2 Water resources management

Kristen Lewis and Roberto Lenton introduce the major challenges for water resources management in their lead piece, sketching out the different forms of corruption in the sector and presenting their consequences with a set of case studies that cover water pollution and environmental sustainability, watershed management and water allocation. They conclude with a set of recommendations on how to tackle corruption in the sector. Transparency International explores how corruption in the water sector affects the mitigation and adaptation efforts with regard to climate change. John Butterworth discusses under what circumstances integrated water resources management (IWRM) offers a promising framework for making water resources management more accountable. Drewery Dyke presents a case study from Afghanistan that shows how local power plays and corruption seize water resources. Enriqueta Abad's contribution on Spain underscores that corruption in industrialised countries can also have serious consequences on local water availability. A final contribution by TI to this section explores the important transboundary dimension of water resources management and examines how corruption in this area runs the risk of undermining regional cooperation and security.

Corruption and water resources management: threats to quality, equitable access and environmental sustainability

Kristen Lewis and Roberto Lenton[1]

Few things are more fundamental to sustainable development than ensuring that the management of the world's water resources is sustainable, equitable, efficient and free from significant governance failures, including corruption. Unfortunately, this ideal has yet to be realised. Water resources management (WRM) means *all actions required to manage and control freshwater to meet human and environmental needs*. These actions include not only an array of governance and management measures but also investment in physical infrastructure for storing, extracting, conveying, controlling and treating water. WRM also includes efforts to protect groundwater, control salinity and promote water conservation.

In short, water resources management is about the fundamental rules of the game. How should water resources be shared among agricultural, industrial, environmental and recreational uses?

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How should water sustainability, quality and aesthetic appeal be valued, and to what extent should they be traded off against competing uses? Who is entitled to use how much? Given the defining role of water for health, livelihoods, economic development, settlement patterns, food production, competitive industrial advantage and, increasingly, tourism, these questions are intimately linked to fundamental decisions about national development strategies and urban planning, as well as political alignments, social equity and cohesion.

The challenges for WRM are formidable: in many places in the world, a large gap between water supply and demand has opened, and it is expected to grow dramatically in the near future.

Competition for water is heating up everywhere. Continuing population growth and urbanisation, shifting dietary habits towards more water-intensive foods, spiralling demand for new fuel crops and expanding water-intensive industries all contribute to ever-growing demand. At the same time, water pollution, degraded ecosystems and global warming[2] endanger local water recharge, quality and sustainable supply around the world.
The numbers speak for themselves.

- Over the past 100 years the world's population has quadrupled while water consumption has risen sevenfold. Water scarcity already affects local regions on every continent, in particular South Asia, China, sub-Saharan Africa, the Middle East, Australia, the western United States and South America's Andean region. By 2025 more than 3 billion people could be living in water-stressed countries. Most distressingly, some of the most affected countries already exhibit a high incidence of poverty and population growth.[3]
- One-fourth of the African population faces chronic water stress,[4] and by 2025 the population in water-stressed regions in sub-Saharan Africa is expected to rise from 30 to 85 per cent.[5]
- Due to overuse and pollution, water-based ecosystems are considered the world's most degraded natural resource. In northern China, 25 per cent of the Yellow River's flow is needed to maintain the ecosystem around it, but human overuse only leaves 10 per cent for one of the greatest arteries of life in East Asia.[6] In Africa, the ecosystem of Lake Victoria, the second largest lake in the world, is in serious decline partly due to pollution.[7]
- Overuse and deterioration of surface water resources has led to a pumping race for groundwater, rapidly depleting aquifers and often leading to saltwater intrusion that makes them unusable. In Yemen, parts of India and northern China, water tables are falling at more than one metre a year, and in Mexico extraction from a quarter of all aquifers exceeds sustainable levels.[8]

Competition for water, already intense, will worsen still with climate change. This competition revolves around water systems that are increasingly vulnerable to pollution, overexploitation and desiccation. Tackling corruption in such a context is as difficult as it is imperative.

2 See article starting on page 28.
3 United Nations Development Programme (UNDP), *Human Development Report 2006*. *Beyond Scarcity: Power, Poverty and the Global Water Crisis* (New York: Palgrave Macmillan, 2006).
4 World Water Assessment Programme, United Nations Educational, Scientific, and Cultural Organization (UNESCO), 'Water, a Shared Responsibility', World Water Development Report no. 2 (New York: UNESCO, 2006).
5 UNDP, 2006.
6 Ibid.
7 World Water Assessment Programme, 2006.
8 UNDP, 2006.

An overview of corruption in WRM

It is important to begin with a caveat: the nature, extent and effects of corruption in irrigation and drinking water supply are well documented, but there have been few systematic inquiries into corruption in water resources management. Nonetheless, it is clear that factors that allow for corruption to take hold in water service sectors also exist in WRM, and, indeed, many cases of corruption in WRM have come to light in recent years.

Corruption in water resources management appears to be closely interlinked with a range of other unethical practices, as well as with governance failures. It is difficult and of limited practical value to draw a strict line between corruption on the one hand and the lack of laws, frameworks, resources, awareness and capacity on the other. Indeed, corruption can be a cause for, consequence of and contributing factor to wider policy failures. Corruption in WRM can therefore be broadly grouped into three areas.[9]

- Corruption related to *water allocation and sharing,* including bribes to obtain water permits and cover up overuse of water resources; patronage or policy capture to skew decisions on water transfers; and allocations favouring specific interests in exchange for money or political support.
- Corruption related to *water pollution*, including kickbacks to regulatory officials to cover up pollution or to distort environmental assessments; and policy capture or bribes to enable deforestation in watersheds.
- Corruption related to *public works and management*, including bid-rigging and collusion among contractors, embezzling WRM funds, buying appointments and promotion in WRM bureaucracies, and favouring construction of large infrastructure projects over other options because of policy-makers' corruption opportunities.

Importantly, corruption and policy failures indirectly related to water resources management often have a strong impact on water quality, availability and distribution. Allowing illegal logging in watersheds, for example, can affect watershed management, modifying streamflows, hurting downstream water users, harming wildlife and causing soil erosion. Unauthorised urban development can adversely affect local water regimes. And allowing overdevelopment of coastal resorts can impact on local water sustainability, for example by exacerbating salinity intrusion. Corruption-fuelled overdevelopment along Spain's coast has aggravated concerns about water shortages while landing dozens of politicians and officials in jail.[10]

The effects of corruption in WRM also have three components.

- *Impacts on economic efficiency.* Water is an important input factor in many economic sectors, including agriculture, fisheries, industry, transport and, in its recreational function, tourism. Corruption can distort the most productive allocation of water among these competing uses while generally inflating the overall cost of supplying and treating water.

9 Examples drawn from P. Stålgren, 'Corruption in the Water Sector: Causes, Consequences and Potential Reform', Policy Brief no. 4 (Stockholm: Swedish Water House, 2006).

10 See article starting on page 35.

- *Impacts on social equity, cohesion and poverty reduction*. Water allocation equals power, and policy capture can instrumentalise WRM to favour specific ethnic groups or business interests – with adverse consequences for poverty reduction, social equality and political stability.
- *Impacts on environmental sustainability and health*. Corruption that leads to water pollution and overexploitation not only has serious consequences for human and animal health and sustainable water supply, it also contributes to degradation of wetlands and other valuable ecosystems, with long-term consequences for livelihoods, development prospects, and wildlife preservation and restoration.

What makes WRM vulnerable to corruption?

Corruption can find fertile ground in water resources management for a number of reasons. First, some stakeholders cannot raise their voices to demand accountability. The fight against corruption in irrigation, drinking water supply and hydropower finds natural allies in those corruption affects most: farmers, households, and communities to be resettled. But in WRM, some important stakeholders are not directly represented in the domestic political arena and thus go unheard: the environment, future generations and, in the case of transboundary waters, water users in foreign countries.

Second, water resources management is extremely complicated, both conceptually and practically. WRM is interlinked in complex ways with environmental systems that themselves are highly complex and often poorly understood by decision-makers and the general public. Similarly, WRM is tasked to deal with a resource that sometimes stretches across vast areas and crosses borders, literally often underground in the form of aquifers, generating multifaceted hydrological interconnections between uses and users that are far from being fully mapped.[11] The resulting veil of obscurity breaks the direct link between a corrupt act and its impact, making it difficult to apportion blame and helping corruption go undetected and unpunished. And, to a much greater extent than in water service sub-sectors, systematic research on corruption in WRM is in short supply, raising doubts about its nature and extent and further contributing to its low profile on the policy agenda.

The large scale and technical complexity of many WRM infrastructure projects can make oversight difficult, rendering the sector vulnerable to corruption. Many large water management projects, such as water storage or inter-basin transfers, are customised engineering endeavours that require expert input for environmental, hydrological and geological questions, as well as for socio-economic, legal and financial issues. Private sector experts – consulting firms, financiers and specialised building contractors – are called upon to help implement such projects. But public authorities in many countries may find it difficult to muster the breadth and depth of expertise to oversee such multifaceted projects effectively.

11 World Water Assessment Programme, 2006.

Big-ticket, fast-paced public construction works offer many opportunities for personal enrichment, and WRM includes many such projects. Such projects require numerous layers of official approval, use large amounts of tax money and face various risks of delay and overruns. These factors offer multiple opportunities and incentives for hold-ups, extortion and collusion in awarding contracts, granting permits and concealing poor-quality work.

In addition, a weak framework for environmental protection and flimsy enforcement mechanisms often let corruption in WRM off the hook. Legal and regulatory weakness is pronounced in the environmental area in many countries, and corruption contributes to environmental degradation. Limited monitoring capacities and toothless punishments for environmental pollution offer little deterrence to water polluters. Developing countries in particular face serious resource and capacity issues with regard to their legal and regulatory framework for addressing environmental issues, including water and watershed management. Even those with strong laws on the books can find themselves hamstrung by a lack of resources when it comes to enforcement.

Mobilising against corruption in WRM is also not easy. The diversity of stakeholders and interests that are involved in WRM makes it difficult to find common ground. In water resources management, many different and often competing actors and sectors vie for the same resources. But they are not pursuing common ends, they operate on very different value frameworks and they often have very few connections and shared organisational structures. These factors make establishing a cross-cutting anti-corruption platform very difficult. Common professional standards, values and organisational structures to discuss and negotiate frameworks for resource sharing can help instil anti-corruption norms and community pressure for responsible behaviour and prevent a corrupt free-for-all.

Finally, WRM has many public masters and often insufficient coordination. Domestic water supply often resides in the health ministry, and irrigation in the agricultural ministry. But water resources management often falls between the stools in terms of institutional responsibility and accountability. Responsibility for water resources is sometimes housed in environment ministries or paired with forestry – but this arrangement leaves out water for household use, water for agriculture, water for energy, water for industry and water for transport, all important aspects of WRM. This lack of clear accountability can create opportunities for corruption to take hold.

Sustainability, water-sharing and corruption: where things have gone awry

Enrichment in watershed management: India

In India, watershed management programmes were launched by the government at a significant scale in the early 1970s. Research[12] shows that, in the early stages of the programmes' development when the main implementing agencies were government departments, financial

12 C. Lobo, 'Reducing Rent Seeking and Dissipative Payments: Introducing Accountability Mechanisms in Watershed Development Programs in India', presentation at World Water Week, Stockholm, August 2005.

'leakages' were of the order of 30–45 per cent of approved amounts. Approved plans included costs that were overestimated by at least 15–25 per cent through the overdesign of structures and misrepresentation of labour requirements, deceptions that then set the stage for the diversion of funds during implementation. This was achieved in several ways, such as forcing labourers to pay a fee in order to gain entry into the workforce, or not adhering to design specifications – using less cement than required, digging trenches to less than the specified depth, planting fewer saplings than the design called for, etc. The net result was not only an increase in implementation costs but also a reduction in capacity to mitigate droughts, augment usable water resources and improve productivity. Later on, when the government actively involved people in implementation, devolved funds to a village body and issued new guidelines, financial leakages were reduced to 20–35 per cent of approved amounts – largely because villagers became more aware of how much money was received and for what purpose.

Water pollution and corruption: China

China's water pollution problems have reached shocking levels. Estimates suggest that aquifers in 90 per cent of Chinese cities are polluted, more than 75 per cent of river water flowing through urban areas is considered unsuitable for drinking or fishing and 30 per cent of river water throughout the country is regarded as unfit for agricultural or industrial use.

The consequences are equally devastating. Two-thirds of China's approximately 660 cities have less water than they need and 110 of them suffer severe shortages. About 700 million people drink water contaminated with animal and human waste. Water pollution has sickened 190 million Chinese and it causes an estimated 60,000 premature deaths every year. Environmental degradation and pollution is believed to cut into China's GDP by 8–12 per cent annually.

The situation is not surprising, given that 13,000 petrochemical factories out of the national total of 21,000 were built along the Yangtze and Yellow rivers, and an estimated 41 per cent of China's wastewater is dumped in the Yangtze alone.

Corruption is a significant factor in the problem. Although China has more than 1,200 anti-corruption laws, bribery, kickbacks and theft account for an estimated 10 per cent of government spending and transactions, with infrastructure projects and procurement among the hot spots. Only a half of the money earmarked for environmental protection between 2001 and 2005 was judged to have been spent on legitimate projects.[13]

Laws and regulations against environmental pollution do exist,[14] but they are weak, poorly monitored and rarely enforced. Only a fourth of factories in 509 cities properly treat sewage before disposing of it, according to a 2005 survey. A company owner admitted in an interview

13 M. Pei, 'Corruption Threatens China's Future', Policy Brief no. 55 (Washington, DC: Carnegie Endowment for International Peace, 2007); E. C. Economy, 'The Great Leap Backward?', *Foreign Affairs*, vol. 86, no. 2 (2007).

14 L. Buckley, 'Valuing Ecosystem Services: An Answer for China's Watersheds?', Worldwatch Institute, 11 September 2007.

he would ignore guidelines to install cleaner technologies since they would cost as much as fifteen years' worth of fines. The national environmental protection agency (SEPA) tries to enforce regulations with fewer than 1,000 full-time employees, less than one-tenth the staff at the disposal of its US counterpart. This makes environmental protection an uphill battle. SEPA director Zhou Shengxian, as reported by Xinhua News Agency, put it the following way: 'The failure to abide by the law, lax law enforcement, and allowing lawbreakers to go free are still serious problems in many places.'[15] He further complained that some local government leaders directly interfere in environmental enforcement by threatening to remove, demote and retaliate against environmental officials. Local enforcement agencies usually report to local officials, who often have personal or financial relations with polluting factories. And these officials have been found in many cases to put pressure on courts, the media or even hospitals to cover up pollution.[16]

Bribery and bid-rigging in water transfer projects: Lesotho

Managing water resources includes massive investments in infrastructure for storage, extraction, conveyance and control. 'Grand corruption' in WRM can arise in the design and construction of such big-ticket projects.

Perhaps the best-known case is the Lesotho Highlands Water Project, a US$8 billion project involving the construction of dams and canals for water transfer and supply, hydroelectric power generation and rural development. The chief executive of the Lesotho Highlands Development Agency was found guilty of accepting more than US$6 million in bribes from multinational companies to secure tenders, and in 2002 he was sentenced to eighteen years in prison. Multinationals from the United Kingdom, France, Germany, Italy, Canada and other countries were also prosecuted for seeking to influence the tendering procedure.[17]

The Lesotho case raises two issues of particular relevance to WRM. The lure of milking big-ticket projects for private gain may keep officials from exploring a wider range of alternatives, such as water conservation. In particular, corrupt decision-makers may favour projects where corruption rents are concentrated, and can be easily appropriated by them or their chosen cronies, over smaller projects, which disperse corruption rents more widely.

Second, because the Lesotho case occurred in the context of a large international water-sharing arrangement, the question is whether these agreements may offer incentives or disincentives for corrupt behaviour. Admittedly, these arrangements can be highly complex – technically, financially and administratively – and thereby provide potential entry points for corruption.[18] But this means comparing them to a situation without any joint governance

15 Statement made by Zhou Shengxian on 26 December 2006, reported in many sources including www.chinadaily.com.cn/china/2006-12/27/content_768328.htm.

16 *Financial Times* (UK), 5 July 2007; E. C. Economy, 2007; *Financial Times* (UK), 24 July 2007.

17 The Lesotho case has been extensively documented. For more, see *Global Corruption Report 2007*. Examples of media reports include *Business Day* (South Africa), 23 August 2004, and *Pambazuka News* (Africa), 8 August 2004.

18 See article starting on page 37.

frameworks and thus without the mutual gains from joint projects and without any regulation of excessive water abstraction or pollution across borders.

In addition, water-sharing arrangements can also open new opportunities for keeping corruption more effectively in check. In essence they are power-sharing agreements that give each party a strong incentive to watch the others to ensure they do not take more than their fair share. As such, 'competitive oversight' among riparian nations, coupled with assistance in capacity building provided by supporting governments and international institutions, can create an environment less conducive to corruption. Indeed, one could argue the Lesotho scandal came to light because of the involvement of other interested and engaged countries.

Practical measures to prevent and limit corruption in WRM

The fight against corruption in water resources management can be advanced through a mix of initiatives.

Institutional reform

Governments can undertake institutional reforms that clarify the WRM responsibilities of different agencies and establish formal mechanisms for public participation, as well as transparency for the entire decision-making process. They can lay down clear criteria for decision-making that also recognise social and environmental factors, such as the need to maintain *environmental flow,* the minimum volume of water throughput required to safeguard the basic functioning of a hydrological system. Water resource agencies should adopt policies and procedures that require the systematic analysis of project alternatives prior to decision-making.[19] Such policies would help ensure that major investment decisions are made based on clear economic, social and environmental criteria, and reduce the opportunities for decisions to be made because of their potential for private gain. Such policies would need to be complemented by clear policies on such issues as procurement of both goods and services.

Such reforms need not reinvent the wheel but can be guided by established principles and models for water resources management spelled out by the 1992 Dublin Principles (see Box 1), and by transparency and participation standards included in the 1998 UN Economic Commission for Europe's Aarhus Convention.[20] With regard to water-sharing across states, the 1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses provides an important template for cooperation and equitable transboundary water-sharing.[21]

19 One example of such a policy is the World Bank's operational directive 4.01, which states that the analysis of alternatives should include 'a systematic comparison of the proposed investment design, site, technology and operational alternatives in terms of their potential environment impacts, capital and recurrent costs'.

20 UN Economic Commission for Europe, 'Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters', 25 June 1998. See www.unece.org/env/pp/documents/cep43e.pdf.

21 Convention on the Law of the Non-navigational Uses of International Watercourses, adopted by the General Assembly of the United Nations on 21 May 1997. See untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf.

Donors and international financial institutions can also do their share by adhering to proactive information disclosure and consultation for WRM projects they finance and commission, and by putting in place effective sanctions against corrupt employees and contractors. Development projects can be designed so they do not reinforce local power structures that underpin corrupt water-sharing arrangements.[22]

Box 1 Integrated water resources management and the Dublin Principles

IWRM is a process that promotes the coordinated development and management of water, land and related resources with a view to maximising economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.[23] IWRM has three goals: environmental and ecological sustainability, economic efficiency in water use, and equity and participation.[24]

At the heart of IWRM lie the Dublin Principles,[25] established at the 1992 International Conference on Water and the Environment in Dublin, which was held in preparation for the 1992 Rio Earth Summit.

- Principle no. 1: fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.
- Principle no. 2: water development and management should be based on a participatory, public approach, involving users, planners and policy-makers.
- Principle no. 3: women play a central part in providing, managing and safeguarding water.
- Principle no. 4: water has an economic value in all its competing uses and should be recognised as an economic good.

A second set of approaches recognises that a larger constellation of stakeholders are essential for tackling corruption in WRM.

Shining the spotlight on irresponsible WRM

A better understanding of water flows, interdependencies and environmental dynamics such as recharge rates and critical thresholds is required. This will make the implications of WRM

22 See article starting on page 33.
23 Global Water Partnership, 'Integrated Water Resources Management', Technical Advisory Committee (TAC) Background Paper no. 4 (Stockholm: Global Water Partnership, 2000).
24 See article starting on page 31.
25 M. Solanes and F. Gonzalez-Villarreal, 'The Dublin Principles for Water as Reflected in a Comparative Assessment of Institutional and Legal Arrangements for Integrated Water Resource Management', TAC Background Paper no. 3 (Stockholm: Global Water Partnership, 1999).

choices more visible and encourage decision-making that considers all stakeholders in a shared river basin context.[26] The research community can make an important contribution by developing and implementing more refined indicators for equitable and sustainable water sharing and modelling the implications of specific decisions on all involved stakeholders. These steps would provide important information tools for consultation and inclusive WRM decision-making.

An instructive example is the eco-regional assessment of the upper Yangtze River, which combines detailed hydrological, environmental and socio-economic datasets. The resulting simulation model not only informs WRM decisions but also provides a planning platform to bring together different stakeholders and forge a consensus around specific WRM strategies. All these measures make policy capture more difficult.[27]

Shaming water polluters into cleaning up their act

Civil society initiatives and the media can help put the spotlight on environmental polluters. This can be particularly effective where powerful local corruption networks thwart attempts by weak regulators to enforce environmental regulations. In 2006 the Institute of Public and Environmental Affairs in Beijing launched the China Water Pollution Map, a public, searchable, online database that meticulously records water pollution by more than 2,500 polluting enterprises, including some foreign-owned ones. Similar disclosure and shaming initiatives, such as the Toxic Release Inventory established in 1986 in the United States, have successfully contributed to a sharp reduction in environmental pollution.[28]

Strengthening communities for more accountable watershed management

The public at large is critical in the fight against corruption in a number of ways, from voting corrupt politicians out of office, to demanding greater accountability, to becoming involved in environmental monitoring and protection. In response to the corruption in Maharashtra, India, in watershed management, the Watershed Organisation Trust in Maharashtra has developed an approach based on participation, transparency and accountability that has shown promising results. The NGO's initiatives include support for establishing self-help groups for local groups and villagers, and participatory impact monitoring and peer group reviews, in which villagers visit watershed projects in other villages to compare experience and performance. In addition to strengthening accountability of watershed management, the participating villagers have developed greater confidence and ability to deal with officialdom – which has translated into a

26 World Water Assessment Programme, 2006.

27 S. Zhang, 'China Blueprint: Eco-Regional Assessment of the Upper Yangtze River', presentation at World Water Week, Stockholm, August 2007.

28 P. H. Sand, 'The Right to Know: Environmental Information Disclosure by Government and Industry', in F. Biermann, R. Brohm and K. Dingwerth (eds.), *Proceedings of the 2001 Conference on the Human Dimensions of Global Environmental Change*, Report no. 80 (Potsdam: Potsdam Institute for Climate Impact Research, 2002).

lower tolerance to being short-changed. In addition, several of these tools have by now been adopted by government and donor-funded watershed programmes in the country.[29]

Filling the research and awareness void

Finally, developing practical ways forward is clearly hampered by the paucity of research on corruption in the context of water resources management. There is a virtual absence of rigorous studies documenting the scope and impacts of corruption across the spectrum of water resources management, despite the clear evidence that some types of water management actions are prone to corruption. This situation undoubtedly reflects the relative lack of detailed field-based research on how water resources management actually works and the practicalities of administering and financing it. It needs to be remedied, however, if we are to understand more fully the role of corruption in the management of water resources and put in place measures to prevent and limit corrupt practices.

29 C. Lobo, 2005.

Climate change: raising the stakes for cleaning up corruption in water governance

Transparency International

Few informed people doubt climate change poses the single most important policy challenge to global human development, world peace and prosperity – even the sheer survival of societies in their current form. It is little wonder, then, that this far-reaching problem would affect the issue of water and corruption.

For starters, if global warming continues on its current trajectory, it is expected to change our hydrological systems fundamentally – altering rainfall patterns and river flows, diminishing water storage in the polar ice caps and driving up sea levels, leading to saltwater intrusion into the precious supplies of big cities. The world will see more and larger storms, floods and droughts. Climate change will thus alter the basic properties of water systems around the world and therefore the basic properties on which water governance is built.

More droughts and local water scarcity will increase competition for water – raising risks of corruption

By 2020 between 75 and 250 million people in Africa alone are projected to be exposed to increased water stress due to climate change. This comes on top of already severe local water shortages throughout the world and ever-intensifying competition for water due to

population growth and rising industrial and agricultural demand.[1] When water flows more sparsely, powerful farmers, rich urban dwellers and water-dependent industries will have strong incentives to secure a larger share and continuous supply through bribes at the service level and political lobbying at the policy level.

Less water means more corruption, both grand and petty. And water shortage in conjunction with corrupted water governance increases the risk of social and political conflict. The abysmal conflict in Darfur has been convincingly linked to corrupted governance and local water shortages intensified by climate change.[2] Many more such conflicts can be expected in the future, if global warming continues to unfold.

More extreme weather requires building new water infrastructure – raising the scale of construction and exposing corruption hot spots

Climate change creates additional urgent demands for upgrading existing water infrastructure and building new facilities. Rising sea levels are estimated to create tens or even hundreds of millions more flood victims each year. This will increase demands for coastal protection systems in many parts of the world.[3] Climate change is also expected to require the modification of many existing dams and therefore additional investment in this sector.[4] Global warming could also shrink yields of rain-fed crops in many regions by up to 50 per cent by 2020, raising demand for more irrigation systems.[5] And, in urban areas, more frequent and intense flooding means overflowing sewers and the risk of contamination of shallow groundwater resources. These effects will make investments in floodproof water networks and adequate sanitation infrastructures more urgent.[6]

Given all these predicted implications, global warming is likely to trigger additional demand for new water infrastructures from flood controls and urban water systems to irrigation and hydropower projects. The United Nations Development Programme estimates that at least US$86 billion need to be allocated annually for climate-proofing infrastructure and building the resilience of the poor to the effects of climate change.[7] This makes it even more urgent to tackle corruption in the water sector, so that valuable resources are not squandered.

1 Intergovernmental Panel on Climate Change (IPCC), Working Group II, 'Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability', Summary for Policymakers, April 2007.
2 United Nations Environment Programme (UNEP), 'Sudan: Post-Conflict Environmental Assessment' (Nairobi: UNEP, 2007).
3 N. Stern, *The Economics of Climate Change: The Stern Review* (Cambridge: Cambridge University Press, 2007).
4 World Conservation Union (IUCN), 'Adaptation Framework for Action for the Mediterranean Region: Views from the Athens Roundtable' (Gland, Switzerland: IUCN, 2002).
5 Intergovernmental Panel on Climate Change, 2007.
6 ActionAid International, 'Unjust Waters – Climate Change, Flooding and the Protection of Poor Urban Communities: Experiences from Six African Cities' (2006); see www.actionaid.org/assets/pdf/Unjust Waters5HI%20(2).pdf.
7 United Nations Development Programme (UNDP), *Human Development Report 2007/2008. Fighting Climate Change: Human Solidarity in a Divided World* (New York: Palgrave Macmillan, 2007).

Changing water flows and more floods require resettlement at a massive scale and more frequent emergency relief – both particularly vulnerable to corruption

Even cautious climate change estimates suggest 200 million people may become permanently displaced due to rising sea levels, heavier floods and more intense droughts.[8] As chapter 5 shows, resettlement is a hot spot of corruption, inviting fraud, bribery and embezzlement in reimbursement schemes and land transfers on a massive scale.[9] Emergency relief efforts for floods and storms are equally prone to corruption, as mobilising short-notice help often results in suspending sound procurement rules.

In Bihar, India, eleven government and bank officials and a private contractor were charged with embezzling some US$2.5 million in state funds designated for flood relief efforts in 2005.[10] Similarly, Hurricane Katrina, whose devastation of New Orleans may have been intensified by global warming, spawned scandalously corrupt relief and clean-up efforts. Up to US$2 billion in assistance may have been lost to fraud and waste, more than 250 people have been convicted of fraud and some 22,000 reports of fraud, abuse and waste have flooded into the US Hurricane Fraud Hotline.[11]

Climate change aggravates the global water crisis, and corruption slows down mitigation efforts

Not only does climate change increase corruption risks in the water sector, the relationship also works the other way round: corruption makes it more difficult to tackle climate change and thus further exacerbates the global water crisis.

Attempts of science and policy capture

Arriving at a robust scientific and policy agreement on the existence, effects and urgency of climate change was exceedingly difficult because of the complexity of the subject matter. But the scientific pursuit was also bogged down and inexcusably delayed by the rather dubious activities of some industry players and their government allies. They sponsored and promoted pseudo-scientific claims casting doubt on the reality of global warming in the face of overwhelming evidence to the contrary. And they ruthlessly pushed a special interest policy agenda at a time when the disastrous implications for low-level island countries and future generations were already plain to see. These activities have delayed the timely development of an international policy response to global warming, thereby aggravating the global water crisis.[12]

8 N. Stern, 2007.
9 See article starting on page 85.
10 *Wall Street Journal* (US), 16 August 2007.
11 M. Worth, 'New Orleans-Style Corruption Taints Katrina Recovery', Water Integrity Network, 15 March 2007. Available at www.waterintegritynetwork.net/page/375/#_edn4#_edn4.
12 G. Monbiot, *Heat: How to Stop the Planet Burning* (London: Allen Lane, 2006).

Emissions tradings: the corruption risks of a new currency

Curbing greenhouse gas emissions is an integral part of tackling climate change. Emissions trading – trade in 'permits' for generating carbon dioxide and other greenhouse gases – is becoming an important incentive to reduce emissions. But, as with any new currency and market mechanism, this system can be corrupted at several levels. Creating and certifying emission credits must be transparent and follow independently verifiable criteria. The infant market for emissions must be carefully established and regulated to avoid price manipulations. And the consumption of permits requires credible monitoring and sanctions in case of violations. All these considerable governance challenges have already been subject to fraud and corruption.[13]

The many linkages between climate change, corruption and the water sector have potentially grave implications that demand our prompt attention. Global warming is already exacerbating the global water crisis and amplifying related corruption risks, pushing water governance at many places to the brink of collapse. Climate change makes tackling corruption in the water sector even more urgent and will continue to raise the stakes even further in the coming decades.

13 *Times* (UK), 25 April 2007; *Financial Times* (UK), 28 June 2007.

Can integrated water resources management prevent corruption?

John Butterworth[1]

Reforms based upon a strategy known as integrated water resources management (WRM) are well under way in much of the developed and developing world. They aim to address water scarcity crises, especially in the developing world, and water quality problems, particularly in post-industrial societies such as Europe. IWRM's key feature is promoting decentralisation and user participation while enhancing the regulatory role of states.

Measures typically include appropriate basin or catchment institutions; integrated planning to meet agreed-upon water quantity to quality targets; a system of formal administrative water rights, such as licences to extract or pollute water; cost recovery and water pricing (the 'user pays' principle); market-based mechanisms for reallocating water; and better environmental protection, such as reserving water for ecological purposes and the 'polluter pays' principle.

Can IWRM open the door to corruption risks? What happens when informal water providers, which still probably supply most of the world's water users,[2] transition to more formalised, and supposedly more transparent and accountable, public administration systems?

1 John Butterworth is a programme officer at IRC International Water and Sanitation Centre, Delft, Netherlands.
2 J. Butterworth *et al.*, *Community-based Water Law and Water Resource Management Reform in Developing Countries* (Wallingford, UK: CABI Publishing, 2007).

IWRM calls for intensive coordination and cooperation among previously independent government agencies.[3] Along the way, IWRM also introduces complexity. And, by adding another administrative layer that prolongs the decision-making chain, it may open up new opportunities for rent-seeking. Research suggests corruption risks increase at the interface between actors without a previous history of interaction. This is because the level of social control and administrative monitoring decreases as interactions occur outside or on the margins of established organisational systems. Catchment agencies, for example, tend to be new, frequently understaffed in the developing world, and lacking established checks and balances that help to prevent corruption.

Tanzania is an instructive, if worst-case, example. Water resources management reforms have been introduced to address problems related to a large number of rural water users and a relatively weak government infrastructure. With World Bank assistance, the Tanzanian government has introduced a new water permit system over the past decade that aims to improve basin-level management, reduce conflict and improve cost recovery of water resources management services. It sits alongside, but is eroding, a wide variety of customary or traditional systems for locally controlling access to water by farmers. These reforms amount to 'corruption by design'.[4]

A lack of objectivity and transparency creates conditions in which corruption can occur within the Tanzanian system in several ways. Permits based upon agreed extraction volumes may seem objective and fair, but in practice they can be highly subjective. Irrigation systems do not allow for volumetric measurements and delivery; enforcement of fee payments is difficult and costly because of limited staff and large distances; and handling permit funds by water officers is not subject to the same checks as government investments. Some argue that water taxes should focus instead on large-scale users, because the current system costs more to run than it raises in revenue.[5]

A key lesson from Tanzania is that 'modern' governance cannot be easily imposed in rural settings dominated by small-scale water use. In such a setting it may be more effective to amend customary systems carefully and strengthen the position of marginalised smallholders, such as women or the poor. Better water laws and regulations along IWRM principles for larger users are needed in many countries, including Tanzania and other African countries, as well as in Latin American countries such as Guatemala and Bolivia. In these countries, traditional systems without effective alternatives struggle to control some large water users.

Along with new laws and agencies, IWRM can be prevented from opening the door to corruption with the help of strong capacity building among traditional institutions and

3 P. Stålgren, 'Corruption in the Water Sector: Causes, Consequences and Potential Reform', Policy Brief no.4 (Stockholm: Swedish Water House, 2006).

4 B. van Koppen *et al.*, 'Formal Water Rights in Rural Tanzania: Deepening the Dichotomy?', Working Paper no. 71 (Colombo: International Water Management Institute [IWMI], 2004).

5 Ibid.

regulatory bodies, well-resourced and transparent administrative systems, and checks and balances, including mechanisms for citizen complaints.

Afghanistan's upstream powers, downstream woes

Drewery Dyke[1]

For downstream villages in much of rural Afghanistan, access to water is hampered by more than just sub-par infrastructure and other resource limitations. They are also disadvantaged by upstream villages' better access, as well as by local power brokers who either dictate the terms of water usage or induce officials to ignore complaints of people living downstream.

A traditional system under stress and vulnerable to corruption

In much of Afghanistan, managing water from the point it enters an irrigation system is generally supervised by a water master, or *mirab*.[2] Pivotal figures to say the least, *mirabs* are responsible for nothing less than safeguarding the equitable distribution of water. The process of choosing a *mirab*, whether by election or appointment by local councils, or *shoura*, has been described as 'opaque'.[3] How a *mirab* goes about distributing water can also be questionable. He can come under the influence – possibly corrupting – of large landowners (*arbab*), community elders or other powerful figures. A *mirab* may even hold land benefiting from the very irrigation system he controls.

Studies conducted in northern Afghanistan after Hamed Karzai established his first government in December 2001 draw attention to the severe strain facing *mirabs* and traditional water management techniques.[4] Customary rules for distributing common resources among villages have, in various instances, 'completely broken down'.[5] Additionally, canal-head communities are in a stronger bargaining position when it comes to allocation, as they can block canals and illegally divert water.[6]

1 Drewery Dyke is a researcher at Amnesty International's International Secretariat in London. This article contains the views of the author and does not represent those of Amnesty International.
2 The term *mirab* is Persian; there are cognates in other languages, such as *kök basi*, or head of source, in Turkmen. In Herat, the controller of a primary canal is called a *wakil*, or deputy.
3 A. Pain, 'Understanding Village Institutions: Case Studies on Water Management from Faryab and Saripul' (Kabul: Afghanistan Research and Evaluation Unit [AREU], 2004).
4 Principally these include studies published by the AREU, including A. Pain, 2004; J. Lee, 'Water Management, Livestock and the Opium Economy: The Performance of Community Water Management Systems' (Kabul: AREU, 2007).
5 A. Pain, 2004.
6 J. Lee, 2007. There are, however, other reasons in other places why traditional water distribution mechanisms are failing. These may include an absence or failures of governance, change of technologies, such as in regions where wells with handpumps or subsurface dams have been built, and changing economic relations and water use.

Other sources of strain to traditional distribution mechanisms include encroachment by migrant communities, theft, diversion communities and the absence or failure of governance. In Daulatabad district, Faryab province, downstream water consumers endured a continuous-flow irrigation system that supplied higher flow rates at the top than at the lower end.[7] District officials acknowledged the inequities, but their response was, 'These are armed people. We can do nothing.'[8] In Kunduz, an upstream community illegally dammed a canal and diverted irrigation water onto its fields, then bribed a *mirab* with cash to ensure additional water for a rice paddy.[9] The *mirab* was later replaced.

Downstreamers have developed several coping mechanisms in response to these inequities: attempting to negotiate with upstreamers; requesting provincial authorities to intervene; bribing their *mirab*, possibly for additional irrigation; stealing water; fighting neighbours who steal water; or persuading a *mirab* or *shoura* to reduce a neighbour's allocation. In 2007 a study found that *mirabs* abused their position by accepting bribes to deliver additional water to landowners or communities. Greed, threats from power brokers, community pressure or personal financial distress motivated these corrupt acts.[10]

Instances of unequal participation also occur when armed militia leaders, well-connected figures and large landowners force the election of their own nominee as water master and skew water distribution in their favour. In one settlement near the Atishan canal, a single absentee landowner had the right to 95 per cent of the water in a secondary canal, and all decisions regarding allocation lay solely with him or his representatives.[11]

Despite international pledges to combat such corruption,[12] the Afghan government and its leading donor countries have been slow to develop mechanisms to prevent these practices in large swathes of both rural and urban Afghanistan. Yet, policy planners on the ground are increasingly able to differentiate between traditional practices harmful to sharecroppers, women and the landless peasantry and practices that provide social cohesion and development.

Through information exchange, targeted financial support, water user groups or, on a higher level, district development assemblies, it remains possible to limit the scope of corruption or compulsion that upstream communities can impose on downstream water users in the country. Such interventions promise not only to make water governance less corrupt but also to restore some trust to an embattled government.

7 A. Pain, 2004.
8 Ibid. The author notes that another official stated that there were no armed power holders in the district.
9 J. Lee, 2007.
10 Ibid.
11 Ibid.
12 The ninth 'Principle of Cooperation' set out in the Afghanistan Compact, a multilateral accord concluded in London on 1 February 2006, states that the Afghan government and international community will '[c]ombat corruption and ensure public transparency and accountability'. The full text of the Afghanistan Compact is available at www.unama-afg.org/news/_londonConf/_docs/06jan30-AfghanistanCompact-Final.pdf.

Corruption fuels housing boom and water stress along Spain's coast

Enriqueta Abad[1]

In Spain, where housing construction accounts for up to 10 per cent of the national economy,[2] plans for new residential development along the coast have doubled in just one year. By mid-2006 communities along the prized Mediterranean coast had approved 1.5 million new homes – along with more than 300 golf courses and 100 leisure craft harbours.[3] An estimated 40 per cent of all new construction in Europe is now taking place in Spain, even though its population makes up less than 10 per cent of the European Union (EU) total.[4]

None of this would be possible without spiralling demand and speculation. But it would not be happening in such wild proportions without a sizable dose of corruption. The authorities have launched dozens of criminal investigations against elected officials and developers. According to Greenpeace, thirty cases have been opened in the eastern province of Valencia and twenty-one are under way in the southern region of Andalucia, where 70,000 illegal houses have sprouted up along the coast.[5]

Most shocking is the story of Marbella, a lavish Andalucian seaside resort near Gibraltar. In 2006 'Operación Malaya' led to the arrest of the mayor, two previous mayors and dozens of city officials after the authorities learnt that 30,000 homes had been built illegally – including 1,600 on parkland. Police froze 1,000 bank accounts and seized more than US$3 billion in villas, thoroughbred horses, fighting bulls and works of art from politicians, attorneys and planning officials accused of taking bribes to approve building permits and re-zonings.[6]

In many parts of Spain, development and corruption go hand in hand. Once a 'greased' construction project is approved, elected officials can use money reaped from licences, land sales and property taxes to fund popular, vote-winning projects. Construction-related income provides upwards of 70 per cent of municipal budgets for towns in the Marbella area.[7] This underground economy thrives where democracy and transparency do not. Town councils have grown immensely rich in the process.[8]

It is a win-win scenario, except for the cause of water resources management. This corruption-fuelled free-for-all in one of Europe's driest regions has severely challenged the

1 Enriqueta Abad is an MSc student at the School of Oriental and African Studies, London.
2 *The Economist* (UK), 3 May 2007.
3 *El Mundo* (Spain), 6 July 2006.
4 *Washington* Post (US), 25 October 2006.
5 *El Mundo* (Spain), 6 July 2006.
6 *Washington Post* (US), 25 October 2006; *El Mundo* (Spain), April 2006.
7 *The Economist* (UK), 16 September 2006.
8 *Financial Times* (UK), 25 May 2007.

ability of planners to provide water services. As it is, 4.3 million people living in 273 coastal towns have no wastewater treatment, according to Greenpeace.[9]

Scandal has also struck the Andalucian city of Ronda, famed for its picturesque cliffs and canyons. With the blessing of city officials, developers want to build a resort called Los Merinos that includes 800 homes, two luxury hotels and two golf courses. The dispute over the project's legality, the area's ability to provide water and the risk of pollution has created a tangled governance crisis. According to the Ministry of Environment, Los Merinos is one of 200 planned urban developments in Spain with no certain water supply.[10] 'I only want to warn people intending to buy whatever type of home at Los Merinos there is no guarantee of water,' said regional environment chief Ignacio Trillo.[11]

According to Cuenca Mediterranea Andaluza, a regional organisation created by the Andalucían government to tackle water corruption, the project is illegal because it does not abide by regulations related to water protection.[12] Developers plan to extract water from an aquifer under the Sierra de las Nieves, a mountainous woodland designated a 'Reserva de la Biosfera' (Biosphere Reserve) by UNESCO. Builders want to supply each Los Merinos resident with more water per day than the maximum level established by local planners. Because the sierra and its fauna, as well as surrounding villages, already rely on the aquifer, overtapping could put citizens and the environment at risk.

The Andalucian government filed an appeal with the Malaga regional court in hopes of blocking Ronda's approval of Los Merinos, claiming 69 per cent of the 800-hectare area is being developed illegally. A judge rejected the appeal in July 2007, declaring the project would not cause 'serious, irreversible destruction of the environment' and that developers have a sufficient water supply.[13]

Like elsewhere in Spain, Ronda's government stands to benefit from licences, land sales and property taxes. Los Merinos represents a vote-winning project, as it would stimulate 'long-term and qualified employment', according to a local golf advocacy group.[14] Civil society groups in Ronda have organised several demonstrations against Los Merinos. In hopes of resolving the controversy, the European Commission has begun a review of the development's approval process.[15]

As of mid-2007 the Spanish parliament had not discussed the issue of corruption in water management for Ronda or similar projects elsewhere. Whether the parliament is unable or unwilling, the link between lucrative development projects and the pressure on scarce water resources may be either too inconvenient or too complex to address.

9 *Washington Post* (US), 25 October 2006.
10 *El País* (Spain), 16 April 2007.
11 *The Olive Press* (Spain), 2 August 2007.
12 *El Mundo* (Spain), 26 January 2006.
13 *The Olive Press* (Spain), 2 August 2007.
14 *El País* (Spain), 25 February 2007.
15 *El País* (Spain), 19 February 2007; *El País* (Spain), 11 February 2007.

Corruption without borders: the challenges of transboundary water management

Transparency International

Water not only crosses different regulatory regimes and legal classifications, it also crosses borders. The extent of global water interdependence is stunning.

Two in every five people in the world today live in international water basins – catchments or watersheds – which account for 60 per cent of global river flows. In Africa, 90 per cent of surface water and more than 75 per cent of the population are located in transboundary river basins. Around the world, water sources for 800 million people living in thirty-nine countries originate beyond their national borders.[1]

Transboundary water issues affect almost everyone. And this hydrological interdependence adds another layer of complexity to the fight against corruption in water resources management.

But is it really possible to speak of corruption – the abuse of entrusted power for personal gain – when water conflicts transcend the domestic legal sphere and occur in the context of power politics between sovereign states? It is. The 'entrusted power' need not be tied to a domestic political system. In transnational water management, it can derive from commitments states enter into through multilateral water treaties, 200 of which have been signed in the last fifty years.[2] Or it can be tied to fiduciary duties to govern water responsibly and sustainably, in accordance with established international norms and agreements such as the Dublin Principles or Agenda 21.

For two reasons, tackling corruption in transboundary water-sharing is more difficult and even more urgent than national water resources management. It is harder to prevent and punish, and it has very grave consequences.

Corruption in transboundary water can cause international conflict, destabilise entire regions and lead to ecological disaster[3]

Over the last fifty years countries have engaged in more than 500 conflictive events over water. Almost 90 per cent were disagreements over infrastructure and quantity allocation.[4] The main

1 United Nations Development Programme (UNDP), Human Development Report 2006. *Beyond Scarcity: Power Poverty and the Global Water Crisis* (New York: Palagrave Macmillan, 2006). World Water Assessment Programme, United Nations Educational, Scientific, and Cultural Organization (UNESCO), 'Water, a Shared Responsibility', World Water Development Report no. 2 (New York: UNESCO, 2006).

2 A. Wolf, 'Conflict and Cooperation over Transboundary Waters', Human Development Report Office occasional paper (New York: UNDP, 2006).

3 Ibid.; S. Postel and A. Wolf, 'Dehydrating Conflict', *Foreign Policy*, no. 126 (2001); World Water Assessment Programme, 2006.

4 A. Wolf, 2006. It is important to note, however, that no outright wars have been fought over water during this period.

trigger for conflict is usually not water scarcity per se, but unilateral construction of a dam or diversion of a river. Both such projects can be heavily influenced by corruption from powerful vested interests.

What is more, many important transboundary water-sharing arrangements coincide with long-standing flashpoints for regional conflict, such as in the Middle East. This makes corrupt water grabs particularly damaging to regional stability. Even when corruption does not lead competition for water to escalate into conflict, it can precipitate the collapse or block the establishment of water-sharing arrangements.

Preserving and sharing the benefits of a common good such as a river basin is vulnerable to a serious free-rider problem: everyone has a strong incentive to take more than their fair share if there is suspicion that others also do so. Trust in the effective enforcement of commitments on all sides is essential to sustaining such agreements. But water corruption fatally undermines this trust by thwarting enforcement and opening the door to irresponsible water grabs or water pollution. The result is not only that countries forfeit opportunities to realise gains from joint water management, but also that shared water ecosystems are vulnerable to overuse and ecological collapse.

The devastating environmental, social and economic consequences of failing water resources management are plain to see at Lake Chad, the great African river basin that has shrunk to 10 per cent of its former size, and at the Aral Sea, formerly the size of Belgium and now a hypersaline water basin one-fourth its original dimension.

Out of jurisdiction, out of sight: more incentives for corruption in transnational contexts

Even where international water-sharing arrangements are in place, monitoring abuse and enforcing effective sanctions is considerably more difficult than within a national jurisdiction. When the victims of water pollution are outside one's own jurisdiction and excessive water diversion hurts only the farmers in neighbouring countries, such corruption is more likely to go undetected and unpunished and is therefore more difficult to resist. Even when water projects are undertaken jointly by two or more states, the jurisdictional twilight zone in which they are placed fosters corruption. The bi-nationality of the Itaipú Dam, a joint project by Brazil and Paraguay, made it possible for management to operate a parallel account not declared to either authority. The resulting fraud has been estimated at US$2 billion.[5]

Leveraging hydro-diplomacy for the fight against corruption

Though the corruption of transnational water resources is both more tempting and pernicious than the corruption of domestic water resources, sharing waters can also provide opportunities for fighting corruption in water across borders. When domestic laws against excessive water diversion are weak or provisions for wastewater treatment unenforced, international

5 O.-H. Fjeldstad, 'Corruption: Diagnosis and Anti-corruption Strategies', Independent Evaluation Group background paper (Washington, DC: World Bank, 2007).

agreements may provide an additional entry point for public pressure. They can take governments to task to preserve ecosystems and provide consultative mechanisms in water management. And they often come with institutional mechanisms such as river basin committees, which can serve as platforms to shine the spotlight on corruption and mobilise new allies in the fight against domestic polluters or water-guzzling agro-industrialists who capture domestic water policies or bribe local enforcement officials.[6]

The 1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses codifies important principles of *prior notification*, *equitable and reasonable utilisation* and *no significant harm* for the use of transboundary waters.[7] These principles inform many international water-sharing agreements, although only a few countries have so far signed up to the convention itself.[8]

6 World Water Assessment Programme, 2006.
7 Convention on the Law of the Non-navigational Uses of International Watercourses, adopted by the General Assembly of the United Nations on 21 May 1997.
8 Ibid.