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Integrated River Basin Management: A Socio-technical Challenge

P. Enda O'Connell
Water Resource Systems Research Laboratory
University of Newcastle upon Tyne
School of Civil Engineering and Geosciences
Newcastle upon Tyne, United Kingdom

Water Resource Management:
Sustainable Supply and Demand
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Integrated River Basin Management: A Socio-technical Challenge

1 Functions and Objectives

2 Evolution of Integrated River Basin Management (IRBM) in the UK

3 IRBM and the Water Framework Directive

4 Towards Sustainable Water Resources Management

Functions

- **Land drainage**: natural and man-made;
- **Water supply**: direct or via storage reservoir;
- **Sewage disposal**: raw sewage or treated effluent;
- **Navigation**: natural or maintained depth;
- **Hydropower generation**: conventional or low-head;
- **Cooling water**: oil or coal-fired power stations;
- **Fisheries**: angling and fish-farming;
- **Recreation and amenity**.

Objectives

- **Economic**: support economic development;
- **Environmental**: protect the environment;
- **Social**: ensure that water supply and sanitation are provided (at affordable prices).

Key question

How do we reconcile the conflicting interests of all stakeholders who are dependent on the finite resources of a catchment?

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Evolution of IRBM in the UK

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1974 Regional Water Authorities established

1989 Privatization: separation of Service Provision (Utilities) from Regulatory Function (National Rivers Authority and Office of Water Services (OFWAT))

1996 Environment Agency established

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Ministerial guidance to Environment Agency on sustainable development under Environment Act 1995

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Water Management

"The Government expects the Agency to use its powers to encourage water conservation in areas of potential shortage where it is economical to do so and to encourage the development of new water resources in a sustainable way where they are needed. A more efficient use of existing water storage and leakage control options should be considered when assessing the need for new water resource developments."

John Gummer, Douglas Hogg, William Hague, 1996

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Matching supply and demand

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- Traditional approach: build new infrastructure to increase supply capacity.
- 1979 Broad Oak Enquiry (Southern Water Authority) refused permission for new reservoir.
- Conjunctive use of surface and groundwater used to increase supply capacity.
- Emergence of Demand Management.

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Background to Demand Management

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- 1989-92 drought
- 1995 drought and Yorkshire Water runs dry (nearly!)
- High and rising leakage to 1997
- Water summit 1997
- Demand Management in water resource plans
- Falling total supply input
- No new reservoirs promoted in a decade

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Integrated River Basin Management and the Framework Directive

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- River basin adopted as logical unit for implementation
- Requires:
  - Sustainable water resources management
  - Full cost recovery pricing
  - Participation of general public in developing River Basin Management Plans
  - Compliance of receiving waters with 'good status'

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River Basin Management Plans

- The plan is a detailed account of how good status will be reached in a particular river basin within the timescale required by the EU
- Besides the technical measures, an economic analysis of water use within the basin will be undertaken, to facilitate rational debate on the cost effectiveness of alternative technical measures and derogations
- Public participation in the preparation and implementation of the plan is regarded as essential

Public participation: Why?

- There are two main reasons for an extension of public participation in water management:
  - Decisions on the most appropriate measures to achieve good status involve balancing the (perhaps conflicting) interests of various groups
  - The greater the transparency in the river basin management process, the more likely will public bodies be to implement the legislation in good faith (if only for fear of public complaints or even legal cases)
- IRBM is now a major socio-technical challenge

Public participation: How?

- The WFD requires that river basin management plans be issued in draft, with all supporting data publicly available
- A biannual conference will be held in each river basin district to facilitate a regular exchange of views and experiences on the implementation of the local river basin management plan
- A network for the exchange of information and experience between water professionals throughout the EU will also be established

Water governance

- Interaction between humans and the water cycle is so complex that the state's ability to manipulate it directly may be quite limited
- Analysis of competing approaches to the governance of water is a necessary prerequisite to the design and implementation of a sustainable water resources management policy

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Towards sustainable water resources management

"Water is essential for natural life and for human use. The way that we use water has a direct impact on the natural environment. This means that it is essential that there is a secure framework for the management of water that protects the long-term future of the water environment while encouraging sustainable development."

Environment Agency, 2001

EA Vision

Abstraction of water that is environmentally and economically sustainable, providing the right amount of water for people, agriculture, commerce and industry, and an improved water-related environment.

Some EA Objectives

- To illustrate the impact of different social and economic choices on future water use
- To manage water resources in a way that causes no long-term degradation of the environment
- To improve the state of existing degraded catchments
- To ensure that water is available to those who need it, and that it is used wisely by all

'Twin-track' approach

- Efficient use of water (water conservation, demand management, leakage reduction etc)
- Bring forward timely proposals for water resources development (where appropriate)

Catchment Abstraction Management Plans

- Balance abstractors' needs for water and environmental needs
- Involve public in process of managing abstractions
- Provide framework for managing time-limited licences
- Facilitate licence trading

Pathway to sustainability: Natural Capitalism and Earth Systems Engineering

- **Natural Capital** refers to the Earth's natural resources and the ecological systems that provide vital life support services to society and all living things.
- **Natural Capitalism** is built around new business models where economic and environmental sustainability are compatible; being implemented by major US companies (e.g. DuPont)

Earth Systems Engineering

- **Earth Systems Engineering** is a multidisciplinary (engineering, science, social science, and governance) process of solution development that takes a holistic view of natural and human system interactions. The goal of ESE is to better understand complex, nonlinear systems of global importance and to develop the tools necessary to implement that understanding.
- **Earth Systems Engineering** provides the new integrative, interdisciplinary and holistic approach needed to ensure engineering interventions in the environment are harmonized with nature.