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Finding Practical Approaches to Integrated Water Resources Management

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ABSTRACT: Integrated Water Resources Management (IWRM) has often been interpreted and implemented in a way that is only really suited to countries with the most developed water infrastructures and management capacities. While sympathetic to many of the criticisms levelled at the IWRM concept and recognising the often disappointing levels of adoption, this paper and the series of papers it introduces identify some alternative ways forward in a developmental context that place more emphasis on the practical in-finding solutions to water scarcity. A range of lighter, more pragmatic and context-adapted approaches, strategies and entry points are illustrated with examples from projects and initiatives in mainly 'developing' countries. The authors argue that a more service-orientated (WASH, irrigation and ecosystem services), locally rooted and balanced approach to IWRM that better matches contexts and capacities should build on such strategies, in addition to the necessary but long-term policy reforms and river basin institution-building at higher levels. Examples in this set of papers not only show that the 'lighter', more opportunistic and incremental approach has potential as well as limitations but also await wider piloting and adoption.

KEYWORDS: Integrated Water Resources Management, local water management, stakeholder participation, adaptive management

INTRODUCTION

Most analysts and professionals would argue that water management has been sectoral and reductionist for too long, and that there is a need to better coordinate management of different components of the resource (e.g. groundwater and surface water), between various sectors and stakeholders, across links in the water chain (the pathway from drinking water supply to wastewater treatment) and across administrative boundaries. In that sense, Integrated Water (Resource)

Management[1] has been widely hailed among those working in water as a welcome aim or vision. However, it has also received widespread critique, on its underlying concepts but, particularly, on the way its implementation has progressed. The present contribution presents a non-exhaustive overview of critical issues raised and responds partly to some of the criticisms. This paper and the related series of papers in this issue focus on 'lighter' and more locally rooted[2] approaches to water management, proposing some possible alternative entry points for applying IWRM in a 'light' or pragmatic, adaptive way with due regard to local realities.

THE IWRM CONCEPT AND ITS CRITICISMS

Although its history goes back much further, e.g. to the Tennessee Valley Authority in the 1930s (Molle, 2008), the more recent incarnation of IWRM can be traced back to the UN's Mar del Plata conference of 1977, and the principles adopted in Dublin in preparation for the 1992 'Earth Summit' held in Rio de Janeiro (ICWE, 1992). IWRM seeks to operationalise these principles, where "water is a public good with both social and economic values and... good water resources management requires both a broad holistic perspective and the appropriate involvement of users at all levels" (Lenton and Muller, 2009).[3] Almost all definitions of IWRM stress that it is an approach to improve efficiency in water use (the economic rationale), promote equity in access to water (the social or developmental rationale) and to achieve sustainability (the environmental rationale). With all these different objectives, it can be a challenging and unwieldy concept. Molle (2008) draws attention to the fact that it is often pretended that all these different objectives can be maximised simultaneously, when in reality there will nearly always be trade-offs and, at best, only a balance can be achieved. 'Integrated' management, as the authors of this paper understand it, aims to address these trade-offs and minimise the negative impacts that might be created by the actions of one particular sub-sector, stakeholder or time, on others. It seeks to avoid inefficiencies and conflicts that are a feature of less-integrated approaches. IWRM thus implies a move away from traditional sub-sector foci that address domestic water supply, wastewater, irrigation, industry and the environment separately (often within different agencies or government departments) to a more holistic approach. There still remain the sense and need for such intersectoral coordination and a solution.

One reason that IWRM has attracted considerable criticism over the past decade is the vagueness of the concept. Like governance and sustainability, IWRM is a 'Nirvana concept' (Molle, 2008) that people can invest their hopes and fears in, exactly because it is so elastic and amorphous (Biswas, 2004). This elasticity exposes the concept to charges of lacking characteristics it was never meant to have (Placht, 2007), and critique that what it means in practice or what is needed to successfully implement it is unclear (Watson et al., 2007). As a result, there has been rather little agreement on fundamental issues like what aspects should be integrated, how, by whom, or even if such integration in a wider sense is possible, and its most ardent critics argue that its "impact to improve water management has at best been marginal" (Biswas, 2004). Emphasis has been generally given to policy and institutional reforms at the national and river basin level with a specific focus on managing demand, i.e. better management and sharing of the water resource between users.

[1] It can be argued that water is not only a resource but has intrinsic values of its own, as well as social, cultural and environmental values that are now more often recognised and represented in water policies. This paper however will follow the customary terminology, that is, IWRM.

[2] The term 'local' is used here as a counterpoint to the river basin or large catchment scale of tens of thousands of square kilometres. Many of the examples cited come from scales of local government (i.e. district or governorate) and smaller catchments of hundreds or a few thousands of square kilometres, such as the Amazon.

[3] While recognising there can be no blueprint, Lenton and Muller (2009) describe IWRM implementation goals as typically involving 1) sound investment in infrastructure, 2) strong enabling environment, including goal setting, legislation and financial allocation mechanisms, 3) clear, robust and comprehensive institutional roles, including for stakeholder participation, and 4) effective use of management and technical instruments.

The present contribution will argue that some of the weaknesses in the concept could be overcome through a much greater focus on locally rooted, pragmatic and adaptive use of its ideas in implementation.

Lack of fit with context

IWRM reforms and implementation have been costly and time-consuming while the benefits are yet to be seen. This is not what only critical writings of scholars say as some multilateral institutions feel the same way.[4] Maybe we have been expecting too much, too soon. At the local level, catchment agencies in many 'developing' countries may be expected to struggle to establish legitimacy and be effective given their limited capacities, at least in the short and medium run. This point is amply illustrated by Lankford and Hepworth (this issue) who contrast the level of capacities in Tanzania with those in the United Kingdom and question why the IWRM approach is more or less the same in each country. Moriarty et al. (this issue) highlight the significant capacity-building required to support planning activities by middle-level managers at governorate level in the Middle East. Fully operational and resourced catchment management agencies constitute a project that will still require decades of development in many countries. While this goes ahead, can IWRM objectives be promoted in other ways? Where IWRM reforms are slow and take time, can lighter forms of IWRM bring about significant improvements in water management? This paper and its attendant series of papers aim to offer some practical alternatives.

A further concern is that 'full' IWRM, with optional adaptive add-ons, is too rare an ideal to be of practical value without continuous adaptation to the specifics of local reality. Rather than seek to overhaul everything, we might be better advised to experiment, check and learn what works in different contexts. Several authors (e.g. Shah and Van Koppen, 2006) have critiqued the way IWRM has been interpreted and implemented as a relatively standard 'package' of reforms regardless of the context.[5] In Europe, a diversity of approaches is locally experimented with (though with varying results), under a broad policy framework, the European Water Framework Directive. In 'developing' and 'transitional' countries, however, IWRM often gives the impression of being externally imposed or adopted to please donors. In South Asia, in Mollinga's (2006) lucky phrase, IWRM is a "concept in search of a constituency" as it is clearly not locally rooted. The new Kazakh water law was drafted by an external consultancy along the lines of the European Water Framework Directive, but bears no practical relationship to realities on the ground, and is therefore largely ignored (Warner et al., 2009). Legal reform leading to centralised introduction of individual water permits is more often than not out of touch with cultural, social and infrastructural realities.

It would appear to make more sense to decide on the broad framework of water allocations at central level but leave the decision to locally established distribution systems. Hybrids of formal regulation and informal (customary) normative frameworks govern actual water use in many developing countries (Meinzen-Dick and Pradhan, 2002). Shah and van Koppen (2006) argue that in countries with mainly informal economies like India and 'black' South Africa the normal IWRM package of basin-level management, property-rights reform, water pricing, and development of catchment management agencies are unlikely to stick. Taking due cognizance of the possibility that existing local

[4] A comparative World Bank study of institutions in various river basins (Blomquist et al., 2005), for example, notes that "(d)espite improvements, significant water resource management problems remain in all the cases we studied". While recognising a "significant shift from current paradigms" the Comprehensive Assessment of Water Management in Agriculture (2008) acknowledged that "making this transition is proving to be difficult". Another World Bank (2003) document calls for interventions to be, among other qualities, 'practical and patient'.

[5] Shah and Van Koppen (2006) describe this package as: 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 and subsequent creation of river basin organisations; development of water resource and service pricing mechanisms; creation of water rights by instituting a system of water withdrawal permits; and promotion of participatory water resources management.

arrangements are captured by local élites, building on effective existing local arrangements is more likely to succeed than starting from scratch at the catchment level.

As local water users cannot wait for river basin organisations to develop enough capacity to effectively penetrate to the local level, much day-to-day decision-making on water development and management issues will remain in the hands of users and communities (e.g. in large parts of sub-Saharan Africa and the Andes). Many have developed small irrigation systems, springs and wells for domestic water supply, and small dams for livestock with limited external assistance. While in many places there is no coordinated control so that water is a free-for-all, other water systems are governed by customary water management arrangements that have also been developed specifically to their environments (Sokile et al., 2005; van Koppen et al., 2007; Boelens, 2008). Such systems are by definition not fair, sustainable or integrated, but they fulfil important local functions.

Current investments and efforts typically do not really build upon these existing arrangements and at worst contribute to eroding them. There are opportunities not just to build upon the existing infrastructure, but even more importantly, upon existing institutions that already have the experience, knowledge and systems needed to manage water effectively at the local level. Some of these institutions are already quite integrated or relatively holistic while they may face challenges in adapting to be relevant at higher scales. Could they not be flexibly inter-coordinated to make a difference at higher scales?

IWRM and development priorities

Other planks of IWRM are demand management and the establishment of modern water rights, an ambition that can be expected to be less suited for implementation in 'developing' country and informal-economy contexts.

The current wave of IWRM enthusiasm took off at a time when it began to be widely held there was a water crisis (Gleick, 1993). This so-called 'water crisis' is arguably more a function of unfair distribution (Gleick's "resource capture") and mismatched supply and demand than an absolute shortage of resources, nevertheless bringing with it very real penury in local water availability. Uncritical deployment of a 'water crisis' narrative and a widespread lack of reliable data on water resources have frequently promoted a dialogue focusing on the environment and sharing existing resources in places where availability of water resources is low with a pressing need for its development (in parts of sub-Saharan Africa groundwater resources remain chronically underutilised and there are extremely low levels of surface water storage). Although the mix of IWRM practices as proposed by Lenton and Muller (2009) specifically starts with a focus on infrastructural development, this is not often explicitly part of the package or given much emphasis. Shah and Van Koppen (2006) argue that IWRM has concentrated on demand management and better sharing of the available resources, while further water resources development on the supply side is still feasible and necessary in many parts of sub-Saharan Africa. They suggest that IWRM principles work best where primary water-diverting structures are large and few in number, most water users are supplied by organised service providers, and capital accumulation in terms of infrastructural creation is already high, i.e. mainly in the formal economies in developed countries and emerging economies.

Challenging the river basin as the only management unit, Lenton and Muller (2009) contend that IWRM can be applied at a variety of scales, from the village level to the basin, national and transboundary levels, as water stress manifests itself at all levels, and often needs to be addressed through a combination of bottom-up and top-down measures. Actions at one scale should reinforce and complement those at other scales. However, IWRM reforms have tended to focus on the higher levels of scale, on policy and legislation reforms at national level and the establishment of river basin organisations.

While in much of the literature IWRM appears to be synonymous with a basin approach, this is not always administratively possible or ecologically sensible. The focus on large catchments or river basins

as the best or only management unit has attracted criticism (for example, in Wester and Warner, 2002; Blomquist and Schlager, 2005; Lankford and Hepworth, this issue). Such catchments often cover areas of tens of thousands of square kilometres with hundreds of thousands or millions of inhabitants, and straddle administrative boundaries between regions or states. Polders and wetlands may make more sense than river basins in, for example, Bangladesh. In areas that are not well endowed with surface water resources, aquifers are a more logical management unit. Man-made infrastructure, such as water supply and sewerage systems and large irrigation schemes, results in planned and ad hoc inter-basin transfers. The hydrological boundaries of water management intercept many other boundaries and units, such as administrative boundaries of local governments (Moss, 2006).

The gap between policymaking and implementation, underestimated in the best of situations, increases if policies are made at abstract scales. While policy has to be made at a large, comprehensive scale, policy implementation takes place at the local level. The closer one gets to the concrete intervention situation, the more conflicts one can expect, and here coordination becomes harder rather than easier but is more realistic. In some cases, these challenges have been recognised and addressed by further decentralizing water resources agencies to sub-catchments or even to lower levels (e.g. catchment fora in South Africa, Simpungwe, 2006). As pointed out in this paper, working with local governments on water resources management offers an alternative entry point.

Lip service to people and participation

Values underpinning IWRM also stress the promotion of 'appropriate' participation in decision-making, equity in the sharing of benefits between users, and decentralisation of water management to the lowest appropriate level. However, a common criticism of IWRM is that it is not people-centred enough. Having developed as an ecological critique to a utilitarian use of water supply and discharge in the 1980s, successfully leading to the integration of land, water and environmental management based on the principle of 'carrying capacity' of the natural environment, people only became (re)integrated in IWRM later (Mitchell, 1990). The lack of concern for people, especially the poor and marginalised (Merrey et al., 2005), is a recurring gripe against the concept. If services (whether Water Supply, Sanitation and Hygiene (WASH), irrigation or ecosystem) that people rely on continue to be rarely at the centre, in many respects, IWRM programmes become just business as usual. Focusing on 'the local' in IWRM makes it arguably easier to address, or rather harder to avoid people, services and real participation in water resources decision-making.

Stakeholder views can, of course, be taken into account in the running of catchment-level agencies through direct involvement and consultation, for example, in the development of catchment plans. EU's Water Framework Directive of 2000 requires active involvement of all interested parties in catchment planning, and tools have been developed to facilitate such processes (HarmoniCOP, 2005). While 'all' may be too much to ask, multi-stakeholder processes – either with pre-selected and invited or elected participants, or open to all-comers – have been popular with states, donors and NGOs as a way to encourage related dialogues on visioning and current challenges (Warner, 2006; Ison, 2004).

The general population may be represented in catchment agencies by their democratically elected bodies, such as local government, who may be allocated a seat in the decision-making organs of the agency (for example, in South Africa). Or catchment agencies may set up their own structures for water management to represent different types of interest groups, including platforms at different levels (catchments, sub-catchments, etc). In some countries, there is a mix of these types of representation, and contestation over roles, for example, local governments taking over or sidelining catchment agencies. Whereas these provide mechanisms for people's participation at catchment or river-basin level, these may not be adequate from the perspective of the local level (Merrey et al., 2009). Catchment agencies are often preoccupied about allocation of resources or pollution between major sectors, and cannot necessarily be managing all local water resources, particularly not in countries with

large numbers of small and informal users (Shah and van Koppen, 2006). There remains a need for better mechanisms through which stakeholders can articulate their needs and interests.

Many attempts to encourage participation in IWRM score poorly when assessed on a ladder of participation (Arnstein, 1969; Bruns, 2003).[6] Rather than power-sharing and more empowering forms of participation, most are limited to activities about informing or consulting people, while there is always a risk of co-optation and power play (Cleaver, 1999; Currie-Alder, 2007). The quality of participation in IWRM efforts is, amongst other factors, a commitment to shared decision-making, limited by the human and financial resources available to catchment management agencies. Such agencies often lack the capacity to fulfil even basic functions.

Meaningful participation, as opposed to token participation, is political because it implies a genuine sharing of power in decision-making, and calls into question the social arrangements that are taken for granted. When states make space for (basin-level) participation, e.g. South Africa, this space may not be taken when the modality is not known or not useful to stakeholders, who do not see how it empowers them and have considerable opportunity costs to participation (Warner, 2006). The lack of real stakeholder influence in IWRM can incite non-official 'participation' in the sense of spontaneous engagement with water resources management (Long, 2001). This explains some entirely predictable 'implementation problems' of water policies and projects in which stakeholders were ignored or sacrificed for the purported greater good, and [stakeholders] responded to this by collective action.

Developing comprehensive approaches to participation will take considerable time under these constraints. Experience with, for example, Dutch interventions to make space for the river suggest that what counts as an administrative success in enabling IWRM by inter-institutional cooperation repeatedly has made local citizen stakeholders feel excluded, manipulated or taken for granted (see also Warner et al.; this issue). The above is not to deny that lower-level participation can be satisfactory where affected stakeholders express low demand for their involvement, but people should at least be given the chance to voice their ideas and concerns.

Institutional inclusion has become an integral strand of participatory approaches, a process "assumed to ensure the more efficient delivery of development, the inculcation of desirable characteristics amongst participants (responsibility, ownership, cooperation, collective endeavour) and therefore empowerment" (Cleaver, 1999). This approach in itself can be faulted for being a patronising view of 'empowerment'. But it falls flat when the values are not shared by the intended participants and the framing of the issue/task at hand can be experienced as a form of co-optation (their participation legitimises the agenda of powerful interests) and control. The process of stakeholder selection and empowerment is therefore highly political itself and voluntary stakeholder self-exclusion should not come as a surprise.

IWRM implementation tends to start from the premise that there is need for a cross-sectoral top structure, where allocations between sectors can be discussed as a way to force sectors to get their house in order. This does not mean that all actions (and actors) have to be fully integrated and handled by a super-agency that replaces the many actors in water, rather it is about finding ways to coordinate and address coordination problems. It is often thought that the holistic agenda for IWRM is or best supported by a single government water agency responsible for all water resource issues (e.g. Durham et al., 2002 quoted in Jeffrey and Gearey, 2006). A centralised, God's-eye view[7] suggests wider geographical boundaries and a dominant role for experts. Green and Penning-Rowsell (1999) have noted that integration and participation seem to pull in opposite directions. If we set store by a human scale and focus, the local level is a more obvious orientation.

[6] Sherry Arnstein's ladder is an admittedly simplified approximation of a participation heuristic, as critiqued by Tritter and Callum (2006) but is nevertheless indicative of the low degree of community involvement of much policy.

[7] God's-eye view is a name for a point of view where the speaker or writer assumes they have knowledge only God would have (www.wikipedia.org). The use is ironic here.

Advocating an overarching IWRM, water managers also fail to recognise participation mechanisms within sectors, their potential contributions to IWRM, and the pitfalls of centralisation. They are more likely to view sectors often as black boxes with a single-use perspective, and not recognise multiple-use of water at lower levels of scale. For example, many rural and peri-urban water supply systems are used not only for purely domestic purposes but also for small-scale productive uses at the household level, and the irrigation sector may fulfil many other water needs than those for crop irrigation only (Smits et al.; this issue). These multiple uses and corresponding needs cannot all be accommodated in decision-making at the catchment level, but rather require local participation mechanisms (see also Wester and Warner, 2002; Warner et al., 2008).

Neglect of political context

Politics (the contest for the distribution of scarce resources, see Haywood, 2002) is the predominant process determining how water (among other) resources is shared between potential uses, and the balance between environmental, economic and social values of water. While the World Bank's Water Resources Strategy Paper (World Bank, 2003) concedes that "water resources management is intensely political", politics is often treated as a problem, so that much IWRM activity ignores politics or is even engaged actively in depoliticising (Allan, 2003; Gyawali et al., 2006; Wester et al., 2003; Blomquist and Schlager, 2005; Mollinga, 2006). Why not recognise water politics as a reality and also an opportunity? Political engagement should be appreciated as a catalyst for public involvement and change.

The assumptions of a Habermasian approach, prevailing in IWRM and institutional recipes such as multi-stakeholder participation, suggest political and organisational divides can be bridged by authentic communication, an 'ideal-speech situation' in which no actor is excluded and power play does not interfere, and in which stakeholders find common ground (Saravanan et al., 2008). While a Habermasian dialogue is attractive as a normative prescription, it reasons away power and knowledge differences (highlighted in Michel Foucault's work) ignored at one's peril. Saravanan et al. (2008) argue that the two schools (Habermasian and Foucaultian) are interdependent, and that this sheds light on how integration actually takes place. The interaction between people, rules and resources in institutions that facilitate and constrain water management sometimes involves sharing and collaboration and sometimes the use of differences in information and power.

ALTERNATIVE STRATEGIES TO ARRIVE AT MORE PRACTICAL APPROACHES TO IWRM

Like any normatively loaded and 'plastic' (Poerksen, 1995), multi-interpretable concept, IWRM attracts a variety of responses in the literature. While some embrace it as a solution for all ailments, others reject it (Biswas, 2004). Rather than throw away the ideas of IWRM wholesale,[8] we seek to bring down its ambitions to a more realistic level and build on its strengths. Having reviewed some shortcomings of IWRM, and highlighted the potential for alternatives, this section aims to sketch a number of different approaches, strategies and entry points to arrive at a more practical IWRM (see also table 1). While actions at other scales are important, and lighter approaches can be applied at all scales the authors propose that a greater focus on local reality would help respond to some of the concerns raised above.

[8] Perhaps it will soon be time to stop using this term so widely since it has become associated with a very specific set of ineffective interventions.

Table 1. Summary of common criticisms of IWRM and possible ways out.

IWRM criticisms/problems	Solutions or ways forward presented in the paper
• Vagueness of IWRM concept. • No agreement on fundamental issues such as aspects to be integrated, how, by whom, or even if such integration in a wider sense is practically possible. • IWRM is not sufficiently people-centred. • IWRM does not adequately incorporate adaptive management principles. • Concept is unwieldy. • Packages of IWRM reforms do not include local IWRM • River Basin Organisations, or catchment agencies may struggle to establish legitimacy. • RBOs or catchment agencies often lack the capacity to fulfil even basic functions. • IWRM activities ignore politics. • Levels of participation in IWRM are low.	• IWRM should be considered more as a philosophy than as a 'package of reforms'. • IWRM principles should be built into projects and programmes. • Local laws and customary institutions should be an entry point for IWRM. • Better linkages should be built with local government and its planning processes. • IWRM should be built from bottom up. • IWRM reforms need to build upon existing mechanisms for participation and organisation of stakeholders around water management, even if this means building upon 'sectorality', rather than a complete overhaul. • 'Light' approaches that aim to apply IWRM principles at all stages of the project cycle (e.g. visioning, assessment, planning, implementation, monitoring and evaluating, etc) are more likely to be good entry points. • Supporting the existing local arrangements should be encouraged as a form of local IWRM in itself and is more likely to succeed than starting from scratch at the catchment level. • Although local IWRM initiatives often have limited scope, they can still contribute to the development of IWRM at basin scale and, as such, serve as important entry points for applying the IWRM framework. • Forging better links between the water, sanitation and hygiene (WASH) sub-sector and IWRM is another way to strengthen grassroots participation in IWRM. • Responding to wider 'domestic' needs of many consumers, such as for small-scale productive uses of water, is another way to implement IWRM.

Lighter approaches to implementation

The present contribution takes up the challenge offered by Lankford et al. (2005) who contrast comprehensive, 'idealised' IWRM with an adapted, 'interpreted' IWRM. Using the bazaar (lighter, adapted and more local approach) and cathedral (full IWRM model) metaphor, Lankford and Hepworth (this issue) illustrate how a polycentric approach to river basin management that is fit for the context in 'developing' countries could be implemented. Moriarty et al. (this issue) present a light approach to IWRM piloting in Egypt, Jordan and Palestine that focuses on building mindsets and skills (identified as a

key problem) and supporting the development of appropriate light auditing tools and planning models for IWRM at the governorate (equivalent to district) level.

One strength of the IWRM paradigm is that it makes conceptual space for real and significant improvements in water management at all levels – from the household to the international basin – by individuals and institutions applying its principles in the context of their own abilities and opportunities (Moriarty et al., 2004a). Moriarty et al. (2000) called this 'light' IWRM, a local approach similar to what others have called 'community water resources management' or 'local water management'. 'Light' approaches aim to apply IWRM principles within sub-sectoral projects and programmes at all stages of the project cycle (e.g. visioning, assessment, planning, implementation, monitoring and evaluating, etc). The idea is that if sub-sector actors apply good IWRM practice at their own level, in their own work, it can lead to the emergence of better local-level water resources management, and be an important first step in the process of IWRM. A tentative example of using guidelines based on the Dublin Principles to implement 'light' IWRM at project or sub-sector scales was the working principles for IWRM in Water and Sanitation (WATSAN) (Visscher et al., 1999). The principles derived from field research involving eight WATSAN and three IWRM projects in seven countries were used as part of a process of self-assessment and improvement of IWRM practice. Other examples of such an approach include the EC (1998) guidelines for water resources development cooperation and the Bellagio principles for environmental sanitation (SANDEC/WSSCC, 2000) where many elements for applying IWRM to sanitation are defined.

The advantage of this approach is that it can build upon the mobilising capacity of each of the sectors, and ensure if not integration, then at least sectoral participation. In addition, the application of the principles is often in the interest of the sectors themselves. The disadvantage of the approach is that it cannot address the really hard issues of cross-sectoral and large-scale upstream-downstream conflict and competition and the real costs in time and other resources of intersectoral working. There is no 'stick' to enforce compliance with the principles and the approach is therefore complementary and not a wholesale replacement for larger-scale allocation and management of water. Incorporating IWRM principles into sub-sectoral projects and programmes is also on a voluntary basis, a voluntarism that carries an opportunity cost: people may need to attend to more urgent concerns than contribute their time and energy to participating in water management decisions. However, lighter approaches can, of course, also be applied at higher scales (basin, province, country) too.

Focusing more on services people use

As local governments have mandates in relation to both direct services provision (water supply, sanitation, storm-water, solid waste), and broader development and spatial planning, they are a crucial entity in IWRM. Yet, in practice, very few local governments actively apply IWRM principles in their work (Smits and Butterworth, 2006). Apart from their participation in catchment authorities (see previous section), other mechanisms have been identified for local government engagement in IWRM. Horizontal cooperation between neighbouring municipalities does not take the catchment as the planning unit, but encourages local cooperation between municipalities, e.g. between Beitbridge and Musina (Zimbabwe and South Africa) on developing joint infrastructure for water supply, or 48 'Euregio' municipalities between Germany and the Netherlands along the Rhine. Applying IWRM principles within local government mandates is a further option and is similar to other examples of applying IWRM principles at local level. As local governments normally have a range of mandates, they can facilitate the integration of issues and actions and to come to a form of integrated water management at the level of the city or municipality.[9]

[9] This, incidentally, is not to exclude the alternative of community organisations as the central actor in local IWRM networks. Where government is ineffective, disinterested or simply failing, civic organisations have in places stepped in, and crossed municipal boundaries to protect water resources (e.g. www.gwptoolbox.org/index.php?option=com_case&id=65).

Another way to think across sectoral borders and promote IWRM is to respond to wider 'domestic' needs of many consumers, such as for small-scale productive uses of water. (IWMI et al., 2006; Moriarty et al., 2004b; van Koppen et al., 2009; Smits et al., this issue). Poor rural and peri-urban families often use water for a range of domestic and productive purposes, such as drinking and other household water uses, gardening, keeping livestock and small enterprises. However, water services providers tend to work in 'sectors' providing 'domestic' water supply systems, 'irrigation schemes', or 'livestock ponds' that only meet part of people's water needs. These services fail to support livelihoods of poor men and women, and are often unsustainable. It is possible to design multiple use water services that meet people's needs, contribute to more sustainable systems and provide an unreached group of people with water to support their livelihoods.

Adaptive management, boundary spanning and partial integration

Of late, adaptive management has appeared to be on its way to overtaking IWRM as the new 'nirvana' ("nirvana concept") in water management. Some now advocate "adaptive management" (Pahl-Wöstl and Sendzimir, 2005) or even "integrated adaptation", notably as a remedy in dealing with climate change (Fischhendler and Heikkila 2007). Although its origin is similar that of IWRM and, in many respects, run the same risk of vagueness and depoliticisation as IWRM (Nadasdy, 2005) the concept of adaptive management has the advantage of explicitly including dynamics and uncertainty. Recognising water management as a complex adaptive system is to recognise non-linear jumps and emergence. Rather than the top-down tweaking of parameters implicit in much IWRM work, where integration is similar to a holistic, comprehensive God's-eye view of water management, a lighter approach to IWRM focuses on the quality of the connections between the system's constituting/constitutive elements. Coordination cannot be planned in advance, but is the emergent outcome of centralised and decentralised action, and of struggles and cooperation (see also Kooiman, 1993). It cannot be predicted that this outcome will necessarily be sustainable and equitable; one can only seem to influence boundaries and connections.

One does not have to take complex adaptivity on board wholesale to recognise the shift in focus from what Lankford (this issue) calls the 'bazaar' as opposed to the 'cathedral'. A bazaar in Morocco or Bangladesh at first strikes one as a loud, chaotic, patternless maze. A bazaar however does not consist of atomistic, autonomous actors, and neither does a water system. Actors in water management depend on one another for the timing, quantity and quality of water in a particular area, which often rewards coordination and cooperation. Considerable insights are now found in how actors mobilise their networks to arrive at integrated, multifunctional, multi-sectoral plans that exceed the organisational capacity of any one actor or sector. The contribution by Warner et al. (in this issue), for example, traces the design of a new brook project, which was so costly (€45 million) that the initiating water management agency would never have been able to finance the cost on its own. In their problem framing, linking and sourcing, 'boundary spanning' initiatives can work small miracles in fragmented, complex, decentralised contexts (Bressers and Lulofs, 2010).

Adaptive management, boundary spanning and partial integration can, of course, be an expedient, "satisficing"[10] compromise to avoid the harder task of 'full' integration. Nevertheless, the authors would argue that lighter forms of integration bring immediate results (early wins) that strengthen a support base for more radical (and higher-level) integration. An adaptive perspective on IWRM also discards the need to integrate with the other to the extent that one almost 'becomes' the other. On the contrary, strengthening the identity of, and connections and interactions between, the actors involved allows them to span in and out of other domains, to integrate where opportune without losing their identity.

[10] 'Satisficing', a term coined by the Nobel laureate Herbert Simon, is "a decision-making strategy which attempts to meet criteria for adequacy, rather than to identify an optimal solution. A satisficing strategy may often, in fact, be (near) optimal if the costs of the decision-making process itself, such as the cost of obtaining complete information, are considered in the outcome calculus. Reasoning that takes satisficing into account is called 'bounded rationality'" (Simon, 1957).

CONCLUSIONS

Rather than ditch the IWRM concept for its obvious flaws, this paper has proposed to focus implementation on more practical and local entry points that offer a number of potential advantages and could be complementary to policy reforms and river basin institution- building. These entry points address some of the scale problems in implementing IWRM, are attractive for their pragmatism rather than idealism, and make it easier (or unavoidable) to engage with people and politics. Rather than a complete overhaul, IWRM reforms should build upon existing mechanisms for participation and organisation of stakeholders around water management, even if this means building upon 'sectorality'. A more practical and service-centred and adapted approach highlights the benefits (and feasibility) of coordination between institutions and inclusive participatory forms of integration. Most of all, however, we would emphasise the importance of a diversity of approaches. Rather than aspiring for an ideal of 'full' IWRM that may be both unattainable and perhaps undesirable in many contexts, at least for many decades, there appear to be several possible entry points for more local initiatives to promote coordinated water management that deserve greater attention.

The criticism of the IWRM concept itself paradoxically focuses on a weakness that could also be considered its strength: its ambition and vagueness. It is easily appropriated or co-opted for technocratic and also populist control agendas, from the all-seeing eye to self-rule. Rather than a tightly defined blueprint with detailed prescription, IWRM is based on some general principles. The growing disappointment with IWRM is unfortunate and, as we have maintained, the overall principles are generally sound but their implementation is found wanting. There remains a real and growing need to address water management problems through an intersectoral approach. Surely water scarcity is going to worsen until we get an awful lot better at managing both supply and demand and competition between different uses and users.

We do not present the local and 'light' as the panacea – each of the approaches shows not only promise but also considerable practical limitations. The pretence of IWRM to achieve and maximise different outcomes in reality can mean harsh trade-offs – but win-lose outcomes will be hard to avoid with 'light' approaches too. Rather it is a shift in emphasis from comprehensive, God's-eye management recipes. The 'bazaar' does not replace the 'cathedral' (or mosque), but somehow coordinates with it, whether in conflictive or more cooperative modes.

This paper has reviewed various inspirational experiences, several of which are reported in greater detail in this issue, with what we see as a more realistic take on IWRM implementation. While embracing IWRM as a principle, they seek their application in an alternative manner: focusing at the more local level, as opposed to the river basin or national level; seeking integration from within sectors, as opposed to establishing intersectoral mechanisms; and building upon existing institutions and participation mechanisms, as opposed to establishing new multi-sectoral institutions. Taken together this package has been dubbed a 'light' approach to IWRM application, claiming to be better rooted in local realities, and accepting that integration can be partial and incidental rather than aspiring for an ideal of 'full' IWRM that may be both unattainable in the near future and perhaps undesirable in many contexts.

While momentarily attractive, discarding IWRM for its flaws in implementation carries a risk of throwing out the baby with the bathwater. There is a need to go back to the outcomes that IWRM originally aimed to achieve. Working towards these will require a better mix of complementary light and full approaches at different levels of scale that build upon local and sectoral realities. It is the specific outcomes desired in a given location that should determine the actual mix of light and full approaches to be applied. We recognise that the right mix for a given country or region can only develop through an adaptive approach, and will continue to be subject to political contestation and a series of constraints (time, capacity, resources). There is a severe lack of human and financial resources to translate locally tested pilots to solutions used at scale. These limitations however should not be an excuse for inaction.

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