

The Need for Integrated Thinking – Is your mindset?

Michael Rouse

Independent International Advisor

Immediate Past President, IWA

**Distinguished Research Associate, Oxford
University**

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Structure of Presentation

- Where are we now and the problem of ‘fashions’
- Government structures
- River basin management
- Integrated water resource planning
- Questions for farming and irrigation
- Standards and regulation
- Combined water and wastewater utilities
- Summing up

Where are we now?

- Generally, looking round the world, there is fragmentation at all levels
 - At regional level
 - EU has Framework Directive but that is mainly about environmental quality and not water resources
 - It is not integrated with the Common Agricultural Policy
 - At national level
 - It is unusual to see one government department dealing with water, wastewater and agriculture – The UK is now an exception
 - Structures based on watersheds, rather than regional or local administrative boundaries, are unusual
 - Often fragmented regulatory systems

The Problem of 'Fashions'!

- When I grew up in the 1970s
 - Every other person was a hydrologist
 - Conjunctive surface and groundwater use
 - Weather radar was becoming available
 - Early computers introduced 'modelling'
- In the 1980s and 1990s
 - The emphasis changed to quality issues concerning health and the environment
 - We ended up with more and more 'end of pipe' numerical standards

Today's Fashions

- None of these fashions were, or are, wrong in themselves
 - They were compensating for previous neglect
 - But in moving on we discarded the previous 'clothes'
 - We need to keep open minds and apply the best integrated thinking
- Today the fashion might be considered to be
 - Integrated Water Resource Management (IWRM – rather like sustainability, the word must appear in all reports)
 - This is encouraging but there is a need to consider what it means in practice

Where are we now? 2

- Fragmentation

- at operational level

- combined water and wastewater operations are unusual
 - Where they are integrated, considerable operational economies but, most importantly, integration provides for an integrated planning approach

- in research

- So often researchers see themselves in either water or wastewater, but not both
 - Water and wastewater research funding is often separate, even different government ministries

Where are we now? 3

- Fragmentation

- In associations

- AWWA and WEF in the United States
 - VEWIN, RIWA and NVA in the Netherlands
 - But not in IWA since 1999, and not in UK

- Fragmentation in new associations

- Ecosan
 - Rainwater Harvesting

- *There are too many cases of people 'stuck' in boxes*

Government Structures

- There is no one right structure
 - History
 - Current circumstances
- Principles
 - Ideally all aspects of water and wastewater policy under one Ministry
 - Defined links between policy makers on water matters and agriculture
 - Clarity of responsibility at national, provincial and local government levels
 - Separation of policy, regulation and delivery

River Basin Management

- Technically, the ideal solution but
 - The question of multi-national rivers
 - Within countries the importance of current administrative areas
 - Management on a river basin scale requires national government overseeing
 - UK moved to Regional Water Authorities based on watersheds in 1974
 - The EU Water Framework Directive requires
 - Establishment of competent authorities
 - River basin management plans
 - Price incentives for conservation of water

River Basin Management 2

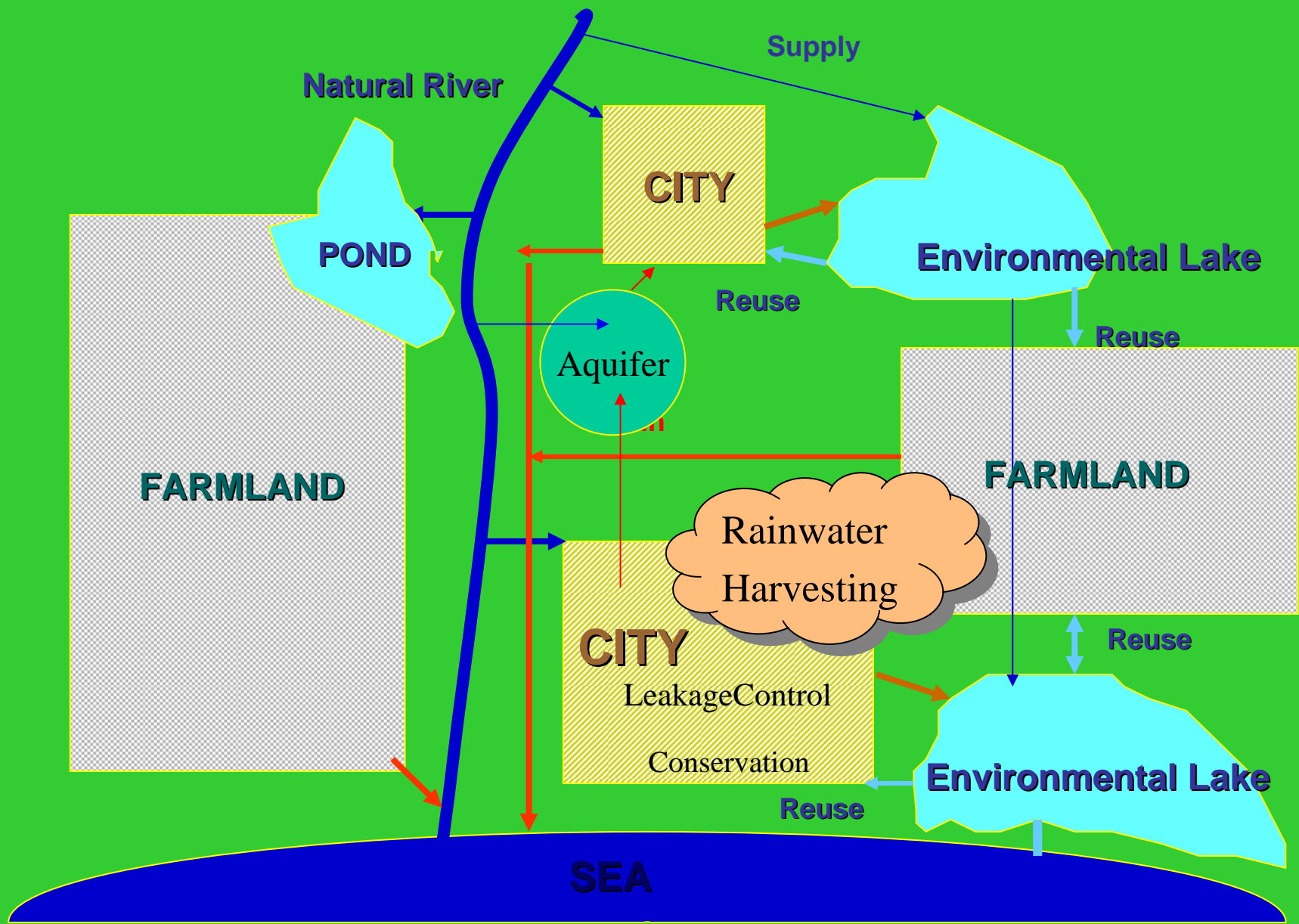
- But not necessary to form UK-type river basin operational units
 - Success of Rhine and Danube through co-operation and voluntary agreements
 - Success at city level as in Seattle in the US through involving all water utilities and other stakeholders in managing water resources and the environment
 - But necessary to have some form of river basin planning structure

Integrated Water Resource Planning

- There has always been a need for integrated planning
 - Today, climate change, increasing demand for water and advances in technology, makes it even more important
- The economics of water and wastewater treatment are changing
- So how can we combine the lessons of the past with our new opportunities?

Integrated Water Resource Planning 2

- A need for area water resource planning which combines
 - Conjunctive use of surface and groundwater
 - Considers wastewater as a resource for
 - Farming
 - Aquifer recharge
 - Environmental lakes
 - Includes rainwater harvesting for direct use, for irrigation and for aquifer recharge
 - Leakage control and conservation measures
 - The following diagram shows the connections



Integrated Water Resource Planning

The effect of this

- More sustainable water resources in time of drought
- Less need for large inter-basin water transfer schemes
- But this can only happen if there is integration in Government thinking, in regulation, in setting standards and in operations

Questions for Farming and Irrigation

- In some areas irrigation accounts for 85% of water use
- Generally, farmers do not pay an abstraction charge and they regard the water as theirs
- There is no incentive for them to use more efficient irrigation methods
- Other than for fruit and vegetables, they do not need a 'safe for humans' quality water and a lower-than-potable standard re-use water would be suitable
- Equally there could be much higher use of sewage sludge on land, and this provides opportunities for an integrated approach to wastewater handling

Standards

- This leads to the question of standards for
 - Potable water
 - Irrigation water
 - Re-use water for discharge to surface storage and for re-charge of aquifers
 - Sewage sludge to non-horticultural land
- It also leads to the need for integrated government thinking on standards and for an integrated research approach on emerging pathogens

Combined water and wastewater utilities

- There are a number of benefits from having combined water and wastewater utilities
 - Management
 - Billing
 - Common support services
 - Scientific and technical crossover
 - Integrated water resources and re-use
- In the context of this paper, the last two are the relevant ones

Scientific and Engineering Cross-over

- Water treatment scientists and engineers have tended to work separately
 - Because organisations have been separate
 - R&D funding has been separate
- Whereas in practice both are
 - Removing particles
 - Using oxidation processes
 - Using microbiological processes
- So in-house teams benefit from integration
- External consultants likewise

Integrated Water Resources and Re-use

- This was covered earlier but is worth repeating
 - Technology, particularly membranes is changing the economics on the optimum size of treatment plant
 - The trend should be away from big water transfers with a move to solutions within areas with integrated water, wastewater and re-use
 - Integration of water and wastewater would facilitate this change of thinking

Summing up

- There has been a history of ‘fashions’ in water management and science
- This has tended to
 - Give too much emphasis to one aspect
 - Neglect others
- There is the opportunity to avoid these mistakes in the future, but there is a need for everyone ‘to step outside his or her box’

Summing up continued

- There is a need for integrated thinking at all levels
 - At government level – most important – covering water, wastewater and agriculture
 - In research
 - I wonder if there should be less emphasis on activated sludge, and more on the wider wastewater issues
 - We need much more effort on the systems issues, including on economics and on consumer understanding
 - In standards and regulation, particularly in relation to re-use of wastewater
 - In operations through combined water and wastewater utilities

Is your mindset?

- We need everyone to think outside their own boxes
- So is your mindset?
- But we must not forget the lessons of the past
- Do you agree?
- Your thoughts please