BASIN GOVERNANCE: CONCEPT NOTE

Purpose

This concept note is a discussion of the critical issues apparent in basin governance today. It includes a framework for integrated river basin management [IRBM]. Basin governance refers to the decision-making processes at all levels about river basin management.

1. Integrated river basin management [IRBM] – definition and challenges

A political decision process

Water is now increasingly high on political agendas and the subject of global forums. Has river basin management followed suit? Yes and no. We see much rhetoric promoting river basin management as a tool to implement integrated water resources management [IWRM] with some successes, but overall much obfuscation. There is a need worldwide for clarity, adaptability and leadership in driving the understanding and use of IRBM.

IRBM is seen as a subset of IWRM. It is IWRM at the basin scale; it is about coordination and adaptation. It involves the co-ordinated management of land and water resources within a river basin, with the objectives of controlling and/or conserving the water resource, ensuring biodiversity, minimising land degradation, and achieving specified and agreed land and water management, and social objectives. These last objectives are paramount in very poor nations where poverty reduction programs and national economic development planning are tied intrinsically to IRBM. In highly developed nations, IRBM is frequently tied to ecosystem restoration, such as in the EU Water Framework Directive or in the Murray-Darling Basin Initiative, but this is changing as water demands from burgeoning populations drive the need for further water abstraction and basins reach water closure.

IRBM may be well defined and widely appreciated. But there are differing interpretations about how it should be practised in different countries. It is essentially a **political decision-making** process at the national/international or sub-state level which seeks maximization of shared benefits amongst often competing interests. This occurs throughout a range of political systems and for different reasons.

Benefit sharing

IRBM is more than technology-driven planning and management techniques. It is more than a process of utility maximization based on the output of best available modelling simulations of water allocations. It seeks to address critical social, legal and ecological issues related to water resources development and management at the basin scale, including issues such as water rights and transferable water entitlements, environmental requirements for water, access to water by the poor, the role of women in water abstraction in developing countries, and the need to maximise the sharing of multiple benefits amongst water users. These issues are complex, pervasive and challenging to water managers. Tools are needed to enhance the decision-making capacity of basin managers to meet these multiple needs and demands on water resources.

IRBM recognizes **benefit sharing across jurisdictions and boundaries**; these benefits include:

- Social: such as the access to potable, clean, fresh water supplies for human survival and health;
- Amenity: related to water use [recreation, aesthetics, spirituality];
- Economic: from water use by irrigation [food and fibre products], hydro-electric power production [renewable energy, recreation uses of reservoirs];
- Environmental including the maintenance of aquatic biodiversity and other ecosystem services through environmental flows in rivers and their interdependent floodplains;

- Risk reduction: hazard and risk minimization [drought mitigation and floodplain management].

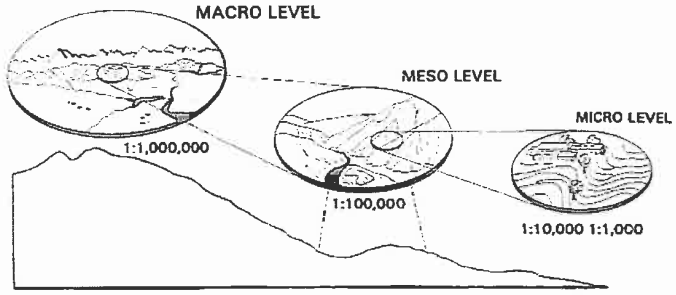
The challenge is **to assemble capabilities** and **develop and apply benefit sharing tools**.

The importance of scale

IRBM regards **the basin** as the scale to implement IWRM. It is the appropriate hydrological unit. In some contexts, groundwater systems dominate water resource availability so groundwater provinces become the locus of management. Where appropriate, conjunctive use management is critical.

The scale of decision-making by administrations and politicians is important to IRBM. Figure 1 illustrates the range of political and administrative decision settings in the water policy context of a nation or between nations. DHI's approach to IRBM recognises all levels, and the need for coordination mechanisms between all three.

Figure 1. Scales, mapping, decision making, organisations and documents in integrated river basin management



Natural System and Resources	**MACRO LEVEL**	**MESO LEVEL**	**MICRO LEVEL**
	Part of a geographical zone such as a river basin or different ecological zones	Regional or local ecological resource system	Areas with relatively uniform ecological conditions
Mapping scale	>1:1,000,000	1:100,000 – 1:500,000	1:10,000 1:1,000
Mapping unit	Provinces	Land systems	Land units, land facets
Level of decision-making	NATIONAL LEVEL	REGIONAL LEVEL	LOCAL LEVEL & INDIVIDUAL
	Highest political decision-making, international agreements	Province, State, District, Territory	Village cooperative, farm, factory, forest, individual
IRBM organisation example	International commission	Inter state basin commission/authority/association	Local land and water management group
IRBM document examples	International agreement	River basin management plan	Land and water management plan, storm water management plan

Adapted from [Newson 1992]. Source Hooper 2005 p. 120.

The lowest level is frequently the domain of local government which, in western democracies, exercises local watershed management through local action planning. In emerging economies, this jurisdiction is successfully run in many places by local water user organizations. The regional level of water resources planning has frequently been void of activity, except in France and Italy where regional water agencies exercise planning and management powers. The national and international level are perhaps best known as examples of basin management in large scale activities such as those in the Mekong River basin.

The challenge is to assemble capabilities and **develop and apply coordination mechanisms between these three levels of management in river basins.**

2. The challenge to manage adaptively

Towards adaptive management

A new research paradigm for natural resources management is emerging in many places. In many respects, this approach is an **adaptive management experiment**; that is, it involves a stakeholder-driven, interactive process whereby all relevant stakeholders in a river basin strive to assess the efficacy of different basin management options, test these in sub-catchments, learn from these experiences, then promote wider application.

The new research paradigm is seen as a stepped process, or a series of research questions requiring fundamental answers to questions such as:

- What is happening to river basin water use and basin ecosystems?
- What are the forces that cause things to happen to water resources and ecosystems by resource use practices?
- What are the interactive effects of these forces?
- Do we have enough confidence in our models to know that if specific variables are changed, these are the outcomes?
- Are these outcomes desired and are they part of the broad social decision system of the river basin?
- Knowing the above, how do we test management options and learn from them?
- What are the procedures for wider application that will gain political support?

These steps include studies of the content, processes and interconnections within and between water resources systems and modelling the predictive capability of different water use scenarios. Knowing this information, we then seek solutions to water resource management problems. These are based on the predictive capability of science [our models] and the policy options for water resources management. We run simulations to understand system response and by doing this, test various management options. For each, we can determine the degree of confidence one can ascribe to each solution.

In undertaking these tasks, two activities are required:

- include stakeholders to capture varying user requirements and
- incorporate a large range of data, knowledge and wisdom.

In so doing, we find frequently that we need may types of data, knowledge and stakeholder wisdom. The problem then is to reduce this data, knowledge and wisdom down to a size that provides explicit options for resource use for river basin management decision makers and local resource managers. As well, these two procedures (stakeholder involvement and information acquisition) allow an extensive range of policy options to be tested. This can be done in a workshop setting using tools like Delphi techniques, shared vision modelling, multi-criteria analysis, interactive multi-objective decision support systems and others.

Knowledge of the basin decision system is the key requirement to improving the likelihood of the adoption and testing of policy options. This involves knowing the decision capital [or capacity] of a river basin setting [perhaps a river basin organization] and involves understanding:

- The basin's human capital: capability [skills, abilities] and leadership within the river basin community and government
- The basin's legal capital: creates a framework for such integrated management, and is usually embedded in national and provincial laws and regulations which clarify user & provider entitlements and responsibilities of users and water providers, role of the state, water allocations, user groups roles, and resource sustainability
- The basin's social capital: networks of information flows, knowledge systems; water associations and other civic institutions, and
- The basin's cultural capital: existing attitudes, beliefs, and values that guide behaviour.

Knowing this information, we can then tailor procedures for effective basin decision-making at different levels, congruent with an overall, stakeholder driven river basin management strategy or plan.

This adaptive management approach to river basin management R&D suggests that the functionality of an **information exchange system** for river basin managers is critical and should include:

- Information and data on the river basin
- Access to assistance that helps understand problems
- Descriptions of interventions to achieve sustainable resource use, designed with cooperative action with end-users [and geo-referenced to land systems in a river basin]
- Interactive capability with stakeholders
- Reports on the successes and failures of field testing of interventions, and
- A mechanism to learn from field testing of interventions.

In this context, interventions are scaled down interventions that will 'bound' the resource management problems in the river basin. An **adaptive management process** is used to field test the interventions in a small area. Then methods are worked out to extend the outcomes to the river basin scale, and in so doing, work out what variables are most significant at this larger scale.

The challenge is to develop and implement a capacity in **providing tools to improve decision-making** at all levels:

- National/international/transboundary (political)
- Regional (basin)
- Local (usually local government, water utility providers)

A further challenge is to identify and provide **mechanisms and institutional arrangements to improve coordination** between these levels for our clients.

4. Critical questions

These are some potential issues which need to be addressed in river basin governance:

1. It is already known what is best practice IWRM, but what are the critical factors which influence adoption of best practice IWRM in a particular basin? Are they always context dependent?
2. Basin realties vary significantly between highly developed and emerging economies (Table 1). What is required for effective IRBM in each?

Table 1. Differences between developing countries and developed countries basin realities

Developed Countries	Developing Countries
Temperate climates, humid, higher river-stream density	Rainfall low, climate extreme, higher mean temperatures, lower stream density, water scarcity an emerging constraint
Population concentrated in the valleys, downstream	Densely populated in both valleys and catchment areas; population high both upstream and downstream of dams
Water rights based on riparian doctrine and prior appropriation	Water rights based on rights to rainfall or ground-water; people's notions of ownership relate more easily to rain than to large-scale public diversions
Focus on blue surface water: water found in rivers, and lakes	Focus on green water: water stored in the soil profile or blue water stored in aquifers
Most water users get water from 'service providers'; most water provision is in the formal sector-making water resources governance feasible	Most water users get their water directly from rain and from private or community storage without any significant mediation from public agencies or organized service providers. Because the bulk of water provision takes place in the informal sector, it is difficult to pass enforceable water legislation
Small numbers of large-scale stakeholders	Vast numbers of small-scale stakeholders
Low transaction costs for monitoring water use and collecting water charges	High transaction costs for monitoring water use and collecting water charges

Source: Modified from (Shah, Makin, and Sakthivadivel 2004) and http://www.iwmi.cgiar.org/home/integrated_river_basin.htm, accessed November 2004; as reproduced in (Hooper 2005)

3. River basin organization evolve through time (Table 2). Does this evolution vary according to the level of economic development of a country/countries? Or are other factors at work which allow basin organizations to be more auto-adaptive?

Table 2 Functional stages in the evolution of an adaptive river basin organization

Functions	Initial RBO	Emerging Auto-adaptive RBO	Mature Auto-adaptive RBO
Group 1: Water (and natural resource) data collection and processing, systems modelling, water and natural resources planning, stakeholder consultation & issue clarification	X	X	X
Group 2: Project feasibility, design, implementation, operation and maintenance, raising funds, ongoing community consultation and awareness raising	X	X	X
Group 3: Allocating and monitoring water shares (quality and quantity and possible natural resources sharing), cost sharing principles		X	X
Group 4: Policy and strategy development for economic, social and environmental issues, community awareness and participation			X
Group 5: Monitoring water use and shares, monitoring pollution and environmental conditions, oversight and review role for projects promoted by RBO partners, monitoring and assessing the health of the basin's natural resources, monitoring the sustainability of resource management, review of strategic planning and implementation of modified plans			X

Source: Modified from (Comfort 1999; World Bank 2006)

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