INTEGRATED WATER RESOURCE MANAGEMENT

A NEW WAY FORWARD

A DISCUSSION PAPER OF THE WORLD WATER COUNCIL
TASK FORCE ON IWRM

WORLD WATER COUNCIL

INTEGRATED WATER RESOURCE MANAGEMENT: A NEW WAY FORWARD

A Discussion Paper of the World Water Council Task Force on IWRM[1]

Mark Smith
Governor, World Water Council
Member of the World Water Council Task Force on IWRM
Director – Global Water Programme, International Union for Conservation of Nature (IUCN)

Torkil Jønch Clausen
Governor, World Water Council
Chair of the World Water Council Task Force on IWRM
Senior Advisor, Global Water Partnership
Chief Water Policy Advisor, DHI Group

[1]This Discussion Paper will be used at IWRM-related sessions and the High-Level Panel at the 7th World Water Forum. Building on input received at the Forum, this paper will subsequently be developed into a World Water Council White Paper.

ACKNOWLEDGEMENTS

The authors are grateful for comments and feedback received on earlier drafts of this paper from colleagues in the World Water Council Task Force on IWRM, Tom Soo and Pierre-Alain Roche, as well as Mohamed Ait Kadi, James Dalton, Isabelle Fauconnier, Stefano Barchiesi and Afonso Do Ó.

Expectations for water resources management have been transformed over the last century. The engineer's hydraulic mission has been replaced by the mission of Integrated Water Resources Management. IWRM sets out to reconcile multiple, competing uses for water, with legitimacy attained through public participation, and with coordination and technical competence assured through specialised basin entities or agencies where they exist. Yet, still problems in water resource management accumulate faster than they are resolved.

Coalescence around the ideas underpinning IWRM emerged at global level from the United Nations Water Conference in 1977, with governments later committing, in 2002, to application of IWRM by developing IWRM and water efficiency plans. By 2012, more than 80% of countries had made good progress towards meeting this target, and yet IWRM, as the common and galvanising mission for water resources management is under scrutiny. Is there a deficit in real action on IWRM implementation?

Since Johannesburg in 2002, demands for change that leads to more effective, more efficient and more sustainable water resources management have only deepened. New vectors for water management have emerged, particularly climate change adaptation and the water-energy-food security nexus. These share the same mission as IWRM – and the pressing need to accelerate action that leads to solutions.

With the expected adoption of the SDGs, 2015 is a critical moment for re-evaluation of IWRM. A collective turning of backs on governments and stakeholders who have invested political, financial and social capital in IWRM is not a credible option. Instead, lessons must be learned and used to operationalise IWRM and to accelerate progress.

If there is a litmus test for the effectiveness of IWRM, it is that IWRM must lead to change. IWRM must make change in water management in complex social and political contexts manageable. The conventional change model for IWRM has been based on four practical elements: policies, laws and plans; an institutional framework; use of management and technical instruments; and investments in water infrastructure. National progress on IWRM has tended, as a result, to emphasise planning and reforms to policies, laws and institutions. While such change is necessary, it is never sufficient. IWRM has hence been criticised for under-emphasising pragmatic problem solving.

A change in mindset over expectations of IWRM will be very timely. An updated and forward looking agenda for IWRM – focused on operationalising adaptive strategies for change – will be instrumental in charting the actions needed to drive progress on both a possible dedicated SDG on water and water-related targets under other goals. Lessons from experience show that a revitalised agenda for IWRM, suited to the demands of implementation of the SDGs, will have to reconcile IWRM processes and pragmatic problem solving. Those leading and promoting change in water resources development and management or who are active in implementing management actions need to focus on helping and facilitating top-down and bottom-up to work in concert.

Hence, an agenda for operationalising IWRM as an adaptive strategy for change needs to combine four basic strategies:

- First, high-level policy and strategy setting to put in place, through dialogue and negotiation between key sectors and stakeholders, agreed, high-level priorities and goals for water resource development and management.
- Second, pragmatic problem solving that complements strategy setting, to meet stakeholder priorities at all levels, related for example to local water services, to water infrastructure or to ecosystem restoration. This delivers early wins, serves to empower stakeholders to take action and energises higher-level reform processes.
- Third, operating mechanisms are needed that bridge strategy setting and problem solving. These create the means for sectors and stakeholders to come together to negotiate and to work dynamically on integration, guided by high-level strategy but focused on action.
- Fourth, monitoring of progress and achievement of goals and targets, to provide and mobilise data and information that builds transparency, trust and accountability.

The post-2015 agenda for IWRM will need policies that raise the level of ambition for implementation, that focus on how to accelerate the rate of progress and to transition to a new state-of-play in which problems are solved faster than they accumulate, not slower. Without this, results will fall behind what is demanded from an agenda that the international community has developed in a series of steps over almost 40 years. The adoption of the SDGs should serve to galvanise a revitalisation of this agenda, in which IWRM policies and practice are based on adaptive strategies for change in water management for development. These must use lessons of what works and what does not work from across multiple levels and sectors to make changes demanded from IWRM more manageable with larger, more rapid and more tangible benefits.

1 The Pursuit of Water Management Fit for a Complex World

The gradual transformation in expectations for water resources management over the last century is well known to those working in the field. The old premise of the engineer's hydraulic mission was once accepted wisdom. When water infrastructure was built, and with rivers and variability in natural hydrology tamed, economic growth and development would follow. The people – or stakeholders as we like to talk about today – benefitted through lower risk, more wealth and better health. Costs borne or rights lost were assumed to be outweighed by the benefits received. All was made possible by centralised, top-down control of water resources development vested in government bureaucracies and justified by both the calls to action of political leaders and the technical certainty of experts. Today, the mission has changed. It is IWRM, Integrated Water Resources Management. IWRM sets out to reconcile multiple, competing uses for water, with legitimacy attained through public participation, and with coordination and technical competence assured through specialised basin entities or agencies where they exist. Yet, still problems in water resource management accumulate faster than they are resolved.

Coalescence around the ideas underpinning IWRM emerged at global level from the United Nations Water Conference in 1977, where the Mar del Plata Action Plan was adopted. The International Drinking Water and Sanitation Decade followed, but the Action Plan called for national action on water resources management with the aim of securing the highest possible level of national welfare. Water strategies today continue to strongly echo the critical priorities set out in 1977, for planning that accounts for improvements in irrigation, prevention of land and water degradation, multipurpose development of hydropower infrastructure, industrial water use, inland navigation, pollution control, flood and drought prevention, and the protection of ecosystems. Governments agreed in Mar del Plata on the need for effective participation in planning and decision making and for national policies, legal frameworks and institutional arrangements that ensure coordination in the development and management of water resources. They called for mobilisation of community action, water resources assessments, the sensitisation of lawmakers and better flow of information on water to the public. The basic building blocks for the actions that will make us better at water resources management were articulated in 1977.

As basic precepts for water management, they remain relevant today. As the Sustainable Development Goals (SDGs) are negotiated in 2015, potentially including the proposed dedicated water goal, we must not waste momentum on trying to re-invent them.

Since Mar del Plata, the Dublin Principles of 1992 have become familiar as the guiding principles for IWRM. There is, as a result, a widespread interpretation that IWRM is expected to combine:

- *Principle 1* – that fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment
- *Principle 2* – that water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels
- *Principle 3* – that women play a central part in the provision, management and safeguarding of water, and
- *Principle 4* – that water has an economic value in all its competing uses and should be recognized as an economic good.

The Dublin Principles, together with the Mar del Plata Action Plan, were then the basis for the call in Agenda 21, at the 1992 UN Conference on Environment and Development in Rio de Janeiro, for integrated water resources development and management. By 1996, the Global Water Partnership (GWP) was established to foster IWRM, which in 2000 provided a definition (GWP, 2000):

> *"IWRM is a process which promotes coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems."*

At the World Summit on Sustainable Development in Johannesburg in 2002, governments then agreed again, this time to develop IWRM and water efficiency plans by 2005 (Jønch Clausen, 2004). This completed, over the course of 25 years from 1977 to 2002, progression from a call for action to commitments by governments to application of IWRM.

By 2012, more than 80% of countries had made good progress towards meeting this target (UNEP, 2012). They have IWRM plans in place and yet IWRM, as the common and galvanising mission for water resources management is under scrutiny. International processes, over the course of decades, have championed IWRM as the solution to the overwhelming need for sustainable and equitable development and management of water resources. However, does IWRM deliver? Can IWRM as it is currently understood and acted upon achieve the changes needed to solve water resource problems fast enough – in fact faster than these problems accumulate? Has the journey from call to action in Mar del Plata, to Principles in Dublin and then planning in Johannesburg left countries around the world facing a deficit in real action on IWRM implementation?

Since Johannesburg in 2002, demands for change that leads to more effective, more efficient and more sustainable water resources management have only deepened. Climate change impacts are strengthening and are felt principally through impacts on land and water. The need to align stakeholders and sectors to manage water resources coherently and to respond to long-term change and increasing variability and extremes is growing as a result. The slack in the system – through which it was possible to get away with water management that was ill-coordinated and fragmented among sectors – is disappearing. Integrated management of water resources is therefore not only a key to climate change adaptation and to building climate resilience (IPCC, 2001), but also to ensuring that the main water users and water-dependent sectors are able to work together on solutions to competition for water supplies that are tightening relative to growing demand.

The concept of the water-energy-food security nexus, which emerged through the Bonn Conference in 2011, brings focus to the imperative of translating diagnostics for problems into real action, of moving beyond IWRM as a water-centric undertaking and motivating active ownership and engagement of the key water-dependent sectors (Hoff, 2011). The challenge that the nexus presents to IWRM is to work truly 'out of the box' by building a shared agenda with the energy and food sectors, including in relation to inter-dependencies on ecosystems, and to prove its effectiveness by focusing on results. The water-energy-food security nexus and IWRM, together with adapting to climate change, share the same mission – and the pressing need to accelerate action that leads to solutions.

In 2015 we will see the next great global set of commitments to sustainable development adopted, in the form of the Sustainable Development Goals (SDGs). It is critical moment for re-evaluation. The challenge that must be faced is to meet the expectations of countries who have adopted – at levels from communities through to the highest policy-making tables – IWRM as the defining mission for water resources development and management. A collective turning of backs on the governments and stakeholders who have achieved these steps is not a credible option. Lessons on how to implement IWRM through action must be learned and used to operationalise IWRM and to accelerate progress. If the current practice of the IWRM mission is not quite right, now is the time make the changes needed for IWRM to deliver the outcomes expected. Otherwise, any SDG on water, or water-related SDG target, will end up out of reach.

2 Application of IWRM: Learning the Lessons

High school students of chemistry learn that water is a very simple substance, an elegant molecule with properties that make it vital for all life, but one without substitute in households and industry, and across the global economy. It is a unique resource, and need for it is ever-present. On the flipside of its chemical simplicity is ubiquitous demand that makes water socially and politically complex. Viable solutions for water resources management must work systemically. They must attempt to satisfy the needs of multiple, competing users while safeguarding human rights and gender equity. They must solve water problems in communities and watersheds, in national development, and across sub-continent-sized river basins and economic blocs. Sustainable solutions need to conserve both biodiversity and the capacity of ecosystems to store, clean and regulate the continual renewal of water supplies. Managing water through 'integration' demands means for negotiation of trade-offs and coordination among users – including among key sectors such as agriculture, fisheries, energy, water supply and sanitation, and environment – and across scales, from local to national to regional. Integration in IWRM must work horizontally as well as vertically (Figure 1).

It must also solve problems. If there is a litmus test for the effectiveness of IWRM, it is that IWRM must lead to change. IWRM must make change in water management in complex social and political contexts manageable.

For Ait Kadi (2014), IWRM is a process. It does not offer a blueprint that can be exported from one place to another but, Lenton and Muller (2009) argued, there are features of IWRM that are common to all contexts. Based on GWP's definition, IWRM must deliver change that leads to water resources management that is economically efficient, equitable and environmentally sustainable.

GWP (GWP 2000) introduced three practical elements that have shaped the agenda on IWRM since 2000:

- a strong enabling environment – policies, laws and plans that put in place 'rules of the game' for water management that use IWRM
- a clear, robust and comprehensive institutional framework – for managing water using the basin as the basic unit for management while decentralising decision making
- effective use of available management and technical instruments – use of assessments, data and instruments for water allocation and pollution control to help decision makers make better choices

to which Lenton and Muller (2009) added:

- sound investments in water infrastructure with adequate financing available – to deliver progress in meeting water demand and needs for flood management, drought resilience, irrigation, energy security and ecosystem services.

Transboundary basin

Nation

Tributary/Basin

Sub-basin

Watershed

(Figure 1).

The UN Status Report on Integrated Approaches to Water Resources Management (UN, 2012) assessed implementation of IWRM against these issues. Measures of progress were strongest in relation to governance reforms, institutional improvements, use of water resource assessments, and awareness of the need to accommodate multiple uses in water resource planning. Progress was assessed as weaker, especially in the poorest countries, in relation to overcoming constraints on financing for development of water resources, infrastructure development and coordination among sectors, and application of management instruments (eg. water allocation, pricing, demand management, environmental impact assessment among others).

It is in these countries that a solutions-oriented agenda for IWRM, focused on priority problems, is most badly needed, as in many cases IWRM has been driven more by donor needs than local demand.

National progress has hence tended to emphasise reforms to policies, laws and the institutional framework for water resources management. While such reforms may be viewed as lacking concrete outcomes, they do bring benefits that help countries resolve complex challenges in water management (Case 1).

Case 1

Morocco's Experience of Water Sector Reforms (Ait Kadi, 2014)

Morocco adopted a new water law in 1995 that provides a comprehensive framework for the integrated management of water resources. Mutually reinforcing policy and institutional reforms have followed, alongside development of a long-term investment programme. Major reforms include:

- implementation of a new institutional framework to promote decentralised management and increased stakeholder participation
- adoption of a long-term strategy for IWRM through the National Water Plan, as a framework for investment until 2020 and the vehicle for prioritising changes in management
- introduction of economic incentives for water allocation through rational tariffs and cost recovery
- establishment of monitoring and control of water quality to reduce environmental degradation, and
- capacity enhancing measures to reduce institutional constraints on water management.

Morocco now has in place a High Water and Climate Council as an apex body for strengthening coherence in water-related policies and programmes and for the creation of river basin agencies.

Below this, at sectoral-level, Morocco has for example irrigation agencies that integrate water supply with the provision of production-related services for farmers, enabling promotion of the efficient use and allocation of water alongside support for improving water productivity and farm output.

River basin agencies are being progressively empowered to enact decentralised and participatory resource planning, co-fund conservation and watershed protection projects, enforce user-pays and polluter-pays policies and develop aquifer management strategies. The pace and scope of these reforms have run in step with the wider political and cultural changes occurring within the country related to the progress of democracy and distributed governance. Reform processes take considerable time as a result, but in Morocco they have succeeded in enabling the country to make significant capital investment in infrastructure needed to maximise development of surface water resources and their use for irrigated agriculture, potable water supplies, industrialisation and energy generation. More major infrastructure projects are at advanced stages of planning and construction to exploit the remaining, untapped surface waters by 2020. With the infrastructure development phase nearing its end, Morocco is now shifting to the difficult task of ensuring socially equitable, technically efficient and sustainable allocation of water resources among competing user groups.

Changes called for in the Mar del Plata Action Plan from 1977 are occurring and progress is being made, but slowly. Change is slowest where it is needed most, in the least developed countries. From the vantage point of many observers, however, implementation of IWRM appears entangled in technical and institutional intricacies rather than embedded in problem solving. To bolster progress, a shift in gears on IWRM implementation is needed. The demands and expectations of countries that have taken the initiating steps called for in IWRM – including governance reforms, participation and integration in planning – will have to be met. Change must become more manageable with larger, more rapid and more tangible benefits from water management for economic development, welfare and ecosystems.

Many observers have drawn similar conclusions. Merrey (2008) argued that IWRM provides a systems framework for improving understanding of the interdependencies of people, ecosystems and hydrology that is useful although too "broad and fuzzy". As a concept, IWRM provides a shared mapping of the landscape of issues to be addressed in water management. Many critics of IWRM however, including Merrey and Giordano and Shah (2014), have been concerned that along the way – and despite assurances to the contrary by proponents – IWRM has become increasingly perceived as an end rather than a means, as a blueprint with set features to be emulated. Critics of IWRM do not, in general, argue against the need for water management that integrates across sectors and scales.

Their perception is that in its current direction of travel, IWRM prioritises principles and process – and even the 'brand' of IWRM – over practical action and pragmatic problem solving. Reconciling process and pragmatism is hence key to a future agenda for IWRM that will build on what has been achieved to date but have more impact. Fortunately, this is also key to making change in complex environments more manageable.

With pragmatic problem solving under-emphasised, implementation of IWRM, according to Shah and van Koppen (2006), has been left over-reliant on a relatively standard package of top-down reforms: the development of a national water policy, a water law and regulatory framework, recognition of the river basin as the unit of water planning and management, creation of river basin entities, development of pricing mechanisms for water, creation of water-use rights, and promotion of participation in water resources management.

This has led to the perception of IWRM by some as increasingly technocratic. Such reforms are necessary, but they are never sufficient. As Butterworth et al. (2010) argued, they need to be complemented with actions to solve problems that are rooted in local realities and that address critical priorities. This makes deployment of a "comprehensive list of integrated solutions", which critics sometimes highlight as an expectation of IWRM, impossible in practical terms (Merrey, 2008). As Butterworth et al. called for, pragmatic so-called 'light IWRM' will better need practitioners' needs than an idealised, normative 'full IWRM'. To move forward, a renewed agenda is needed in which IWRM is equated by policy makers and by practitioners from multiple sectors, and by stakeholder groups in civil society and public and private sector, to adaptive strategies for change in water management.

3 Catalysing and Guiding Change in Water Resources Management

A change in mindset over expectations of IWRM will be very timely. With the anticipated adoption in 2015 of the SDGs and therefore the launch of a new global framework of priorities for sustainable development, it will be crucial for action on water resources management to rapidly accelerate the transformations that were broadly envisaged in Mar del Plata and further elaborated since then. An updated and forward looking agenda for IWRM – focused on operationalising adaptive strategies for change – will be instrumental in charting the actions needed to drive progress on both a possible dedicated SDG on water and water-related targets under other goals. There are experiences and lessons – good and bad – from IWRM and from mobilising change in water resources management that should inform a revitalised agenda for IWRM.

Water resource management problems are characterised by having influences across multiple scales and the involvement of multiple stakeholders with competing needs and objectives. There are, unavoidably, layers of uncertainties and unknowns, because of inadequate data but moreover the impossibility of assessing all effects of water across all uses and scales. There are imbalances in power among stakeholders and decisions on water resource allocation, development, management and protection have inherently political dimensions. Lessons on how to activate change from within such systems should guide IWRM as an adaptive strategy for change. In her Nobel prize-winning work, which originated from research into groundwater management, Elinor Ostrom demonstrated that adaptive governance of natural resources is more effective in achieving beneficial change where decentralized, self-organising institutions are rich in information and empowered to make decisions on collective action through dialogue and deliberation (Dietz, Ostrom and Stern, 2003).

Experience from organizational change in business also provides clues on how to manage change adaptively. For example, Kotter (1996) set out eight critical elements for successfully managing change in organizations.

These build from creating a sense of urgency and convening a coalition of champions through to empowering people to take action and embedding change in new cultures. In either setting, re-orienting and reshaping a system from within is more successful where efforts are made to help people re-learn expectations and norms, supported by data, communications, empowerment and learning-by-doing.

Butterworth et al. (2010) argued that aspirations for water resources management and development are better served where IWRM focuses on practical problem solving as entry points. Stakeholders and various sector interests then collaborate to negotiate solutions to tangible, shared problems related for example to reconciling water resources development options, water allocation, pollution or ecosystem restoration. Problem solving lends itself more easily to bringing immediate results from integration and hence to providing returns on the investment by stakeholders of time and resources in working jointly with other water users on water management. Results-on-the ground then spur and reinforce institutional change at higher levels (Case 2).

Case 2

Problem solving as a springboard for IWRM implementation in Nigeria (Smith and Cartin, 2011)

The Komadugu Yobe river basin covers parts of semi-arid northern Nigeria and south-eastern Niger, upstream of Lake Chad. Severe drought is a frequent hazard and there is deep poverty in the basin, made worse by severe degradation of the river caused by a 35% decline in flow because of the compound effects of the construction of the Tiga and Challawa Gorge dams since the 1970s, abstraction of water for large-scale irrigation and regional drying of the climate. Farming, fishing and livestock-based livelihoods have been devastated as a result. To compound these problems, the six federal Nigerian states of the basin were unable to coordinate development of water resources. By the mid-2000s, damage to the river and its ecosystem services had left communities less able to cope with drought and facing rising conflict over resources.

To begin to address these problems, the Nigerian Federal Ministry of Water Resources working with a coalition of partners supporting implementation, initiated interventions along a set of parallel tracks. Results from a basin water audit were disseminated to make transparent the depth and severity of the water crisis in the basin and to ensure that all stakeholders had access to and shared the same information. Concurrently, pilot projects were launched to solve problems on the ground and deliver livelihood benefits for communities.

These included piloting of actions such as clearing of aquatic weed infestations that were blocking the river flow, dredging channels, improved flood early warning and conflict resolution. To address the absence of coherent and coordinated basin management institutions, State IWRM Committees were formed in each state in place of formerly fragmented responsibilities for water resource management. This facilitated convening of dialogues at basin level that spurred multi-stakeholder negotiation of a Catchment Management Plan based on consensus over a set of nine Strategic Actions required for basin restoration and sustainable development of water resources. Pilot actions focused on priorities in the emerging Management Plan and results helped to build consensus. By 2006, water conflicts reaching court had fallen by 90%.

The changes achieved and improved consensus led to the announcement by President Olusegun Obasanjo at a summit of State and Federal governments in 2006 of a $125 million Trust Fund to support restoration of the Komadugu Yobe basin. In 2008, the Nigerian IWRM Commission was set up to apply the lessons from the basin to IWRM implementation nationally.

Local problem solving by itself cannot deliver results on the scale needed for improvements in water resources management to eventually outpace the accumulation of water resource problems. It does however play an instrumental role in making adaptive change strategies operational.

Local results provide early wins that strengthen support for and confidence in changes needed at higher levels for more widespread impacts to be achieved, including through changes to policies, laws and institutions (Butterworth et al., 2010; Smith and Cartin, 2011).

They also affirm to stakeholders that, despite the time demands of working jointly with other stakeholders and the difficulties involved in negotiating resolutions for example to competing uses, integration yields benefits.

Solving local problems also provides opportunities for stakeholders to trial solutions, adapt and learn, while helping to build consensus (Case 3 and Case 4).

Case 3

Solving problems in the La Poza micobasin, El Salvador (Hernández, 2012)

The La Poza microbasin is situated on the Pacific coast in south-western El Salvador, with an area of just 10.4 km^2. Communities in La Poza faced indifference from national institutions and low capacities at local level to address the effects of deforestation, soil erosion and pollution on water resources. Beginning in 1999 and in the absence of a national legal framework for implementation of IWRM, existing community organisations created a Microbasin Management Committee with support from training provided by the Foundation of Municipalities of El Salvador. The Committee was able to negotiate payments for ecosystem services with downstream Water Boards to create a source of financing for local water resource management projects. Alongside these steps, participation of local people was encouraged both through training in leadership, environmental awareness and watershed management and through demonstration of slope stabilisation, re-vegetation and installation of infiltration wells.

In 2004, community leaders led a process to elaborate a management plan for the microbasin and build consensus among community members on the problems, needs and priorities for management of the microbasin. The plan was validated by local municipalities through workshops in the community and the Management Committee was established as a legal entity able to raise and manage funds for implementation projects. By 2008, indifference from higher levels and lack of local capacity had been overcome, with local actors implementing projects to conserve forests and vegetation in the upper watershed and enhance water infiltration, leading to improved resilience to storms and improved availability of water in dry periods.

Case 4

Overcoming top-down inertia in the Jordan Valley, Jordan (Abu-Elseoud et al., 2007)

Damya village was relocated after the 1967 Arab-Israeli war away from its previous location on the banks of the River Jordan to a dry desert landscape. In its new location, despite being just 3 km from the King Abdullah irrigation canal, Damya had no water supply for irrigation. Drinking water was diverted to livestock watering and garden irrigation, cutting each individual's annual allocation of drinking water by 60%. A local community-based organisation (CBO) thought that the solution lay in development of a new irrigation scheme. They repeatedly asked politicians to put pressure on the Jordan Valley Authority to correct this problem by connecting the Damya to the King Abdullah canal but, over the course of a decade, without success.

With help from a regional water governance project, the CBO in Damya tried a different approach, beginning in the mid-2000s.

They facilitated a process in which all village households took part in analysis, visioning and scenario building to develop a strategic plan for local water resources. This generated accurate data on water use and allocation in the village and a clear indication of needs. Villagers realised that the old idea of a new irrigation scheme, pursued for a decade or more, would not solve their problems. They needed irrigation water to be distributed to all households, for livestock watering and gardens. Otherwise, drinking water availability would not change. A CBO leader commented, "There was a change of perspective from what we considered to be best for the village to what the village decided was best." With consensus behind them and data in hand, villagers were able to present their case to officials and develop a more open and transparent relationship with government agencies, leading to agreement by the JVA to connect Damya to the irrigation canal.

Local action cannot take place in a vacuum, or else opportunities for informing and influencing wider scale change in water management will be missed. Implementing IWRM hence creates opportunities to combine local action with reforms to national water policies, the legal and regulatory framework and development of institutions at various levels, including at the regional and transboundary level. Top-down and bottom-up should work in concert. Features critical to activating change, as championed in the work of Elinor Ostrom, then emerge.

IWRM that combines higher level reforms with pragmatic problem solving helps to catalyse change in two directions. In IWRM implementation, processes of reform to policies, laws and institutions are typically accompanied by convening of different sectors and stakeholders in local and national forums for consultations on reforms and to support the preparation of IWRM strategies and plans at national and basin levels (GWP, 2004).

If reforms incorporate development or strengthening of local-level institutions – for example water user associations or sub-basin forums – and if there are effective mechanisms for representation of stakeholders at higher levels, then higher-level reforms create the means to empower stakeholders to take action. Without such linkages across scales, however, IWRM is liable to remain aloof from resolving issues that motivate stakeholders. Integration across scales is likewise critical for ensuring that lessons from local action and early wins provide fuel for reform processes, and for scaling up successful implementation. Such vertical integration is hence critical for implementing IWRM as an adaptive strategy for change (Case 5).

Case 5

Catalysing change in the Volta basin (Smith and Cartin, 2011)

Communities on either side of the White Volta, in Burkina Faso and Ghana, share a river, but up until the mid-2000s they could not easily cooperate in managing local water resources. Responding to local conflicts was in the hands of the Ministries of Foreign Affairs, in the capitals. To address this, the 'Improving Water Governance in the Volta Basin' (PAGEV) project, working in concert with others, facilitated the formation of water management committees that linked communities across the border alongside national-level committees and stakeholder forums. The project helped the two governments to re-establish a joint technical committee and to negotiate a joint Code of Conduct for the basin, while also supporting the negotiation of the 6-country Convention on the Status of the Volta River, which was signed in 2007 and led to the formation of the Volta Basin Authority (VBA).

At the local level, to complement institutional change, the project supported livelihoods projects along the White Volta with the aim of both demonstrating IWRM at local level and building trust and capacity. Re-vegetation of 45 km of degraded river banks along the White Volta was completed, using fruit trees and fuelwood species to combine both riverbank restoration and livelihood benefits.

Rehabilitation of a small, off-stream dam was completed to capture water for small-scale irrigation of dry season cropping and watering cattle. These projects, and others such as the construction or rehabilitation of wells in six villages on either side of the frontier, were implemented in partnership with local community-based organisations. Participating communities were also given training in setting up and running management committees for their projects, including management of finances for continuing investment and maintenance. The pilot projects thus built links between livelihood benefits and participation in decision making over management and development of water resources. These activities contributed to improving incomes for participating households by US$ 90–180 per year.

By 2010, together with other organisations, the project was contributing to the finalisation and process for stakeholder endorsement of the first Strategic Plan for the VBA, which incorporated the strategy of using joint actions between local stakeholders and higher-level platforms to catalyse change needed for the implementation of IWRM.

The purpose of combining local action with higher-level reforms is not to turn IWRM into a mosaic of fragmented, on-the-ground problem solving. Such an approach would be destined to produce only small-scale, fragmented results. Its larger purpose is to help mobilise critical elements of change processes needed for IWRM implementation, including learning-by-doing, empowerment to take action, and re-learning of expectations and norms. By design therefore IWRM implementation will invariably be a messy, noisy process in which stakeholders are trialling solutions, negotiating choices and moving upwards and downwards between levels and sectors, carrying and brokering information, lessons, ideas and proposals. Lankford and Hepworth (2010) said that IWRM should function like a bazaar not a cathedral. They meant that progress emerges from highly dynamic, interactive exchange and negotiation among the sectors and scales that need to integrate, rather than from the cool and quiet of top-down deliberation. Grand technocratic coordination is hence inconsistent with operationalising IWRM, because change in politically and socially complex systems, as in the case of water, needs different tools.

It would be wrong, however, to mistake operationalisation of IWRM through adaptive change for disorganisation. Roles and responsibilities must be allocated appropriately among levels. A revitalised agenda for IWRM will need structures which serve facilitation of change rather than coordination. Responsibilities vested at national level relate to setting up goals, policies, strategy, institutional mandates, regulatory frameworks and incentives and to allocating for example financial resources. Some of these responsibilities may be taken up at transboundary level, depending on agreements between states. The focus at these levels is on enabling and empowering the levels below to take action (Iza and Stein, 2009). Action is then implemented at the most appropriate level below. For example, responsibility for basin planning, large infrastructure development and operation, monitoring and management of data, regulatory processes and approvals is often in principle most appropriately situated at the basin level. The focus at smaller scales is on action to address local priorities for water services, operations and maintenance for small-scale infrastructure, local agreements for dispute resolution and allocation among users (Case 6).

Case 6

Integrating water resources management across levels in Mekong basin

The Council of Ministers of the Mekong River Commission (MRC) sits at the top of the hierarchy for integrated management of the Mekong basin and brings together Ministers of the four countries of the Lower Mekong, Cambodia, Lao PDR, Thailand and Vietnam, as well as high-level representatives of the Dialogue Partners China and Myanmar. The Council has adopted an 'IWRM-based Basin Development Strategy' to guide the Basin Development Plan (BDP) for joint development efforts in the basin. In turn, the BDP is supported by and articulated with IWRM strategies and plans at lower levels: the national level; basins and tributaries at provincial level; and at sub-basin and district levels. Dialogues among stakeholders in formal or informal committees help to shape actions that contribute to development and management of water resources at each level. Implementation actions take place through national, provincial and district authorities, including regulation and infrastructure development at basin and sub-basin levels, or in thousands of small watersheds, such as water quality regulation, flood protection measures, local water supplies, small-scale hydropower and irrigation dams etc.

The four Lower Mekong countries have all included references to IWRM in their national policies, with National Mekong Committees put in place as a platform for cross-sectoral dialogue. The institutional arrangements in the Mekong basin hence cater for both vertical and horizontal integration. Basin and sub-basin committees draw members from the public sector (including across sectors between key ministries), the private sector and civil society. Hundreds of dams, mostly for hydropower production, are currently being planned and built on the tributaries of the Mekong and even a few, very controversially, on the mainstream. They are mostly being planned, built and operated by private developers, with the focus of stakeholder dialogues increasingly on getting the private sector to the table at all levels.

In keeping with the importance to IWRM of dynamic, interactive processes of negotiation – and in contrast to the perception that IWRM has the effect of sidelining politics – space at each level for political engagement is crucial. Arrangements for water governance put in place the institutions, instruments, platforms and mandates needed at each level, but the energy to move forward – and sometimes backwards - is driven by politics. As many commentators point out repeatedly, water resource development and management is inherently political. IWRM is more successful in galvanising change where there is debate and negotiation, whether it involves local actors focused on finding local solutions or national leaders formulating agreement of overarching strategy or agreements among riparian states. Rather than stifling political engagement, an agenda for operationalising IWRM through adaptive strategies for change puts in place mechanisms for facilitating debate, negotiation and collaboration (Smith and Cartin, 2011). Certainly, these must be supported in ways that promote fairness and safeguard rights. And, as mechanisms for making IWRM operational, they must integrate – both horizontally and vertically – by bringing together sectors and by making sure that representation of stakeholders spans levels, upwards and downwards.

A revitalised agenda for IWRM, suited to the demands of implementation of the SDGs, will have to be better at making change manageable. Experience of reconciling IWRM processes and pragmatic problem solving does exist. It tells us that those who are leading and promoting change in water resources development and management or who are active in implementing management actions need to focus on helping and facilitating top-down and bottom-up to work in concert.

Hence, an agenda for operationalising IWRM as an adaptive strategy for change needs to combine four basic strategies:

- First, high-level policy and strategy setting to put in place, through dialogue and negotiation between key sectors and stakeholders, agreed, high-level priorities and goals for water resource development and management. These set the direction and the enabling environment at national or basin levels, using reform processes familiar from IWRM.
- Second, pragmatic problem solving that complements strategy setting, to meet stakeholder priorities at all levels, related for example to local water services, to water infrastructure or to ecosystem restoration. This delivers early wins, serves to empower stakeholders to take action and energises higher-level reform processes.
- Third, operating mechanisms are needed that bridge strategy setting and problem solving. These create the means for sectors and stakeholders to come together to work dynamically on integration, guided by high-level strategy but focused on action – they are where we find the bazaar at work on water.
- Fourth, monitoring of progress and achievement of goals and targets. Data and information builds transparency, trust and accountability and helps actors at all levels to align to a shared vision.

4 Updating IWRM: the Next 15 Years

Progress has been made on the action agenda for water that governments agreed in 1977 in Mar del Plata, and followed up in the years since, but the challenges for water resources development and management have not been static. A global action agenda on water must be forward looking, not backward looking. It must make use of what has been learned since, including how meeting objectives for sustainability draws upon the inter-dependencies of economic growth, health, equity and poverty reduction, education, ecosystem services, energy and food security and water resources. It must accommodate and address the new vectors for change in water management that have emerged or intensified since 1977. These include climate change, the challenges of the water, energy and food security nexus, demographic change and a global population expected to reach 9 billion by the middle of the 21st century, and calls for the greening of growth.

Adoption of the SDGs – whether or not they include a dedicated goal on water or even a target on IWRM – will put pressure on IWRM to deliver more tangible progress more quickly. The post-2015 agenda for IWRM will need to catalyse change. The high-level reform processes emphasised in the preceding decades and strategy setting have been necessary but not sufficient. The opportunity now, building on the experience of practitioners, is to re-balance IWRM by using pragmatic problem solving to address stakeholders' priorities. The key will be the operating mechanisms for IWRM that bridge the gap between the two. These need to foster debate, negotiation and collaboration, to enable sectors and stakeholders in civil society and public and private sector to build coalitions, communicate vertically and horizontally, and use the lessons from learning-by-doing to energise more widespread and more rapid change.

The SDGs provide a new opportunity to re-think the operating mechanisms for IWRM, to check what arrangements are most suited to IWRM as an adaptive strategy for change. With emphasis before now on reform processes and IWRM planning, the operating mechanisms for IWRM have often been structured using a water-centric and predominantly linear process for promoting change: with an enabling environment in place, priorities were set through IWRM planning and implementation actions were then envisaged to be coordinated at basin and local level. With new vectors for change in water management at work, and with climate change in an increasingly uncertain world, a wider mix of operating mechanisms will be necessary in the post-2015 agenda for IWRM. Ownership of and involvement in IWRM needs to extend beyond the water box and proactively include key water dependent sectors. Formalised institutions for water management will continue to play an important role, but alongside less formalised and perhaps transient platforms for negotiation and collaboration. These might be led by other sectors – particularly sectors which are major, large-scale users and managers of water, such as the energy sector or agriculture sector – or under non-water policy processes, such as climate change and disaster risk reduction. Under such operating mechanisms, actors may come together across sectors and scales to solve specific, shared problems before returning to their respective, conventional operations. Basin organisations or other water institutions may also lead, or play a supporting and facilitating role. However, if these operating mechanisms are guided by and working towards an overarching national or basin-level water strategy then they will provide an impetus for genuine cross-sectoral integration and problem solving (Case 7 and Case 8).

Case 7

Solving problems in the water-energy-food nexus in the Huasco basin, Chile (Latorre C, perscomm, 2015)

The Huasco river flows through the Atacama desert on the Pacific coast of Chile, one of the driest regions on Earth. Mining and irrigated agriculture are the mainstays of the economy in the basin. Both depend on water from the river. Competition for water creates substantial risks for both sectors, as well as municipalities in the basin and biodiversity in downstream wetlands. Residents of the basin have been concerned that the Huasco river may suffer the fate as the neighbouring Copiapó river, which after receiving no rainfall for 10 years has dried up because of mining and abstraction for agriculture.

In response to the expanding risks to water resources in the basin and beginning in 2007, the *Juntas de Vigilancia del Rio Huasco* (JVRH), the basin management institution, was reorganised. Originally set up in 1908 to manage irrigation canals, the JVRH was given jurisdiction over the Huasco river and tributaries, from glacial headwaters and mountain lakes down to the mouth of the river, with responsibility to manage three reservoirs. Through highly contentious and difficult consultations, a new structure was agreed for the reformed JVRH, with a Board of Directors that included representation from the irrigators, the mining company and municipalities.

The JVRH had the task of finding ways to manage allocation of water for multiple uses. Around the same time, the mining company invested in a 'water fund' to support improvements in infrastructure for irrigation and in agricultural water management. The Board of the JVRH provided a platform, as a result of these changes, for negotiation among the main water users in the basin and for collaboration in making improvements to water management and allocation, including by trading of water use rights. With the efficiencies gained in water allocation and use, not only was competition among sectors reduced, but the savings in water made it possible to install a turbine at the outlet of the Santa Juana reservoir. The hydroelectric plant sells power to local communities and is 75% owned by the JVRH. Collaboration among the water, agricultural and mining sectors has improved water security for everybody, made new energy generation possible, and kept water flowing in the river.

Case 8

Lengthening the odds on water crisis in southern Nevada, USA through collaboration (Marshall, 2014)

The population of southern Nevada, including the city of Las Vegas, is expected to increase by close to 1 million people by 2050. Nevada's share of water from the Colorado river of 370 Mm^3 annually is already insufficient to meet urban water demands. To address this challenge, the Southern Nevada Water Authority (SNWA) is implementing a programme that combines: aggressive measures for water conservation, development of flexible water-use agreements, and forging of partnerships among the regulatory authority, public sector, businesses and NGOs to collaborate on solutions. The SNWA is using these partnerships and collaborations to develop alternate water supplies.

They have put in place arrangements to purchase or lease surface water rights along the Virgin and Muddy rivers, which drain into Lake Mead, above the Hoover Dam. SNWA's acquisitions of water rights amount to 38.5 Mm^3 per year, from willing sellers, with roughly one-third related to irrigation of land that was no longer used for production. Water is left in the river and water elevations maintained in Lake Mead. Collaboration and trading arrangements yield benefits for the environment and the security of water supplies to Las Vegas as a result, as well as income for irrigators and assistance with the management of downstream hydropower generation.

5 Policy for IWRM Implementation and the SDGs

The post-2015 agenda for IWRM will need policies that raise the level of ambition for implementation, that focus on how to accelerate the rate of progress and to transition to a new state-of-play in which problems are solved faster than they accumulate, not slower. Without this, results will fall behind what is demanded from an agenda that the international community has developed in a series of steps over almost 40 years. The adoption of the SDGs should serve to galvanise a revitalisation of this agenda, in which IWRM policies and practice are based on adaptive strategies for change in water management for development. These must use lessons of what works and what does not work from across multiple levels and sectors to make changes demanded from IWRM more manageable with larger, more rapid and more tangible benefits.

Four practical elements have shaped the agenda on IWRM since 2000: putting in place enabling policies, laws and plans; setting up the institutional framework; application of management and technical instruments; and investment in infrastructure. Fifth and sixth elements should be incorporated into this list:

- effective strategies for dynamically catalysing and managing change at all levels – facilitation of processes for social learning, supported by data, communications and empowerment to take action to solve problems and learn-by-doing, which work with and reinforce reform processes and investments
- operating mechanisms that bridge strategy setting and problem solving – platforms that enable sectors and stakeholders to come together to negotiate, coordinate, collaborate and jointly innovate.

Experience has repeatedly demonstrated that successful IWRM demands both vertical integration across levels, from local to transboundary, as well horizontal integration across sectors at all levels. Based on experience of how to work effectively across levels and emerging examples of problem solving among sectors in the water-energy-food security nexus, policies to increase and accelerate benefits from IWRM should incorporate:

- promotion of strong, high-level political engagement to mobilise and convene sectors, enabling them to agree strategies and build oherence among sectoral policies
- creation or reinforcement of operating mechanisms for IWRM in which stakeholders working at different levels and/or different sectors can come together to negotiate and to jointly plan and agree actions and investments to solve problems, supported by dynamic, visionary leadership
- support for joint problem solving by sectors and stakeholders through data and assessments that demonstrate what is at stake for each, removal of barriers to joint working on problem solving and putting in place incentives that are appropriate for each, and
- active promotion and investment in demonstrations of practical problem solving, to address stakeholders' priorities and galvanise constant learning-by-doing, with effective knowledge brokering mechanisms in place that ensure that demonstrations directly inform and reinforce reform processes.

Finally, to assist with the transition from policy-making to action on the ground, strategies are needed that activate the formation and mobilisation of coalitions of organisations – in civil society, public and private sectors – able to play the role of facilitator by convening across sectors and brokering representation, communication and action across scales. The role of such coalitions is easily overlooked in conventional strategic planning and programme design, but they are vital for catalysing change in the complex, multi-level, multi-sector and multi-stakeholder world in which water management takes place.

Abu-Elseoud M, Al-Zoubi R, Mizyed B Abd-Alhadi FT, de la Harpe J, Schouten T. 2007. Doing Things Differently: Stories About Local Water Governance in Egypt, Jordan and Palestine. Inter-Islamic Network on Water Resources Development and Management, Amman, Jordan.

Ait Kadi M. 2014. Integrated Water Resources Management (IWRM): the international experience. pp 3- 15, in: Martinez-Santos P, Aldaya MM, Ramón Llamas M (editors), Integrated Water Resources Management in the 21st Century. CRC Press, London.

Butterworth J, Warner J, Moriarty P, Smits S, Batchelor C. 2010. Finding practical approaches to Integrated Water Resources Management. Water Alternatives 3, 68-81.

Dietz TE, Ostrom E, Stern PC. 2003. The struggle to govern the commons. Science 302, 1907-1912.

Giordano M, Shah T. 2014. From IWRM back to integrated water resources management. International Journal of Water Resources Development 30, 364-376.

GWP. 2000. Integrated Water Resources Management. TAC Background Paper No. 4. Global Water Partnership, Stockholm.

GWP. 2004. Catalyzing Change: A Handbook for Developing Integrated Water Resources Management (IWRM) and Water Efficiency Strategies. Global Water Partnership, Stockholm.

Hernández S. 2012. El Salvador: Development of Community Participation in the microbasin La Poza. IWRM Case Study #343. Global Water Partnership. Downloaded on March 12, 2014 from: http://www.gwp.org/en/ToolBox/CASE-STUDIES/Americas--Caribbean/El-Salvador-Development-of-community-participation-in-the-microbasin-La-Poza-343/

Hoff H. 2011. Understanding the Nexus. Background Paper for the Bonn2011 Conference: The Water, Energy and Food Security Nexus. Stockholm Environment Nexus, Stockholm.

IPCC. 2001. Climate Change 2001: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK.

Iza A, Stein R (editors). 2009. Rule: Reforming Water Governance. International Union for Conservation of Nature, Gland, Switzerland.

Jønch Clausen T. 2004. "...Integrated Water Resource Management (IWRM) and Water Efficiency Plans by 2005": Why, What and How?. TAC Background Paper No. 10. Global Water Partnership, Stockholm.

Kotter JP. 1996. Leading Change. Harvard Business Schol Press, Boston.

Lankford B, Hepworth N. 2010. The cathedral and the bazaar: monocentric and polycentric river basin management. Water Alternatives 3, 82-101.

Marshall Z. 2014. Supplying southen Nevada: challenges and solutions. pp. 93-101, in: Waskom R, Akhbari M, Grigg N (editors), US Perspective on the Water-Energy-Food Nexus. Colorad Water Institute Completion Report No. 116. Colorado State University, Fort Collins, CO, USA. Downloaded on March 12, 2014 from: http://www.cwi.colostate.edu/workshops/nexus2014/CaseStudies.aspx

Merrey DJ. 2008. Is normative integrated water resources management implementable? Charting a practical course with lessons from Southern Africa. Physics and Chemistry of the Earth 33, 899-905.

Lenton R, Muller M. 2009. Integrated Water Resources Management in Practice: Better Water Management for Development. Earthscan, London.

Shah T, van Koppen B. 2006. Is India ripe for integrated water resources management? Fitting water policy to national development context. Economic and Political Weekly XLI(31), 3413-3421.

Smith DM, Cartin M. 2011. Water Vision to Action: Catalyzing Change Through the IUCN Water & Nature Initiative. International Union for Conservation of Nature, Gland, Switzerland.

UNEP. 2012. Status Report on the Application of Integrated Approaches to Water Resources Management. United Nations Environment Programme, Nairobi.

WORLD WATER COUNCIL

www.worldwatercouncil.org

WORLD WATER COUNCIL - CONSEIL MONDIAL DE L'EAU

Espace Gaymard - 2-4 Place d'Arvieux - 13002 Marseille - France
Tel : +33 (0)4 91 99 41 00 - Fax : +33 (0)4 91 99 41 01
wwc@worldwatercouncil.org
www.worldwatercouncil.org

facebook.com/worldwatercouncil twitter.com/wwatercouncil