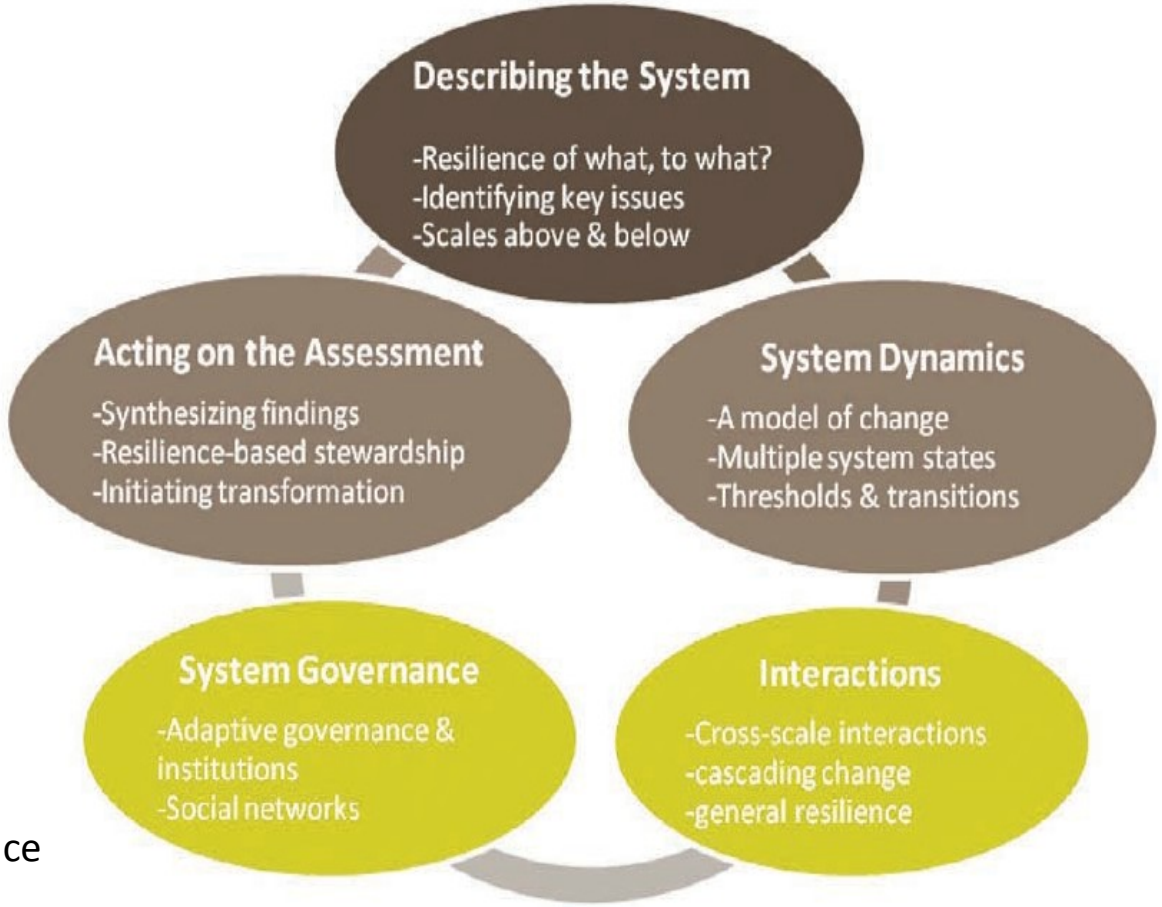
Integrated social-ecological Systems Resilience Model



Resilience Alliance handbook 2011

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IWRM, the post-hydraulic and resilience

How can resilience strengthen sustainable IWRM approaches?

What is absent from the current sustainable IWRM profile is a recognition that we may need to dramatically overhaul our society if water security is compromised. We may need to move from a sustainable to a resilient agenda.

We can think of this in terms of moving from **adaptation** to **transformation**

Strategies to enable transformation via a resilience lens:

1) Changing the focus from economic development to **social well being** – the end of the hydraulic paradigm.
2) **Pedagogic learning** – iterative steps to reinforce an acceptance that potable water will cost more but underpinned by social equity values.
3) Overcoming market dissonance and rebuilding trust between water users and IWRM practitioners by **cost transparency.**
4) **Strengthening science's potential to promote deep change** in respect to values, beliefs, perceptions and behaviours around water.

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Conclusions: Initiating a conversation

As IWRM is a systemic 'process' rather than a set of protocols, **there can be no one singular resilience framework which can be deployed**.

Building relationships of trust between water resource managers, scientists and water users will be crucial in enabling the 'deep change' that will need to evolve regarding people and water resources.

IWRM practitioners cannot direct macro policy change in support of resilient approaches, but by demonstrating their utility through operational practise with consumers and communities it is hoped that over time the **opportunity spaces for more creative policy options widens**.

As a governance objective, resilience is placed within a powerful **socio-technological** position and we must accept its normative potential.