The real water crisis: inequality in a fast changing world

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Summary

Competition for water and its scarcity dominate the headlines, but in reality the global water crisis remains one of equitable access rather than availability. Water equity requires that each person shares access and entitlements to water, and benefits from water use. We may well achieve economic growth without tackling the fundamental inequalities in water access, services and resources, but we will never achieve the kind of transformative economic development that benefits the poor and shares prosperity.

Significant progress has been made at the global aggregate level on access to water and sanitation, but there are still huge disparities and, as competition increases, so does the risk that water resources will be captured by the powerful, with marginalised people losing out.

As we enter the post-2015 development era, we will mark a decade since the 2006 Human Development Report, which positioned power, poverty and inequality at the heart of the global water crisis. But while we have a good idea of the central challenge, we still lack workable solutions.

Building on ODI research on this issue we identify four propositions, or areas, where we need to chart a different path if we are to see meaningful progress on water equity in the decade to come.

- First, that the post-2015 world is, in many respects, already with us and is defined above all by flux and instability: in social and political systems; in climate; in where and how people, especially marginalised people, live and work. Water equity is, therefore, a moving target in a fast-moving world. Approaches geared towards predictable, steady change are increasingly going to fail – from relying on formal, utility-run networks alone to serve growing cities, to designing water services to meet climate variation that stays within historical boundaries. Those already coping with change, adaptively and often informally, provide windows into 'good-enough' solutions.
- Second, that we risk losing sight of the bigger picture when it comes to private and public roles in water. The role of large corporations in water management is grabbing headlines, just as private participation in water services did in previous decades. It remains a major task to align interests and incentives so that big business and government can work together for shared benefits in water. Yet the bigger and all too often ignored question is how to deliver equity via 'small business': the many millions of smaller private enterprises, community groups and individuals who make up the majority of users, providers and managers of water.
- Third, that while we've started to recognise drinking water and sanitation as human rights, we still tend to see water resource management problems as issues of water availability (too little, too much) and infrastructure. Yet insecure access and entitlements remain at the root of water and livelihood insecurity – not just for the 780 million people without safe drinking water, but also for those who cannot access sufficient water for productive uses. Beyond access to water itself, the benefits water can provide, whether energy from hydropower or from ecosystem services, are also central to the achievement of water equity. As investment in hydropower and irrigation accelerates

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and urban centres grow, policy makers in sub-Saharan Africa (SSA) need to learn from the mistakes of their Asian counterparts: many large scale water resource developments have helped deliver growth, but have under-performed on poverty reduction. Mobilising water for broad-based, transformative growth will require that social, environmental and livelihood risks are systematically managed within much stronger resource management frameworks to ensure a different set of outcomes.

- Fourth, that while there is a re-emerging consensus around the need to invest in the infrastructure of water conveyance and storage, not least to buffer rainfall variability and support production, this must be matched by investment in institutions that balance demand and supply, and mediate between the claims of competing users. Institutional investment should be based on an understanding of the real problems people face and specific entry points for tackling them, not with idealised solutions that view 'systems integration' as an end goal and ignore deep-routed governance problems and political context. As pressure on water resources grows and the landscape for financing water infrastructure widens, governments and donors need to re-engage with water resources management, but on different terms to those that have dominated over the past two decades.

Introduction: Water equity

The 2006 Human Development Report (HDR), *Beyond Scarcity: Power, Poverty and the Global Water Crisis,* focused global attention on the startling inequality in access to water (UNDP, 2006). It framed this crisis in relation to two kinds of water access that are interlinked but that are still considered separately. First, access to 'water for life' – relatively small volumes of water for the essential purposes of drinking, sanitation and hygiene. Second, access to 'water for livelihoods' – the larger volumes required for productive purposes and economic activities.

Debates over the content of a post-2015 development framework to follow the Millennium Development Goals (MDGs) have forced a re-evaluation of what progress means in many areas, both at the global aggregate level and at the individual level. Inequality has re-emerged as a major concern as we confront the structural imbalances in our societies, economies, and in our relations with the natural environment (Melamed and Samman, 2014).

This paper argues that water equity – fair shares in access and entitlements to water, and benefits from water use – should form a central ambition in the decades to come. It does not seek to position water equity within a post-2015 framework of development targets and indicators. Instead it looks further ahead, to the underlying question of *how,* in practice, water equity should be approached in a post-2015 world that is changing rapidly and is, in many respects, already with us. It argues that four major shifts are needed in how we approach water services and water resources management if water equity is to become a meaningful concept:

- acknowledging flux and instability, rather than stasis and stability, as the new normal
- building on existing entrepreneurial capacity at local level, rather than fixating only on big business
- focusing on secure entitlements to water for productive uses, as well as for health, to ensure benefits are broadly shared as competition for water grows
- giving due attention to political context and support for institutions, without prescribing ideal institutional forms.

This paper aims to revitalise a debate that was triggered by the powerful arguments of the 2006 HDR. The fundamental principles and problems highlighted in that report were widely acknowledged, but there is little sign, to date, that we have found workable solutions to the problems it described. Re-engagement is needed if, in 2016, we are to mark the tenth anniversary of the 2006 HDR and turn from the MDGs to a new development era with both insight and confidence.

Taking stock and charting the challenge

So, how far have we moved towards water equity? In terms of 'water for life' and the challenge of providing universal access to water supply, sanitation and hygiene, global monitoring tells us that more than 200 million people have gained access to an improved source of drinking water since 2006. This means that the water MDG target, to halve the proportion of people without sustainable access to safe drinking water, has already been met ahead of target.

Success for some masks failure for others, however. A big part of this success story is that close to half a billion people in China gained access to water between 1990 and 2010. But while the proportion of people without access has gone down across nearly all global regions, the actual number of people has gone up in Oceania, Central and Western Asia, and sub-Saharan Africa (SSA). In SSA alone, that means 60 million more people were reliant on unimproved sources in 2010 than in 1990.

In the case of sanitation, the global number of people without improved access has reduced fractionally, from 2.6 billion to 2.5 billion. More than one third of the world's people still rely on shared or unsafe sanitation, or defecate in the open. Looking at specific regions, 300 million more people across SSA and South Asia use open defecation or unsafe and shared sanitation than in 1990 (JMP, 2014a). The statistics for sanitation also reveal how inequality becomes more

and more apparent as we drill down through different levels of disaggregation. Across income quintiles, for example, the poorest fifth of the population in SSA is five times less likely than the richest quintile to use improved sanitation, and around 16 times more likely to practice open defecation (JMP, 2012). Ethnic and socio-cultural forms of exclusion also persist. In Viet Nam, households belonging to the Kinh and Hoa ethnic groups are almost twice as likely to use improved sanitation as ethnic minority households, and eight times less likely to practice open defecation (General Statistical Office of Viet Nam, 2011).

The 2006 HDR recognised that 'the most basic foundations for human life and progress' cannot be achieved without universal access to water and sanitation. This thinking is visible in the post-2015 proposals on water supply, sanitation and hygiene. They call for an end to open defecation by 2025; universal access to basic water, adequate sanitation, handwashing and menstrual hygiene by 2030; and for safer and more convenient forms of water supply and sanitation by 2040 (JMP, 2014b). Together, these proposals provide a strong basis for renewed focus on water equity in the post-2015 world.

By contrast, the importance of equity in access to 'water for livelihoods' (in larger volumes than required for drinking, sanitation and hygiene) continues to be overlooked in a recurrent fixation with scarcity at the macro scale, with limited supply set against rapid population growth and the need to grow more food and generate more energy, as well as climate change.

The basic arithmetic of scarcity is, at first sight, compelling. As the global population heads for more than nine billion people by 2050, the world is rapidly becoming urbanised and wealthier. Food preferences are changing as a new middle class emerges, with a shift to more water-intensive diets. And concern over climate change is increasing interest and investment in 'cleaner' energy, including hydropower, biofuels and shale gas, with direct or indirect implications for water impoundments, withdrawals, diversions, consumption and quality. By 2050, it has been suggested that 3.9 billion people, or over 40% of the world's population, will be living in river basins under 'severe' water stress (OECD, 2012).

Water scarcity at the scale of entire countries and economies is, then, a legitimate concern for governments and businesses in the face of these pressures. But a fixation on scarcity tends to focus minds on the question 'how much?' without also asking 'for whom?' The authors of the 2006 HDR concluded that 'scarcity at the heart of the global water crisis is rooted in power, poverty and inequality, *not in physical availability*' (UNDP, 2006). Others have pointed out that *scarcity*, construed at national, regional or global scale and divorced from relational concepts such as need, want and access, is not the same as *scarcities* – the multiple realities experienced by local people, where physical availability is only one component of water security (Jairath, 2010; Mason and Calow, 2012). Certainly, increasing scarcity in the aggregate is likely to increase competition between individual users, raising the risk that the poorest and most marginalised communities and individuals will lose out. Physical water scarcity (and over-abundance) is also made more complicated by increasing variability in climatic and hydrological patterns.

What water equity even means is arguably more complex in the case of water for livelihoods and productive purposes. Should the objective be equity in access to the resource itself (entitlements on the basis of livelihood need) or to the benefits generated from the resource (entitlements on the basis of water productivity)? Very often, answers are only found when the questions relate to specific environmental, social and economic circumstances. In addition, data on access to water for productive purposes are virtually non-existent in many countries when compared to data for drinking water and sanitation, as are data on resource conditions and trends. But while our understanding of equity in access to water for livelihoods is still lacking, we argue that this issue becomes more important in the face of increasing competition and environmental change.

Whether the scarcity in a particular context is manufactured by power imbalances, or is a genuine physical constraint, water equity for both life and for livelihoods remains a central challenge. The following four propositions seek to re-orientate the debate in the pursuit of workable solutions.

Proposition 1: water equity is a fast-moving target in a fast-changing world

Our first proposition is that we need to acknowledge change, rather than stability, as the defining characteristic of the contexts in which water equity must be achieved.

Many of the people who are not yet reached by water supply and sanitation live in environments of profound flux and instability. They live in the urban hinterland or in rural communities that are being re-shaped by economic migration. They live in entire countries and regions affected by political crisis, conflict and climate change. Already, around half of the global population without improved water services live in fragile states. A similar situation will arise for sanitation by 2030, based on current rates of progress.[1] The pace of change – political, economic, demographic - also jeopardises the sustainability of existing services and infrastructure. And yet our paradigms for water and sanitation service provision and water resources management still assume stasis and stability.

The challenge is not just to acknowledge change, but

its unpredictable patterns, as the norm. We often hear that urbanisation will be the defining demographic trend of the decades to come. The UN projects that, by 2050, the population living in urban areas will be almost as large as the current population of the whole world (UNDESA, 2012). China has released its 'National New-type Urbanisation Plan', aiming to raise the urban proportion of its population to 60% by 2020 (Anderlini, 2014). Yet even in China, with its strong bureaucracy and statistical system, the pace and complexity of movement is so great that the Government has to resort to monitoring the sales of popular pickles to understand how many people are living where at any given time (Boehler, 2013).

Gathering reliable data and understanding the direction and impacts of social and environmental change becomes progressively harder the more localised the focus becomes. This applies not only to patterns of urban-rural migration but also to patterns of conflict and climate change. We may be able to estimate broad trends at the macro-scale, but this is much harder at smaller scales – individual communities in the case of services, or individual watersheds and basins for large water storage and distribution infrastructure.

It is at these smaller scales – the community and catchment – that critical functions of water service delivery and resource management often take place. The ubiquity of water and the stake that everyone has in it has led, logically, to an emphasis on user involvement in the construction and maintenance of infrastructure, and the management of this natural resource. With several decades' experience, however, we need to revisit this model to see if it is now fit for purpose. Is water management ever 'single interest, single group'? What is achievable through the warmly persuasive yet often unrealistic mantra of popular participation?

The poor sustainability of many water supply systems in developing countries is now well recognised. Across SSA, some estimates suggest that 35- 40% of handpump-equipped water points are 'non-functional', representing a total investment of some US$1.2-1.5 billion over the last 20 years (Baumann, 2009; RWSN, 2010). Detailed post-construction surveys conducted at local levels indicate failure rates can be much higher (Calow et al, 2013). Uncertainty also surrounds the sustainability of community-level behaviour change away from open defecation, and the ability of groups of farmers to take on the operation and maintenance of irrigation infrastructure and water distribution, on the basis that 'participation' will always deliver better outcomes, has also been questioned (Vermillion, 1997; Perry, 2013) .

The causes of such poor sustainability are interrelated, and the evidence on why community-constructed and managed systems fail is extremely patchy. Nevertheless, part of the problem may be an assumption that communities are always static and cohesive enough to maintain their facilities, and that they pass on the skills to do so with little or no external support. Community stasis and cohesion can, however, be threatened by unpredictable change and the choices people make in response, both willingly (migration in search of economic and social opportunity) and unwillingly (distress migration and tensions caused by conflict and disasters). Rapid and less predictable shifts in climate will place still more pressure on the capacity of users to manage systems for irrigation water distribution and drinking water supply without strong support (Howard and Bartram (2010).

Despite this, the dominant models in the sector – from irrigation management transfer to water and sanitation user committees – have become so mainstream that we no longer question whether they can, with little or no support, provide equitable and sustainable outcomes.

In the face of unpredictable socio-economic, political and environmental change, those seeking to support water equity have two key responsibilities. First, financing, implementation and research organisations must develop a more robust evidence base that goes beyond identifying which services are failing (e.g. mapping the functionality of water points) to understanding why they fail. This means looking at the interplay of the socio-political and bio-physical – exploring aspects such as behaviour-change motivation, knowledge transfer, community relations and population mobility, alongside the technical issues of hydrology, climate and technology in rapidly changing environments.

The second task is to build systemic capacity to support users in constructing and managing facilities in the face of change. This involves both governments and (the focus of the next section) the private sector, which already fills a number of entrepreneurial roles at differing scales and levels of formality. The task is especially urgent in fragile contexts that are characterised by socio-political instability and weaknesses in legitimacy and capacity, within and beyond the state itself.

In such contexts, which often fall between the stools of humanitarian response and development, ODI's work suggests that realism, and a focus on tangible entry-points in programme design, may help to develop capacity and legitimacy at the systemic level while supporting community-based water supply, sanitation and hygiene services. While there are limits to what the water sector can do to influence systemic change, external organisations working in such environments need to ask challenging questions about their interventions: who is included and who is excluded, not only from the benefits, but also the responsibilities, of providing and maintaining services; what is the visibility of state actors in front-line service provision; and how can their involvement, accountability and legitimacy be progressively enhanced (Wild and Mason, 2013).

Proposition 2: public-private partnership for water equity must look beyond water stewardship and big contracts

Our second proposition is that the private sector has a key role to play in achieving water equity. We must, however, look beyond the activities of large multinational corporations to an 'informal' sector made up of much smaller, and far more numerous, entrepreneurs.

Recent years have seen a surge in interest in the role of large corporates in the management of water resources. Led by companies in the food and beverage sector, with products linked closely to water, several major multinationals have been looking for a more visible and engaged role in what has, until recently, been seen as a public responsibility. These companies argue that they have an inherent connection to other water users (including poor and marginalised users and the environment) in a web of 'shared risks' and potential shared benefits (Mason, 2013). For these companies, engagement with public entities and civil society on water management problems is therefore a logical response to ensure that their own operations, reputations and license-to-operate are not jeopardised by problems of water quality and quantity, as well as being a contribution to the pursuit of water equity. Collaborations between development finance institutions, non-governmental organisations (NGOs) and businesses have been launched under banners such as 'water stewardship'.[2] These provide increasing scope to put the rhetoric of shared benefits into action and put outcomes to the test.

However, even as these initiatives capture the attention of donors, big business and the research community, we risk missing the bigger picture. As in the 1980s and 1990s, when debates about private vs. public involvement in water management were dominated by controversial contracts and concessions in urban water supply, the focus is still on large companies and particularly those leading the debate on water use and management. Through their supply chains and buying power, these corporations can influence how water and other natural resources are managed. To date, most companies' influence beyond the factory gate is questionable (Ceres and Sustainalytics, 2014). A pre-occupation with big business could also distract us from the fact that water management and services in many developing countries are *already* in private or civil society hands. This domestic 'informal' sector lacks the brand profile of multinational companies, but in most countries plays a critical role in the delivery of water services and in the management of water resources – of varying sizes, at varying scales and with varying degrees of formality, state sanction and oversight.

In the water management domain, for example, small farmers may be the most important private entrepreneurs. Roughly 70% of water withdrawals are for agriculture and, more importantly, agriculture accounts for around 90% of consumptive use. As well as contributing to rural poverty reduction and food security, farmers are also central to the management of water (Allan, 2013). To fulfil these roles effectively, however, farmers need secure access and entitlements to land and water, and recognition as key actors in the management of land and water rights rather than passive recipients and implementers of regulation.

In water supply and sanitation service provision, the importance of the small and often informal domestic private sector has been recognised for decades, but has often been viewed as a problem. The normal characterisation is one of an exploitative system that results in, for example, a poorer household relying on a street water vendor in Maputo's *bairros* paying more per litre than a wealthier household in the *cidade de cimento*, which gets its water from the official utility.

As the NGO Water and Sanitation for the Urban Poor (WSUP) is demonstrating, however, a utility can create space for community-level entrepreneurs to enable rather than exploit poor users by, for example, contracting them to help households overcome the administrative hurdles of getting a connection to the official utility (Mason and Tucker, 2013). In the case of sanitation, support for local private businesses to provide sanitation goods and services is gaining recognition as a necessary supply-side counterpart to the mobilisation of household demand. The examples that stand out include Sanergy in Kenya, which supports small businesses throughout the urban sanitation chain (Sanergy, 2013), and financially sustainable models for community-managed toilets in slums in Tiruchirappalli and other Indian cities (WaterAid, 2008).

The local private sector's contribution to water equity may be small in individual terms but hugely significant in the round. The first step, then, is to give the role and contribution of small and medium-scale enterprises (SMEs) in water the same level of resourcing and research attention as the efforts of big business.

Beyond this, focused work is needed to understand the blockages that stop the domestic private sector playing a more effective and equitable role in water management and services. In sanitation, for example, bottlenecks range from limited diversification in hardware products and components, to tenancy regulations that discourage households from upgrading their properties by installing a toilet. In small-scale irrigation, a focus by the water community on technical considerations, such as water productivity, means that other important dimensions (such as an understanding of and access to markets) have been neglected, constraining attempts to unlock the potential of small farmers as water managers.

Overall, regardless of whether we are dealing with big or small businesses, it is necessary to move beyond ideological positions about what public and private sectors should do, and focus on what, given their incentives and constraints, they can add.

Proposition 3: water strategies for economic transformation differ from those for economic growth

At a global scale, the primary human uses of water diverted remain agriculture (roughly 70%, but as much as 90% in some countries), followed by domestic and industrial sectors (19-20%) and, increasingly, power generation (10-11%) (World Bank, 2010). Behind the big sector numbers, water is an input in almost all production, and is essential for the maintenance of healthy ecosystems that support a range of different services. This is the domain of what the 2006 HDR called 'water for livelihoods' – harnessing the productive potential of water for growth and poverty reduction while limiting its destructive aspects, the most visible being floods and droughts.

While the economic arguments for investment in water, sanitation and hygiene (WASH) are now well rehearsed (e.g. Hutton, 2012), there is surprisingly little evidence on the links between the development of water resources and economic growth. More importantly, the relationship between water development and poverty (looking beyond GDP or average income) remains under-researched. Most commentators agree that investment in the hardware of water storage and conveyance is essential to generate wealth and mitigate risk, but links to poverty reduction remain inferred or assumed. So what do we know, and what can we hypothesise?

First, water infrastructure and management, including the ability to store, distribute and allocate water across competing uses, matter more than endowments – the sheer availability of water. The 'red flagging' of a country under a crude water scarcity index means little in itself. Of the current 23 water-scarce countries defined by national metrics, 12 are middle-income countries (MICs) and only three are low-income countries (LICs). In SSA, water resource endowments compare favourably in absolute terms with countries in other parts of the world: the region has roughly 9% of the world's water resources and 6,000 cubic metres of annual water resources per capita, compared with Asia's 4,000 and just 1,500 in the Middle East and North Africa (Foster and Briceno-Garmendia, 2010). Yet SSA has the lowest water withdrawal per capita of any region because it has only just begun to mobilise its considerable water assets for agriculture, energy and industry.

A more important point, beyond water resource availability, is around the seasonal and inter-annual variability of rainfall and hydrology - a significant and measurable factor in economic performance with a disproportionate impact on the economies of SSA (Brown and Lall, 2006). More broadly, research by scientists in 30 countries has concluded that the 'sleeping giant' of water challenges in the rapidly changing societies of Africa, Asia and Latin America is not physical scarcity, but the inefficient use and inequitable distribution of water in the key river basins of the Nile, Ganges, Yellow, Niger and Volta and the Andes mountains (Cook et al., 2011).

Second, investment in water infrastructure in SSA is accelerating rapidly, albeit from a very low base. For example, although water is vital for agriculture, and irrigation provides a buffer against rainfall variability, only 5% of Africa's cultivated land is irrigated, and most of this is concentrated in just three countries – Madagascar, South Africa and Sudan. Over the past 40 years, only four million hectares of new irrigation has been developed in SSA, by far the smallest expansion of any region (Foster, V and Briceno-Garmendia, 2010).

This situation is now changing. Sustainable land management and reliable water control form the centrepiece of major new initiatives such as the Partnership for Agricultural Water for Africa (AgWa) under the Comprehensive Africa Agricultural Development Programme (CAADP), Feed the Future and The New Alliance for Food Security and Nutrition. In Ethiopia, a country that has suffered more than most from chronic food insecurity linked (in part) to climate risk, the latest poverty reduction plan aims to triple the irrigated area by 2020. In Kenya, the government's medium term plan aims for 400,000 hectares of new irrigation by 2030. And beneath the statistical radar, smallholder-based groundwater irrigation is beginning to take off as urban and rural economies converge, markets open up and cheap pumps from India and China make irrigation more attractive. Improved agricultural water management and irrigation expansion, so the argument runs, will boost yields, increase climate resilience and reduce poverty.

Third, growing and increasingly affluent populations also need energy. In Africa, however, generation capacity, electricity access and reliability of supply fall way behind the levels seen in other regions. The 48 countries of SSA (with 800 million people) generate roughly the same power as Spain (with 45 million people), and per capita power consumption is falling. Yet hydropower remains underdeveloped in Africa, with substantial untapped potential (Foster, V and Briceno-Garmendia, 2010). As in agriculture, the situation is changing – and changing fast – with a resurgence in investment, globally, for hydropower dams that generate 'clean' energy, and contribute to irrigation and flood control. New actors, principally Chinese and private banks, are changing the financing landscape, with some reports suggesting Chinese finance now supports half of new hydropower dams constructed globally. New financing tools, such as carbon trading, are playing their part too (Skinner and Haas, 2014).

So what of our initial proposition – that water strategies for economic transformation differ from those that promote economic growth alone? The key contention here is that while harnessing water for productive use and mitigating environmental risk is central to the development ambitions of many countries, particularly in SSA, new infrastructure is not intrinsically good for the poor if parallel investments in the institutional 'plumbing' of rights and allocation are missing. Specifically, investments in water storage, conveyance and distribution do not guarantee secure benefit streams for poor people, or preserve the environmental assets on which they depend, if entitlements are eroded and the benefits from water use are captured by powerful groups. Hydropower may, for example, allow an expansion of electricity in low income slum areas – or deliver power to and generate foreign exchange from other users.

There is much to learn from the experience, and mistakes, seen in Asia, from the risks of de facto privatisation of a common resource to the transfer of wealth from poorer to richer groups with more concentrated and influential interests. For example, large irrigation projects in South Asia have consistently under-performed, failing to deliver the expected benefits – directly or indirectly – to poorer farmers with weak or non-existent land and water rights (Comprehensive Assessment of Water Management in Agriculture, 2007). In the Mekong, where fish is the most important source of animal protein, poverty reduction may be threatened by a new wave of dam building. And in China, even a tightly controlled media has let slip that damming the Yangtze has incurred massive and largely unforeseen social and environmental costs. Indeed research published recently points to evidence that budgets for large hydropower projects systematically understate actual costs, under-value or ignore inflation and debt servicing, and downplay or under value environmental and social costs (Ansar et al., forthcoming). The conclusion we draw here is not that no new hydropower plants should be built, but rather that planning systems and licensing processes for major energy and water infrastructure need to be designed and managed differently, to achieve greater transparency and accountability, and with more open debate of alternatives. Moreover, as new sources of finance for big infrastructure come on-stream, by-passing international environmental and social safeguards, the need to strengthen national legislation and decision-making frameworks for water allocation becomes ever more important.

What are the implications? In short, water strategies for economic transformation may need to include a deliberate break with the past, and the development of a much clearer understanding of *'how'* and *'for whom'* water resources should be developed (Hatfield-Dodds, 2006). With the benefit of hindsight, many previous water developments have missed opportunities and incurred unforeseen costs, with insufficient attention given to poverty reduction, even where overall (net) gains have been positive. This implies not just better design and implementation of infrastructure; it also means investing in national water resources management to ensure that the claims and entitlements of poorer people are protected and strengthened.

Proposition 4: water-resources management is an urgent priority – governments and donors need to re-engage

So, if we want to avoid water 'capture and control', and ensure that new demands can be met without compromising the entitlements of the poor, what tools do we have and what are the trade-offs? In most parts of world, water accounting and allocation systems are rudimentary at best, and certainly ill-equipped to deal with the stresses of climate, land and demographic change (ERD, 2011). And there remains precious little hard evidence on 'what works' as far as institutional arrangements for pro-poor water resources management are concerned (Hepworth et al. 2012).

This has not stopped sector professionals and donors articulating a vision of how water resources *should* be managed. Water should be treated as both a social and an economic good – allocated to its most valuable uses while protecting the environment and ensuring that basic needs are met. Water withdrawals, use and waste disposal should be integrated to account for interdependencies and externalities, and administered through licensing and pricing systems. And more broadly, management and governance should be integrated across sectors and scales, moving away from decision-making silos to greater policy coherence. The vision, captured under the banner of integrated water-resources management (IWRM) for three decades and more recently under the water, energy and land/food 'nexus' has tremendous intuitive appeal. The problem is that the implementation of 'integration' or 'nexus approaches' remain elusive, and the debate is still couched in language that suggests system optimisation can be achieved with the right 'awareness', 'technical capacity building' and 'political will'.

There is no doubt that siloes do exist for water services and water resources management, and between agriculture, energy, industry and many other sectors. This is a reasonable preoccupation for water specialists who, nonetheless, persist in talking about water and all of its uses as a single 'sector'. But siloes mean very little to anyone else. The interplay and overlap happens, whether for pastoralists using water from a borehole for themselves and their cattle, or for a city utility that is negotiating bulk supply. Focusing on end-users and identifying where the overlaps already occur would be a first step in

designing useful kinds of support. Indeed a focus on 'integration' as an end goal rather than a means to an end can get in the way of more pragmatic, problem-focussed solutions that put people rather than systems or siloes centre stage (Molle, 2008; Giordano and Shah, 2014). Similarly, much of the debate continues to take place in an unrealistic planning framework from which the political dynamics and deep-rooted governance problems that lie behind 'irrational' and 'fragmented' decision-making have been entirely abstracted.

China is one country grappling with growing competition for water, limited supply in its northern regions and significant hydrological variability. Here, ODI research is looking at how decision-makers are crafting and implementing new policies aimed at managing and reallocating water following decades of 'build-augment-control'. China's economic growth has come at a high environmental cost with growing water scarcity, exacerbated by pollution, reckoned to cost the country 2-3% of its GDP. Environmental degradation has become a hot political issue, with a 'war on pollution' declared by Premier Li Keqiang at the recent annual meeting of the National People's Congress. Water scarcity is especially acute in the drier north, where the success of state-funded irrigation along the Yellow River has contributed to today's problems. In particular, spiralling urban and industrial demand is raising difficult political questions about how to protect rural livelihoods and meet grain targets while releasing water to thirsty cities (Calow et al, 2009).

Faced with this conundrum, policy makers have allowed provincial and local government the space to innovate. What has followed, with the backing of a revised (2002) Water Law that pushes principles rather than prescriptions, is a series of pilot schemes along the Yellow River that incentivise irrigation managers and farmers to release water for the cities downstream. At the same time, the Government has invested heavily in land and water management to liberate 'more crop per drop', helping to ensure that farmers don't lose out. In some cases, the money has come directly from downstream industries and municipalities that are keen to use or bank the savings (Calow et al, 2009).

A similar 'learning by doing' approach has been adopted *within* irrigation districts, with a variety of contracting and water user association (WUA) models piloted to see what works best for local operation, maintenance and cost-recovery. In each case, we see engagement with the 'nuts and bolts' issues of rewards and incentives, the clarification of roles, responsibilities and accountabilities and, above all, getting results in terms of improved services, better fee collection and more crop and income per drop (Shah et al, 2004; Calow et al, 2009). What we don't see are process-orientated blueprints.

ODI's work in eastern and southern Africa illustrates some rather different challenges, and the problems that can arise when donor agendas in aid-dependent countries change course. Ethiopia, for example, has a relatively generous endowment of water, but this is distributed very unevenly in space and time. Unmitigated hydrological variability costs the economy perhaps one third of its growth potential (World Bank, 2006), yet investments to address this and harness the country's considerable water assets for power, food production, livestock, manufacturing and improvements in livelihoods have, historically, been very limited. In part, the necessary water-resources development in Ethiopia, and indeed throughout SSA, has been hampered by a donor agenda that favoured IWRM when resource development was a priority, and is now silent on resource management just as investments in infrastructure, and competition for water, are ramping up. The danger in Ethiopia, and elsewhere in SSA where water development is accelerating rapidly, is that unconstrained development and weak management will squander opportunities for the kind of broad-based, transformative growth highlighted above, eroding the entitlements of those with a stake – but little voice – in water decisions.

What needs to be done? First, governments and their development partners need to re-engage with water *resources*, but the conversation need to change. This means focusing more on people and their use and needs for water, and less on top-down integration and unrealistic planning frameworks. There is both a need and an opportunity to avoid repetition, and to begin connecting debates on resource management with existing bodies of knowledge and analysis on governance and politics learned over the last 30 years or more. Finally, we need to recognise that there are few quick wins: investment in institution building – registration systems, water accounting, strengthening of customary rights, allocation licensing, environmental assessment, stakeholder platforms, pollution control – is a long-term endeavour. If we are to maximise the benefits from the new wave of infrastructure investment in Africa in particular, and ensure that these are broadly shared in ways that reduce poverty, we need to begin in earnest.

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Endnotes

1. Data derived from linear projections of the WHO and UNICEF JMP statistics on change in water supply and sanitation coverage, 1990-2011 (themselves based on linear trend lines drawn through country household survey estimates), compared against UN-DESA Population Division projected populations. Fragile states classification from OECD.

2. For example, GIZ's International Water Stewardship Programme, supported by the German and British Governments.

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