

# Lessons from Integrated Water Resources Management in Practice

There is growing recognition that unless we manage our water better, we will not achieve our societies' broader development goals. In response to this challenge, over the last several decades numerous practitioners and policy makers around the world have been evolving practices for water resources management that have aimed to achieve a balance among economic efficiency, social equity and environmental sustainability. These practices have collectively come to be known as the Integrated Water Resources Management (IWRM) approach. While IWRM is widely acknowledged as the way forward – particularly in the face of emerging challenges such as climate change – there are still questions about how to translate policy commitments to IWRM into practice.

This brief highlights lessons from GWP's book *Integrated Water Resources Management in Practice* (Earthscan, 2009). The book uses case studies at local, basin, national and trans-national levels to present in practical terms how better water management, embodying key principles of IWRM, has made a positive contribution in areas as diverse as agriculture, urban water supply, transport, energy, industry, job creation, and environmental protection. The lessons learned from these cases confirm the experiences of GWP and partners in facilitating and implementing an IWRM approach, for example in the Partnership for Africa's Water Development (PAWD).

Notably, none of the cases featured in the book set out to achieve IWRM, rather they set out to address a particular water-related problem or development challenge. And in several cases, an IWRM approach emerged only over time, to correct imbalances between the three E's (economic efficiency, social equity and environmental sustainability). For example, in Chile, an IWRM approach evolved to address the equity and environmental issues caused by a narrow adherence to 'economic efficiency' in the development and allocation of the country's water resources. This evolution can also be seen in the case of China's controversial Three Gorges project, which began with an almost exclusive focus on infrastructure but ended with more than half the budget being used to fund community relocation and environmental remediation, and ultimately led to a fundamental change in the country's approaches to water resource management.

## Box 1. Five key lessons

- IWRM is not a one-size-fits-all prescription and cannot be applied as a checklist of actions. Pragmatic, sensibly sequenced institutional approaches that respond to contextual realities have the greatest chance of working in practice.
- Water resource planning and management must be linked to a country's overall sustainable development strategy and public administration framework.
- Water management must ensure that the interests of the diverse stakeholders who use and impact water resources are taken into account.
- Approaches to water resources management will evolve as the pressures on the resource and social priorities change. The challenge is to develop institutions and infrastructure that can adapt to changing circumstances.
- While the river basin is an important and useful spatial scale at which to manage water, there are often cases where it is appropriate to work at smaller sub-basin scale or at a regional multi-basin level.

## What is IWRM

IWRM can be thought of as the way in which water can be managed to achieve the objectives of sustainable development. It is an approach that reflects the need to achieve a balance among:

- **Economic efficiency** – to make scarce water resources go as far as possible and to allocate water strategically to different economic sectors and uses.
- **Social equity** – to ensure equitable access to water and the benefits from water use, between women and men, rich people and poor, across different social and economic groups both within and across countries. This involves issues of entitlement, access and control.
- **Environmental sustainability** – to protect the water resources base and related aquatic ecosystems, and more broadly to help address global environmental issues such as climate change mitigation and adaptation and sustainable energy and food security.

Of course in the real world of practice there are often difficult tradeoffs to be made. IWRM provides a framework within which it is possible to evaluate and negotiate such tradeoffs. For example, in the case of Japan's Lake Biwa, where limited water resources were insufficient to meet growing needs, the competing claims of downstream megacities, upstream farmers and industries, and local tourism and environmental protection interests had to be reconciled through intensive engagement and processes of conflict resolution, which spanned many years. The conflicts provided opportunities to seek equity and synergy in water resources development as part of their resolution.

The IWRM approach was initially most comprehensively articulated in the chapter on freshwater resources in Agenda 21 of the 1992 Earth Summit in Rio de Janeiro (see Box 2).

### Box 2. Agenda 21 provision for the application of integrated approaches to the development, management and use of water resources

'The widespread scarcity, gradual destruction and aggravated pollution of freshwater resources in many world regions, along with the progressive encroachment of incompatible activities, demand integrated water resources planning and management. Such integration must cover all types of interrelated freshwater bodies, including both surface water and groundwater, and duly consider water quantity and quality aspects. The multisectoral nature of water resources development in the context of socio-economic development must be recognized, as well as the multi-interest utilization of water resources for water supply and sanitation, agriculture, industry, urban development, hydropower generation, inland fisheries, transportation, recreation, low and flatlands management and other activities. Rational water utilization schemes for the development of surface and underwater supply sources and other potential sources have to be supported by concurrent waste conservation and wastage minimization measures.'

Source: Chapter 18, Agenda 21

IWRM covers a wide range of activities, among them:

- designing and managing water resource infrastructure;
- allocating water resources between competing users; and
- implementing incentives for the efficient use and protection of water.

Most countries have started with a focus on 'hard' infrastructure, but as competition for water grows and environmental concerns emerge, the 'softer' institutional side of IWRM becomes even more important. Experience suggests that an IWRM approach that uses the right mix of hard and soft tools is the most effective. This means that countries still in the process of developing their water resources also need to invest in creating the institutions and building the capacity necessary to manage infrastructure and protect the resource from over-exploitation, and that countries with adequate infrastructure to meet their current

needs put in place mechanisms to ensure continuing investment in maintaining, upgrading and adapting it even as they refine their institutional approaches.

## Why IWRM

In many of the current and emerging challenges the world faces, water will necessarily play a large role. These include:

- Addressing and adapting to climate change;
- Reducing poverty, particularly in communities engaged in water dependent activities such as agriculture;
- Growing more food to meet increasing demand; and
- Furthering economic growth while also protecting ecosystems and maintaining ecosystem services.

The concept of IWRM arose in part to help address the failure of traditional approaches to meet development goals without sacrificing environmental sustainability. But even before its formal adoption at the 1992 Earth Summit, much of what we now refer to as IWRM was already being practiced, as many of the examples featured in the book demonstrate. IWRM simply reflected evolving good practice, rather than any radical new innovations, and it still, at its core, represents the best thinking available on good water resources management.

It is clear that, if the water sector is going to contribute to meeting the world's emerging challenges, it will have to take the kind of approach IWRM offers: one that considers the integrated and interconnected nature of the resource, one that provides mechanisms for negotiation and conflict resolution among different stakeholders, and one that encourages adaptation and can accommodate shifting physical, political and economic realities.

The challenges cut across most sectors of society, but there are also a number of specific challenges to the use and management of water that demand an IWRM approach, most notably:

- Urban water services – in particular managing wastewater as a resource while protecting human and environmental health;
- Water allocation – managing competition between sectors and getting the most benefit from scarce water resources while ensuring that water contributes to, rather than impedes, the achievement of national development goals; and
- Developing and managing transboundary river basins so that countries can find ways to share the benefits of water resources equitably.

## The challenges of integration

Some critics have objected to IWRM as impractical in the real world because of the challenges of integration. Integration, they argue, makes theoretical sense but cannot easily be implemented. This kind of critique assumes that the purpose of IWRM is integration of all activities that use or impact water resources. But looking at the original expression of IWRM adopted at the Rio Earth Summit and successful examples of IWRM in practice, it is clear that IWRM is a means to an end, and it is the goals to be accomplished and the context – the existing physical and institutional systems – that determine what elements of integration are important, and when they are needed.

What the IWRM approach emphasises is that water is by its very nature an integrated resource – it impacts and is impacted by many different variables. And increasing pressure on the resource magnifies these interconnections. So, for example, in many cases one cannot manage surface water without also considering its relationship with groundwater. One cannot manage water for agriculture without considering the implications for the quantity and quality of water for other uses. One cannot design and manage a dam with-

“ IWRM is a means to an end, and it is the goals to be accomplished and the context that determine what elements of integration are important, and when they are needed.



out considering the various uses and users of water and the possible tradeoffs and synergies among economic efficiency, social equity and environmental sustainability.

The cases featured in *Integrated Water Resources Management in Practice* did not set out to achieve integration for its own sake, rather they set out to address particular water-related problems or development challenges. The solutions in these cases demanded an approach that went beyond water resource management as it is narrowly viewed. In Aalborg, Denmark, the issue was contamination of the groundwater that served as the town's primary drinking supply. The solution involved urban planners, environmental interest groups and farmers. In the case of Sukhomajri, addressing the issue of downstream water quality and the silting up of the lake that supplied water to the city of Chandigarh required looking at land management practices upstream, and ultimately supplying irrigation to the poor farmers attempting to eke out a living on the denuded hillsides. In Mexico's Lerma Chapala basin, halting the rapidly falling water levels in Lake Chapala and improving water quality required finding an institutional mechanism to coordinate between three levels of government and the different water-using sectors in the basin.

## **Bridging the gap between theory and practice – implementing IWRM**

Looking at the wide range of cases represented in the book, several key points for successful implementation emerge. These include the importance of linking between scales, involving stakeholders and managing change.

### ***Linking between scales***

IWRM can be implemented at many different scales. From the very local, as in the case of Australia's Angas Bremer irrigation scheme, to the international, as in case of the Mekong River Basin, and every scale in between. What these cases make clear is that the river basin is often not the most critical focus for management efforts and that what matters is that linkages are made across spatial scales and levels of decision-making, with actions at one level reinforcing and complementing action at other levels. So one factor behind several of the success stories was a national level policy that provided a framework for action at smaller scales. For example, Denmark's National Aquatic Environment Plan (NAEP) proved to be a key part of the solution for the cities of Aarhus and Aalborg. In other cases, successful implementation of IWRM at local or basin level influenced national policy, as in the case of Sukhomajri, which provided a model for watershed management, and the Lerma Chapala, which proved to be a pilot case for the concept of Basin Councils.

### ***Involving stakeholders***

Involving stakeholders can dramatically improve the quality of decisions as well as compliance with them. It builds trust, lays the foundation for implementation, and often results in a better balance between the three 'E's of equity, economics and environment. But for participatory processes to be effective, stakeholders need to be brought in at the appropriate stage and their participation needs to be grounded in a well defined and accepted structure (see Box 3 for pitfalls).

Particularly in basins where competition for water has become a zero sum game – with all available resources being put to use – bringing users together to determine how water is allocated and to develop ways to improve water use efficiency is crucial – as demonstrated in the Lerma Chapala basin. In the case of the Snake River in the USA, users were brought together to resolve a conflict between power generation and transport interests on one hand and environmental interests seeking to restore the river's native salmon population on the other. The battle now continues in the courts – highlighting the importance of an effective legal framework to adjudicate between competing interests when consensus cannot be reached.

“ The river basin is often not the most critical focus for management efforts.

### *Managing change*

Change should never be imposed for its own sake, but addressing water problems and larger development challenges often does require substantial changes to policies, to institutions, and to practices. Such change is almost always difficult, but *Integrated Water Resources Management in Practice* does offer several hints for more successful change processes:

- Promote better water management in a way that is compatible with broader approaches to governance and public administration.
- Keep it simple – establishing new institutional arrangements on top of existing structures can increase complexity. Be strategic about where to make changes and ensure that those affected by the changes understand and support them.
- Introduce and sequence policy changes and the implementation of management instruments in a way that responds to national priorities and social and economic realities.
- Underpin policy change with a sound technical foundation and strong lead institutions.

### Box 3. Pitfalls in putting IWRM into practice

- **When it has been applied as blueprint – as a checklist of actions – in a way that does not take into account specific problems to be solved and contextual realities, IWRM has not delivered concrete benefits.** Even within countries there are often significant differences that shape water resources challenges and possible solutions.
- **Trying to establish management relations between too many variables risks getting mired in complexity at the expense of effectiveness.** When putting IWRM into practice it's important to think strategically about where and to what degree coordination and new management instruments are necessary.
- **Participation can stall processes, undermine development and impose heavy costs on participants** if it is undertaken without clear objectives and timelines, informed stakeholders, and mechanisms for negotiation and conflict resolution.

### IWRM & development outcomes

Returns from investments in water frequently come back as wide-ranging and often long-term benefits spread across different segments of the economy. One of the most important outcomes of better water management is that social and economic life is more secure than it otherwise would have been. And that greater security often leads to more and more sustainable, economic and social development.

In the cases highlighted in the book, an IWRM approach resulted in:

- Improved groundwater quality and protection of drinking water supplies – Aalborg and Aarhus, Denmark.
- Improved livelihoods upstream and protection of infrastructure assets and water quality downstream – Sukhomajri, India.
- Reduced poverty and healthier wetland ecosystems – the MACH project, Bangladesh.
- Improved agricultural productivity, water efficiency and farm incomes – Angas Bremer Irrigation District, Australia and Office du Niger, Mali.
- Economic growth, improved access to safe water for the poor, greater private investment in water infrastructure, reduced pollution and greater water efficiency in the industrial sector – South Africa.
- Growth of an economy based on water-dependant exports, improved social equity and reduced environmental impacts – Chile.
- Better communication between countries sharing a river basin and a platform for more coordinated water resources development and benefits sharing – Mekong River Commission.

## Box 4. Win-Win-Wins are possible

Looking at IWRM in practice shows that it does not always have to be a standoff between economic, social and environmental objectives. There are a number of examples featured in the book where there were gains in economic efficiency, social equity and environmental sustainability. One such case is the Management of Aquatic Ecosystems through Community Husbandry (MACH) project in Bangladesh. Here the restoration of ecosystems has meant greater income and food security for local communities.

In the last several decades, the extensive wetlands of Bangladesh have undergone a steady decline – due primarily to agriculture intensification in the flood plains, unsustainable fishing practices, and, more recently, industrial pollution. The MACH project, which ran from 1998–2007, has not managed to resolve all of these issues; however, it has been able to achieve greater positive impacts than previous interventions. Several characteristics distinguished MACH from its predecessors. It looked at the wetlands as a system – one in which there are intricate connections between land, water, people and other living organisms. It involved all the actors who impacted the system – the resource users and the polluters – and attempted to take into account the differing priorities of these actors. And finally it worked to ground natural resource management in the community, while simultaneously fostering links to higher levels of government.

MACH shows that, at local level, good management often addresses both land and water resources, institutional as well as infrastructural interventions, and vertical as well as horizontal linkages. The case also shows that for pilot efforts to have broader impacts, effective monitoring is critical.

## Insights into the nature of IWRM

Looking at IWRM as it is successfully applied in the real world yields several insights:

- **IWRM is a means not an end.** None of the successful case studies analysed set out to achieve IWRM. Rather they set out to solve particular water-related problems or achieve development goals by looking at water holistically within larger physical and development contexts.
- **IWRM is not a fixed prescription but an iterative process.** This means that the specific form IWRM takes will vary from country to country and from region to region. It also means that **IWRM is an inherently adaptive approach – one that can accommodate emerging challenges, constraints and changing social priorities.**
- **What tools from the IWRM arsenal are appropriate is highly context-specific.** Although certain tools such as water pricing and river basin organisations have come to be seen as pillars of IWRM, they are not appropriate in every situation and many of the successful examples of IWRM in practice do not include either.
- **How water is developed and managed must reflect country priorities (including environmental standards) and governance approaches.** Water management will not be successful if it is set up as a stand-alone system of governance separate from other structures of public administration.
- **IWRM includes both ‘hard’ and ‘soft’ components:** the infrastructure needed to harness water for productive use and protect from droughts and floods and the institutions and management interventions needed to: ensure its efficient use, mediate between competing users and uses, and safeguard the resource and the ecosystems that depend on it.

Where this pragmatic approach to water management has been applied, and a core of institutions has been established, resourced and supported to provide it, a wide range of positive development outcomes have followed.

This brief is part of series designed to offer practical policy guidance for those wishing to catalyze positive change in how water is developed, managed and used. This includes policymakers, water and related-sector professionals, NGOs and community organizations.

The brief is based on the book *Integrated Water Resources Management in Practice: Better Water Management for Development* edited by Roberto Lenton and Mike Muller of the Global Water Partnership Technical Committee and published by Earthscan with the GWP (2009). It also benefited from the discussion during the 2009 Stockholm World Water Week side session convened by the GWP; ‘A new vision for IWRM: Lessons from practical experience.’ A transcript of the discussion is available at [www.gwp.forum](http://www.gwp.forum).

To order a copy of the book, go to <http://www.earthscan.co.uk/?tabid=49404>.