Uncertain frontiers: mapping new corporate engagement in water security

Nathaniel Mason

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Results of ODI research presented in preliminary form for discussion and critical comment

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While every effort has been made to ensure accuracy, statements as interpreted in this paper (and as such, attributed to 'key informants' throughout) do not necessarily represent the views of these individuals or the corporations they work for.

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Acronyms

CEO	Chief Executive Officer
ELM	Emfuleni Local Municipality
GIZ	Gesellschaft für Internationale Zusammenarbeit
ISO	International Organization for Standardisation
M&S	Marks and Spencer
MNC	Multinational Corporation
ODI	Overseas Development Institute
SAB	South African Breweries
TRIPS	Trade-Related Intellectual Property Rights
WEF	World Economic Forum
WRG	Water Resources Group
WRM	Water Resources Management
WWF	World Wildlife Fund

Executive summary

An increasing number of multinational corporations (MNCs) are recognising water as a central business concern, a vital input for production processes, and potential point of contention in relations with government, investors and society at large. These multinational corporations have operations and supply chains located across the world, including in developing countries. In response, a new rubric of 'water stewardship' and management of 'shared water risks' has emerged. This encompasses discrete attempts to reduce water dependency and wastewater impacts in plant operations. But many MNCs are also realising that the characteristics of the resource mean that many water risks cannot be tackled unilaterally. Rather, they require engaging with other stakeholders, in catchments and river basins up- or downstream of their operations, and through the links in their extensive supply chains.

As such, these MNCs are beginning to make a transition, from being major users of water resources, to water resources management (WRM). Historically, the strong public good characteristics of water resources mean that their overall management has been entrusted to public agencies. The public WRM role requires allocating bulk quantities of water, safeguarding the needs of the environment and vulnerable users, and coordinating institutional and infrastructural development. Few MNCs would claim to be actively undertaking these conventionally public roles. But where they perceive the public architecture for WRM to be inadequate, they may undertake to bring their own convening and analytical power to bear, and enter into an array of partnerships with other companies, non-governmental organisations, and public agencies. The considerable economic and political power wielded by major MNCs means that these analytical, convening and partnership activities can indelibly shape WRM outcomes – especially in developing countries where public capacity may be limited.

The existing global WRM community – predominantly the public sector – has been slow to respond to the surge in new initiatives from MNCs. For some, private sector entities including MNCs are essential partners in the search for 'water security' – availability of and access to sufficient quantity and quality of the resource, and freedom from water-related risks. But beyond pilot projects involving a few donors, international NGOs, and governments in middle-income countries, active engagement from the existing WRM community has been limited. A modest but important body of research has meanwhile begun to explore the risks and opportunities of corporate engagement on WRM, raising important questions about the extent to which 'shared risks' will be tackled in such a way that ensuing benefits are shared.

The present paper follows, and attempts to build on, that body of research. It surveys a broad range of activities at the frontiers of private sector engagement on water predominantly, though not exclusively, driven by MNCs concentrated in the food and beverage sector. In so doing, it endeavours to point out where these activities hold promise, in terms of making a positive contribution to water security, broadly understood, as well as well where asymmetries of power and unclear motivations may jeopardise such outcomes. A simple schematic is adopted, whereby potential contributions by MNCs to three necessary but all too often lacking conditions for water security – namely accountable institutions, transparent information, and equitable and sustainable investments – are considered at each of four scales, ranging from MNCs' internal operations, to interactions with communities in the immediate catchment, to the supply chain, and finally engagement at river-basin or national level. In each case, an 'area for action' is proposed – the objective being to increase the prospects of MNC engagement on water yielding positive results for all, rather than entrenching the influence of a relatively narrow set of interests. As described in the table below, some of these require action by corporations themselves; others by non-corporate actors; while still others entail collaboration between the two. These suggested areas for action are based on the initial scoping undertaken for this paper, and preceding research. In each case, they would profit from further critical reflection and debate by the broader WRM community, as well as MNCs themselves.

Proposed areas for action to enhance prospects of equitable and sustainable outcomes from new corporate engagement on water

Hydro-geographical scales	Key water security gaps: Accountable institutions	Key water security gaps: Transparent information	Key water security gaps: Equitable and sustainable investment
Internal operations	1. Development by non-corporate water actors of an enhanced understanding of the incentives, constraints and internal decision processes within MNCs; MNCs can assist by entering into robust dialogue about the relative weight of motivations e.g. reputational vs. core operating risks	2. Enhanced transparency on the part of MNCs for data related to relative (per-unit) and overall water savings in their operations, including recognition that simplified numbers and graphs produced for external relations purposes tell a powerful story but often omit more than they include	3. Greater understanding of the different instruments internally available to MNCs to manage water risk, including purely financial instruments, and how this variety may condition the type and limits of investment by MNCs towards water security outcomes
Community and catchment	4. Further evolution of new partnership models for multi-stakeholder water resources management at catchment level, with each partner playing a role according to strengths, and with a share in the benefits of use guaranteed to local communities and ecosystems	5. Further development of participatory risk assessment approaches with more transparent presentation by MNCs of the stake they have, as a business, in engaging in catchment and community-scale projects	6. Improved mapping of the total contribution of private sector investment delineated by type of water resources management project and longer-term intervention; Experimentation with new corporate models and vehicles which allow them to invest in such a way that gives equal emphasis to interests of local stakeholders alongside those of investors
Supply chain	7. Improved understanding from the water management community of the place of water within the political economy of broader supply chain governance; and development of appropriate institutional models and incentives to encourage actors at all tiers to play appropriate roles	8. Evolution of independently verifiable approaches for mapping of water risks across the supply chain (e.g. water footprinting), integrated with consideration of other environmental and social externalities, as well as the financial bottom line; further encouragement for other corporations to map their supply chain water risks and consider how they can improve water management within them	9. Further development of the business case for collaborative responses to supply chain water risks (i.e. investment in technology transfer for enhanced WRM) and appropriate policy frameworks to encourage this; matched by discouragement of unilateral responses e.g. large scale land/ water acquisitions, which jeopardise access and rights of poor people
Basin to national	10. Enhanced transparency and legitimacy through participation of civil society, particularly local civil society, in partnerships such as the Water Resources Group that are seeking to support and influence water resources management at basin and national scale	11. Full public disclosure of analysis and advice provided to governments in low- and middle-income countries by MNCs and their partners; Informed technical critique of the details of the relevant analytical frameworks and methodologies by the academic and research community	12. Reorientation of partnership models at basin to national level, with country governments taking the lead to frame investment needs; with support, coordinated by development partners, drawing equally on private sector, civil society and other stakeholder groups

1 Introduction

1.1 Scope and purpose

Extent of and motivations for corporate engagement on water

Water occupies an increasingly prominent place in the attentions of business leaders, especially the directors and managers of multinational corporations (MNCs) and their investors. In the World Economic Forum's 2012 survey of global risks, private sector respondents ranked 'water supply crises' second in terms of impact and fourth in terms of likelihood (WEF 2012). Initiatives, projects and platforms proliferate, driven by corporations individually and collectively. To articulate this surge in interest and engagement, new or adapted concepts have emerged – as have a succession of tools to help corporations understand their water risks, and make use of water opportunities. Corporate engagement on water now extends well beyond the bounds of urban water service provision, which dominated debate among development actors in the 80s and 90s.

The MNCs concerned depend on water as a key input or sink for production in their operations. Many such operations, as well as those in the global supply chains on which MNCs rely, are sited in developing countries – making this as much a development issue as a business concern.

A number of corporations are engaging on water not only within their own plants and premises, inside the 'factory gate', but also far beyond. Corporations are attempting to quantify water use through the supply chain, with water 'foot-printing' methodologies. And some are also starting to engage in broader water resources management (WRM), for example where corporations act as conveners, or co-conveners, of dialogue at the catchment and basin scale (The Coca-Cola Company, 2012; 2030 Water Resources Group, 2012a). Corporate entry into WRM represents a significant shift, because it has conventionally been the preserve of the public sector, requiring the allocation of bulk quantities of water, safeguarding the needs of the environment and vulnerable users, and coordinating institutional and infrastructural development.

The motivations for this rapid acceleration in corporate interest and engagement are diverse. On the one hand, there is a clear internal business case: 'income... profit... share ownership... board of directors' (Greg Koch, Managing Director, Global Water Stewardship, The Coca-Cola Company, 2012, quoted in Hepworth 2012: 543). But this business case may be arrived at via different intermediary imperatives. There is the straightforward issue of operational continuity – ensuring production processes are not threatened by water that is poor quality, insufficient or over-abundant. Then there are two related external imperatives, of reputational management, and regulation (SABMiller, GTZ and WWF 2010). Even this three-part distinction is probably a simplification, and other considerations may also play a mediating role. One key informant pointed out that the reputational driver was not only about broad public opinion, but also the opinions of government and families which often own businesses based in middle- and low-income countries that MNCs might seek to acquire. Also mentioned as possible motivating factors were the need to engage employees, and a sense of heritage in countries where companies have been operating for many decades. An alternative framing is between primary risks, which arise from the physical quality and quantity of water involved in production processes (including wastewater) and secondary risks, which arise from primary risks affecting other stakeholders – communities, other businesses, governments and ecosystems (Farrington 2012).

Current norms for water resources management: water 'security'

Meanwhile, amid debates around water 'security' (Box 1) a recurring call is for enhanced understanding of the role of the private sector (GWP 2012a; Penrose 2012). The call, often made

from outside the corporate sphere, reflects the fact that research has lagged behind fast-evolving practice (Hepworth, 2012). Private sector engagement on water remains something of a mystery for the many water resources management specialists who are more accustomed to working with, and within, public institutions (Newborne and Mason, 2012). With the exception of a limited subset of governmental, non-governmental and inter-governmental agencies and institutes that support or directly participate in platforms and partnerships, this comprises the majority.

Box 1: What is water security?

Water security has been variously defined by different policy and academic writers. The most commonly cited definition is that of Grey and Sadoff (2007: 547f):

The availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies.

Though this definition has the advantage of brevity, Mason and Calow (2012: 18) suggest that it can be expanded on somewhat, adopting a working definition which explicitly recognises that water security is a function of human capacity as much as physical manifestations of the resource:

Water security means having sufficient water, in quantity and quality, for the needs of humans (health, livelihoods and productive economic activities) and ecosystems, matched by the capacity to access and use it, resolve trade-offs, and manage water-related risks, including flood, drought and pollution.

Whatever the preferred definition of water security, it can be understood to be a general normative goal for water resources management, acknowledging different needs and interests and requiring management of risks (including over-abundance and quality issues, as well as scarcity).

What explains the relative obscurity of private sector engagement in water management? Companies commonly attribute their reluctance to make available information to the need to retain the edge on their competitors. In this case, however the opacity of their corporate processes and the paucity information do not appear to be attributable to competition between corporations – what little research that has been conducted suggests that MNCs are cooperating closely in pursuit of goals like standardised water risk and accounting methodologies (Daniel and Sojamo 2012). It might therefore be speculated that external relations concerns are shaping the type and extent of available information on details of corporate water engagement. As encountered in the course of this research, the principle source of information is corporations' own sustainability reporting. Some companies are starting to commission external verification of their reporting (e.g. Bureau Veritas Solutions 2012) but for the majority, it is not clear that impartial, unprocessed information is being offered to the reader.[1] Meanwhile, until recently the research and policy community were still preoccupied with the domain of private sector involvement in – predominantly urban – water supply and sanitation services (e.g. OECD 2009). Only in the last two years have a few efforts been made from outside the circle of corporations and their associated non-corporate partners, to understand and critique emerging practice in relation to broader corporate water use and forays into water resources management.

[1] Though no more than anecdotal evidence, it was comparatively harder to gain access to key informant interviewees for this research, than in research on similarly contested topics which did not involve corporate actors to such a high degree.

’Implications of corporate engagement: ‘New normative approaches’?

The need for research is pressing since, in the words of one of the most prominent groupings of corporations and their non-corporate partners, the 2030 Water Resources Group, ‘we could now be on the cusp of developing *new normative approaches* to water management’ (WEF 2011a: 2, emphasis added).

If true, this presages a fundamental realignment of norms and dynamics in the sector. Although the private sector has long provided certain services that contribute to water resources management – for example the construction and operation of water storage and distribution infrastructure – the resource management role itself has been exercised by the public sector. At its heart, this involves allocating shares of the resource between different users (including safeguarding a minimum for the environment) and the various planning, coordination and monitoring tasks which this entails. This fits with the notion that water resources (or equitable and sustainable outcomes arising from sound management of water resources) are a public good. It follows that there are strong normative arguments for entrusting management of natural resources to the public sector as the only entities with the legitimacy (at least in democracies) and reach to secure the public good. Correspondingly, there are concerns that excessive influence by other interested parties, whether an individual business, a political pressure group, an NGO, or any other, may jeopardise the public good function.

This does not mean that we can be certain that the current institutional arrangements, where WRM is fundamentally entrusted to the public sector, are working in all cases. Water resources management, including in developing countries, is undertaken by a range of public sector institutions at national and sub-national levels – from central ministries and inter-ministerial committees, via administrative bodies and basin organisations at an intermediate level, to local water committees and users associations. These institutions display greatly differing standards of performance and degrees of functionality. A forthcoming systematic review of almost 30,000 articles pertaining to water resources management institutions found ‘little empirical evidence linking water resource policy to economic and poverty reduction outcomes’ (Hepworth 2012: 557, citing Hepworth et al. forthcoming). But while this lack of certainty implies that alternative models may be worth exploring, it also constitutes an essential caveat: that all new approaches, and especially new *normative* approaches, need to be transparently undertaken and independently, rigorously evaluated.

As noted, the independent research response to date has been limited, outside the comparatively closed circle of corporations and their collaborating partners. One stream of research, which this paper builds upon, has been undertaken by ODI’s Water Policy Programme (Newborne 2011 and 2012). Products of this and other work by researchers at various universities, consultancies and NGOs, have been consolidated in a special edition of the journal *Water Alternatives* titled ‘Open for business or opening Pandora’s Box? A constructive critique of corporate engagement in water policy’. Perhaps naturally for relatively new terrain, the focus of this work has been to develop coherent typologies for emerging concepts and practice deployed by corporations in relation to water. Broadly, it is distinguished by a desire to reflect, in the most part from a neutral but enquiring outsider perspective, on the incentives and constraints which condition corporate engagement – borrowing from various disciplines including political economy analysis (Sojamo and Larson 2012), company law (Newborne and Mason 2012), financial risk management (Larson et al. 2012) and water footprinting (Chapagain and Tickner 2012).

This paper draws on the recent research, adding new insights where possible from analysis of the abundant grey literature produced by MNCs and their associated partners, and a number of key informant interviews. However, it is inevitably impossible to analyse one set of actors in isolation and effort is made throughout to consider how government, non-governmental organisations, other

companies (smaller than MNCs or operating in the territory of one state), and civil society interact with, and shape the space for, MNC and other corporate engagement.

Water security gaps

Ultimately, the paper is an attempt to map the emerging 'new frontiers' of private sector engagement on water, with a view to establishing how far corporations can, and should, contribute to bridging three key gaps, outlined further below, which currently impede water security from the local to the national scale:

- The institutional gap
- The information gap
- The investment gap

Although it is too early to formulate detailed policy recommendations, the paper endeavours to distil key areas for action – some for corporate actors and their partners, others for non-corporate 'outsiders', and still others for collaborative working – which may constitute ways forward amid the challenging new terrain.

1.2 Narratives and concepts

Clarifying terms: water security, risk and stewardship

Water security is not a new term, but it is rapidly gaining conceptual (if not practical) traction. Definitions proliferate, but framed in the right way, water security is an expansive concept that can capture the many competing objectives of WRM. As such, water security requires consideration of how to reconcile water use and impacts across scales, between sectors and over time. Water security concerns the hydrology-society interface – where the natural resource must be considered alongside society's capacity to access and manage it. It can also incorporate the different impacts of inadequate water management, including over-abundance as well as insufficient quantity and quality. Some commentators reflect on a concern that water security is susceptible to alignment with existing norms like national security, with the risk that water management will become a zero-sum game to be achieved through unilateral responses, backstopped by hard or soft power (Tarlock and Wouters 2009). But it is this explicit risk of politicisation which makes water security more useful as a term. The fact that water security is inherently contentious exposes us immediately to the question: *whose* security? This contrasts with existing norms and paradigms in the water sphere – notably Integrated Water Resources Management[2] – in which difficult and inherently political trade-offs can get lost amid upfront messages around integration and synergy (Molle 2008 and Mollinga 2008).

A concern in framing this paper under the rubric of water security is that this is not always the preferred term for corporate actors themselves, even as they are engaging, fundamentally, in actions which will impact on the water security of communities, and potentially entire catchments and countries. While water security has been used by certain voices aligned with, if not directly representing, corporate interests (e.g. WEF 2011b), other terms are being deployed within corporate reporting and strategy – notably 'water risk' and 'water stewardship':

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[2] IWRM is defined by the Global Water Partnership as 'a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment' (GWP 2012b)

- **Water risk** is widely deployed in the straplines and titles of the various analytical tools, developed for managers and directors within companies, as well as investors, to understand the impacts of water on business, and vice-versa (WRI 2012; Batton et al. 2011; WWF and DEG 2011; GEMI n.d. a, b and c; WBCSD 2011). Although these tools do not necessarily originate from individual corporations, they appear to respond to a wide demand. For Nestlé, 'Water has become the most pressing global environmental issue representing a serious long-term risk for our business and society as a whole' (Nestlé 2011: 7). Coca-Cola places 'the need to address water risks for both communities and business' first in a list of 'global water challenges' (The Coca-Cola Company 2012: 3).

  Notable in both these framings of water risk is the notion that impacts on business and society, or community, are inseparable. Indeed, 'water risk' rarely features in corporate documents without the word 'shared' to signify mutualism and synergy. The idea of shared water risks correlates with the concept of 'shared value', coined by Porter and Kramer (2011) to encapsulate 'policies and operating practices that enhance the competitiveness of a company whilst simultaneously advancing the economic and social conditions in the communities where it operates'. Thus, for proponents of the idea of shared water risks, the elision of potential trade-offs between corporate water demand and impacts, and those of other users, is a necessary way to force different actors to recognise their interdependence – to mitigate shared risk and work towards creating shared value. A key informant argued that this was akin to companies confronting the fact that many water risks cannot be addressed by unilateral action or throwing money at the problem – they necessarily require collaboration with other actors who manage, use and impact on water. For others, however, this elision of tradeoffs amounts to a potentially misleading use of language. Risks are often incurred by different water users at different points in time and space. Moreover, risk in a broad sense is a function not only of physical hazard, but also exposure and vulnerability (put simply, how much is at stake, and what is the ability to anticipate and cope with risks arising). Even where the physical hazard is broadly the same, there are likely to be considerable asymmetries in exposure and vulnerability between MNCs and poor local water users in developing countries – as well as in their ability to influence and shape the risk-management response. As such, there may be 'many water management contexts (where) interests are not shared, risks are not balanced, and values are contested' (Hepworth 2012: 552).

- **Water stewardship** is also frequently deployed in corporate documents – featuring, for example, in the titles of both Pepsi and Coca-Cola's water-related reporting (PepsiCo, 2010, The Coca-Cola Company, 2012). As argued by the Alliance for Water Stewardship, a consortium of eleven organisations promoting an international Water Stewardship Standard, stewardship implies a custodial role over something that is not owned. This custodial role extends not only to the defined quantity of water that is used in a given instance, but also to the wider resource-base (Alliance for Water Stewardship, 2010). The CEO Water Mandate (Box 2), which counts 87 corporations among its members at the time of writing (CEO Water Mandate 2012a), articulates the essence of water stewardship as being to help companies 'identify and manage water-related business risks' and to allow them 'to contribute to and help enable more sustainable management of shared freshwater resources' (CEO Water Mandate, 2012b). As such, water stewardship includes the water risk agenda, but may encapsulate how some corporations frame their contribution to broader WRM. As will be further explored in this paper, the way that new, often self-defined stewardship roles fit with existing architecture for management of the resource base, is a key concern. Where the fit is good, the considerable energy, expertise and resources of private corporations may yet be tapped; where the fit is poor, there are concerns that the WRM mandate of public agencies will be duplicated, or potentially undermined.

Despite the equal and possibly greater prominence of the terms 'shared water risk' and 'water stewardship', the choice of 'water security' as the headline domain for this paper is nonetheless a

deliberate one. The former terms are still used principally by corporations themselves, and the limited range of other actors already working closely with them. As noted above, this paper is written from a neutral perspective, one that is shared by the majority of those concerned with public policy (and some in the private sector who have yet to engage on water). From this perspective, the broader concern is water resources management; its goal (at least according to the current preoccupation in the sector) is water security. The issue for this paper is therefore where, and how, private sector engagement can contribute to the global public good of water security. It arguably a second-order question whether this contribution is articulated in terms of water stewardship or reduction of water risks.

Box 2: The CEO Water Mandate

The CEO Water Mandate falls under the UN Global Compact, 'a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption'. Launched by the UN Secretary General in 2007, the CEO Water Mandate is governed by a steering committee comprising 10 representatives from endorsing companies, and 'non-voting Special Advisors representing different stakeholder interests'. The Pacific Institute, a not-for-profit research institute based in the US, provides coordination and logistical support, including development of particular projects, research and guidance material. Involvement of other UN agencies is reportedly ongoing, with specialists invited in for particular projects and as advisors. Recent outputs include a *Guide to Water Related Collective Action*, and *Corporate Water Disclosure Guidelines*. The CEO Water Mandate website states that endorsement does 'not necessarily' mean companies are 'top water performers': rather than being a certification scheme, it is intended to act as a platform for sharing, discussion and collaborative action.

As an example, in June 2012 45 Chief Executive Officer signatories to the mandate, including several from major MNCs, signed a 'special communiqué' under the aegis of the UN Global Compact, in advance of the Rio+20 Earth Summit. This called for 'much greater action by Governments to create an enabling environment in the form of proactive funding and supportive policies', towards the goal of 'global water security'. Meanwhile, the signatories argued that they 'support international efforts to improve water management'. Since its inception, the CEO Water Mandate has faced criticism from a number of environmental organisations – for example, the Polaris Institute has argued that 'the real agenda of the CEO Water Mandate is to facilitate greater control over water sources and services by for-profit corporations'.

Source: UN Global Compact (2011), CEO Water Mandate (2012c), UN Global Compact (2012: 1f), Sierra Club (2008), Polaris Institute (2010: 1)

The political-economy of private sector engagement in water management

In considering all three terms – water security, water risk and water stewardship – the key is to keep politics firmly in mind. Interests, individually and as alliances, are inevitably at work. Sometimes water interests will be shared, sometimes they will not. Does shared risk guarantee parity in the response? Currently, are corporations' constitutions appropriately designed for them to take a custodial role over a resource that is, in most countries, publicly owned? The new resources, know-how and energy which corporate actors bring to the water management space is potentially hugely significant, but like the entry of any new actor or force – public, private or civil society – it throws up important questions about power, knowledge and equity. Put simply, more work is needed from non-corporate actors, to comprehend the political economy of corporate engagement on water. This paper seeks to examine, in a constructive manner, the benefits private corporations can bring, while asking these important questions.

1.3 Conceptual framework

A first consideration in approaching this field is on which corporations to focus. The relative newness of corporate engagement on water use and management means that the range of corporations is necessarily delimited – but it is still large, and increasing. The number of signatories to the CEO Water Mandate has almost doubled from 2009 to 2012 (Sourcewatch 2009, CEO Water Mandate 2012a). Many companies that are not signatories nonetheless include water use and/ or impacts as part of their sustainability reporting. As a consequence, for this initial framing research a conscious choice is made to focus on corporations whose main business is in food and beverages, which have arguably been leading practical and conceptual innovation on water within the corporate sphere. As can be seen from Figure 1, food and beverages companies are the most numerous among the signatories to the CEO water mandate (15 of 87, or around 17%) – more so if the four signatory agribusiness corporations (dealing in agricultural inputs and food commodities) are also included. The nearest rival in terms of sectoral membership is the paper and wood product industry, with some 13 signatories.[3] Among the food and beverages 'cluster' that have signed up to the CEO Water Mandate, dedicated beverage and brewing companies[4] outweigh companies with a more diverse portfolio of food and nutrition products[5] by almost 3:1. It is not unreasonable to assume that the underlying reason is that, if you are marketing liquid products, association with water in the mind of consumers and regulators will be especially strong. The internal, operational risks posed by water are also especially apparent for beverage and brewing companies, as attested to by one key informant: for a given bottling operation of a multinational brewer, water of sufficient quantity and quality is usually a non-fungible input (due mainly to the cost of transporting water); compared to the supply of, say, sugar or grain to the factory of a multinational food product manufacturer, which can be substituted within a sophisticated 'supply net'.

The choice to focus on food and beverage companies does not, however, remove the need to consider other sectors. The power sector, while not strongly represented among CEO Water Mandate Signatories, is nonetheless one for which the operational imperative to reduce water risks is especially strong (even if the reputational stakes are often lower). Larson et al. (2012) observe that cooling water supply interruptions and biofouling jeopardise production capacity for most thermal power plants ('de-rating events'). The serious threat this poses to energy security means water is a strategic consideration for power companies, even if it rarely registers on the balance sheet due to widespread underpricing of the resource. The fact that power companies have pioneered use of purely financial instruments (such as derivatives) to offset these risks raises important questions. In particular whether, in cases where reputation is not a primary consideration, there exists an incentive to physically reduce risk through enhanced efficiency and improved management.

The attention given to MNCs from the food and beverage sector in this paper is therefore to some degree a function of their being relatively further ahead in terms of water engagement, or at least in making public statements around water issues. Subsequent work will need to dig deeper into the activities of MNCs in other sectors, which may not be so public-facing.

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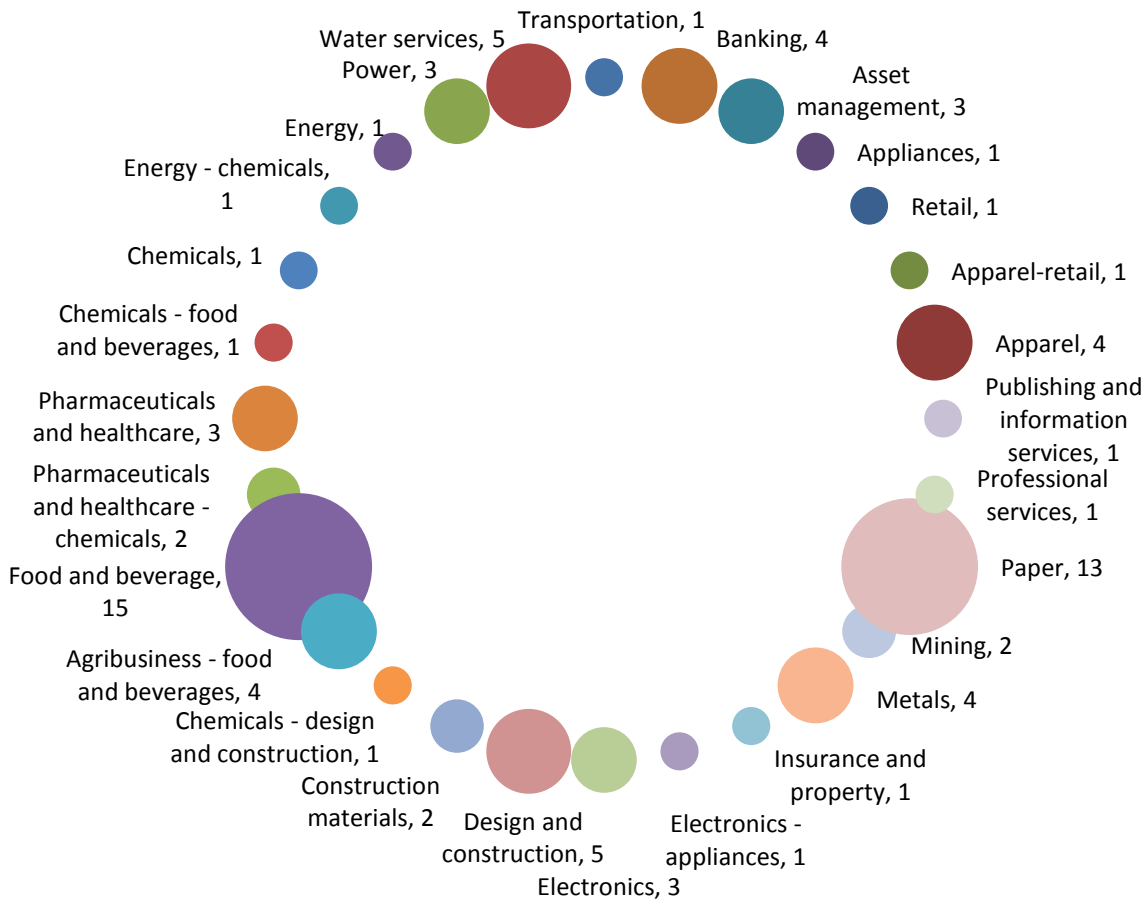
[3] These categories are derived from examination of each company's webpage, rather than ones assigned by the CEO Water Mandate itself, and are intended for illustrative purposes.

[4] Anheuser-Busch InBev (Belgium); Carlsberg Group (Denmark); The Coca-Cola Company (USA); Coca-Cola Enterprises Inc. (USA); Coca-Cola Hellenic Bottling Company (Greece); Diageo plc (UK); Heineken NV (The Netherlands); Molson Coors Brewing Company (USA); PepsiCo, Inc. (USA); Pernod Ricard S.A. (France); SABMiller (South Africa)

[5] Danone (France); Nestlé S.A. (Switzerland); SunOpta Inc. (Canada); Unilever (UK).

Figure 1: Signatories to the CEO Water Mandate by sector – number labels and bubble size represent number of corporations



Source: For list of corporate signatories, CEO Water Mandate (2012c). Sector categories, author's own

With the rationale for focusing on a subset of corporations explained, the next step is to outline the schematic approach to the exploration and analysis. As noted, water security is a multi-scale challenge, and corporate interventions can be discerned at a number of scales, though any such delineation is somewhat artificial. As will be seen, water use within operational sites is rarely considered without linking to the broader water body from which water is withdrawn and into which wastewater is often discharged. And once perspective shifts to the water body, the 'mobile, fluid and fugitive' quality of water (Meinzen-Dick 2000) means that water impacts can be conveyed far downstream or, in the case of groundwater, between aquifers due to propagation of drawdown effects from excessive pumping (Foster et al. 2003).

Nonetheless, review of corporations' own literature suggests a broad spatial hierarchy is common in corporations' approach to water, as it is in the wider water resources management domain. An instructive example is provided by Coca-Cola. The company reports on water against three headline objectives, under the headings Reduce, Recycle and Reuse (The Coca-Cola Company, 2012). The first concerns unit efficiencies in in-plant water use; the second the quality of wastewater returned to water bodies, while the last is, broadly, an attempt to offset water impacts in the wider water environment of river-catchments and basins, through 'Community Water

Partnership' projects (a range of watershed protection; productive use; water supply, sanitation and hygiene; and education and awareness interventions, for which an elaborate accounting methodology has been created – LimnoTech 2010). 'Source Water Protection' – a cycle of risk-assessment and implementation mandated for all bottling plants – locates operational facilities, and the water-related risks they incur and impose, in the broader catchment. Coca-Cola is also among the companies exploring the use of water footprinting to examine how embedded or 'virtual' water in inputs such as sugar beet extends their water risks and impacts to distant catchments, potentially in other countries (The Coca-Cola Company and The Nature Conservancy 2010). Finally, Coca-Cola is at the forefront among companies participating in the 2030 Water Resources Group, which, as outlined in Section 5, provides an entry-point to WRM processes at the national level (2030 Water Resources Group 2012a).

Following this approach, and in order to provide a practical delineation between different forms of corporate engagement on water, the first part of the analytical framework deployed in this paper involves a four part, spatial typology:

1. **Internal operations,** primarily concerned with per-unit water efficiency improvements and wastewater control.
2. **Community and catchment (sub-basin)** scale interventions, concerning risks imposed and incurred by production facilities in their immediate hydro-geography of the river catchment, which cannot be managed within the plant itself.
3. **Supply chain** interventions, where for many industries (especially food and beverage) the greatest water impacts occur, but where they are least understood.
4. **Basin to national** scale interventions, involving corporate engagement in broad water-resources management decision making, including allocation between productive sectors.

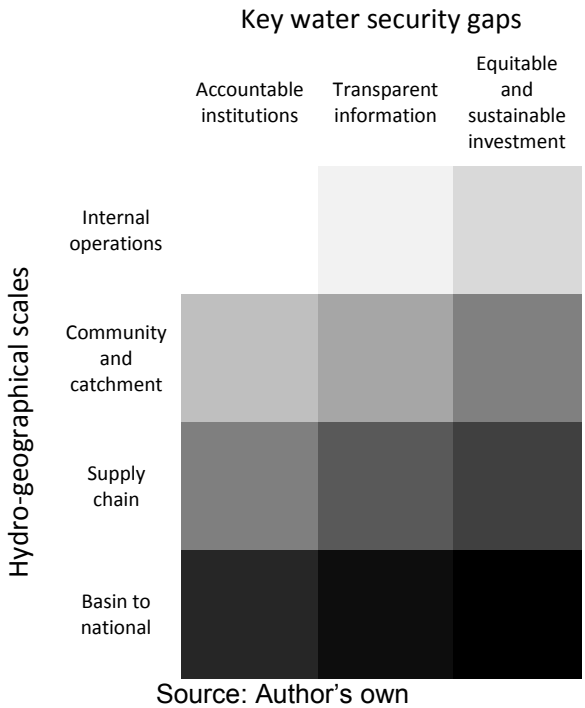
The second part of the typology adopted in the present paper takes a step back from what corporations are already doing, to ask: What are the key gaps in water security, which corporations could, potentially, contribute to bridging? It is proposed that three key gaps are impeding progress towards water security, as follows:

1. **An institutional gap.** WRM, especially in many developing countries, is limited by institutional failures – not only in terms of the under-resourced and low-capacity agencies constituting the existing public architecture of WRM, but also of workable rules of the game, for example secure water rights regimes. The dominant paradigm of Integrated Water Resources Management places strong emphasis on getting the institutions right but has arguably been too process-driven and top-heavy to achieve substantive outcomes, in many contexts to date.
2. **An information gap.** Effective WRM is impaired by significant gaps in data and understanding – not only of basic hydrology, meteorology and climate, but also of interdependencies between the resource base and society and ecosystems (Mason and Calow, 2012).
3. **An investment gap.** While costing studies have been undertaken to calculate the required expenditure to meet the MDG targets on water supply and sanitation, WRM outcomes (including the as-yet undefined goal of water security) remain of uncertain cost – though in terms both of infrastructure and the capacity to manage it, the needs are substantial in many middle-income countries, and vast in many low-income countries.

Where MNCs engage on water, particularly in low- and middle-income countries, they do so as financially and sometimes politically powerful entities with particular interests and stakes in the resource. As such, it is necessary to specify additional criteria, or necessary conditions, when considering how corporations can contribute: institutions for WRM need to be accountable; information should be transparent; and investments geared towards producing equitable and sustainable outcomes.

Contrasting these typologies provides a four by three matrix, which encompasses the spatial and conceptual 'new frontiers' which this research seeks to map (Figure 2). In the concluding section, the same matrix is used to delineate the proposed areas for action.

Figure 2: Analytical framework to map corporate engagement on water across spatial and conceptual frontiers



Source: Author's own

2 Internal operations

2.1 Institutions

In relation to corporations own operations, two institutional questions are paramount. First, whether there exists a compelling motive, within the business itself, to devote time and money to the issue of water security; second, what is the direction and scope of the response which that motive entails.

This section, at the scale of 'internal operations', is somewhat distinct from the others in that it is aimed not only at understanding action at the relevant scale, but how internal factors (motives, or institutions in the broad sense of 'rules of the game') condition action at all scales.

Companies are key 'institutions' of the private sector. As noted above motives for companies, including MNCs, to engage on water are diverse. Their incentives and constraints are conditioned by a broader set of institutions and norms. The company laws and, for companies quoted on stock exchanges, securities law of the country in which they are headquartered, set the normative framework within which the constitution (mandate and internal rules and procedures) of each company in that jurisdiction is drawn (Box 3).

Box 3: How corporate behaviour sits within wider normative frameworks

Companies are 'legal and social constructs' and, fundamentally, how responsive they are to different categories of stakeholder is determined by the way their corporate purposes are defined in their constitutions, as written within frameworks of company law. Analysis of example jurisdictions in OECD countries (in particular, in different states of the US, and in the UK, France and Germany) illustrates different ways of defining the purposes of corporations and the legal duties of company directors.

According to conventional norms – i.e. the manner of framing and writing company constitutions that is most prevalent among (large) MNCs – the first loyalties of company directors are owed to shareholders (investing equity capital) and lenders (investing loan capital).

Whether and how far company directors are obliged, or permitted, to take account of other stakeholders, including company employees and customers, and also further categories of stakeholder such as local communities, depends on where and how the individual company in question is constituted, as well as how it conducts its business - and justifies/defends that conduct to/in the face of its shareholders and lenders.

Source: Newborne and Mason, 2012; Newborne, 2012

For many MNCs, the paramount objective is to increase (in some cases, to maximise) return to shareholders, subject to making repayments under loans to creditors. The interests of a wider set of stakeholders and other considerations such as 'community', 'environment' and the 'likely consequences of any decisions in the long term' are referred to in some company laws (e.g. the UK Companies Act chapter 46, section 172) but the hierarchy is clear. Shareholder interests generally take precedence, and a return must be provided on their investment. On this basis, it is not unreasonable to assume that financial imperatives - whether they manifest as direct operational risks, or are mediated through reputation and regulation - will play the leading role in how a company engages on water.

Nonetheless, even assuming that profit, or shareholder value, is a primary motivating force for a corporation, the lenses through which its directors and managers perceive water-related issues

and decide upon the appropriate response are widening, as societies' perceptions of companies' responsibilities evolve. This widening of expectations may be in tension with existing, and arguably outdated, company and securities law.[6] Moreover, recognising corporations as true 'legal and social constructs' requires us to have regard to the huge mix of individual and collective incentives and constraints at play in any complex, multi-actor organisation. These will include positions of individual employees, collective norms that are actively pushed by management or develop organically, and formal and informal incentive structures (for example, how ambitions at corporate level are linked to individuals' reward and remuneration). These factors mean it is impossible to assume that profit or shareholder value will dominate all corporate decision making, insofar as directors succeed in justifying their conduct to shareholders and investors within the parameters of their legal duties (Box 3; Cahn and Donald 2010).

But untangling motivations is made harder, by the way in which corporate sustainability reporting tends to present activities. Objectives are more often than not conflated, and there is no easy way to tell if brand, license to operate, or direct operations, are the foremost concern. The distinction may not matter, as long as the outcomes are the same. But where a corporation sees water risk primarily through the lens of reputation, it can be expected to invest comparatively more in presenting its action in a positive light, and to focus on activities with the greatest public relations value – for example the kinds of community projects described in section 3. Where corporate social responsibility budgets are fixed, spending more on presentation means spending less on more substantive activities. Less public- or media-friendly activities, which nonetheless have greater impact, may lose out.

A key informant pointed to two core characteristics of a corporation, which can be expected to inform the importance of reputation in their response to water-related risk: size of brand, and size of business. For those for which corporate brand integrity is a key asset (as opposed, or in addition, to the brand integrity of specific products) reputation will be a stronger motivation to take action on water risk, since detriment to reputation will be felt across the company and cannot be 'contained' to a single product. Size of business (both geographically and in terms of revenue) may also correlate with a tendency for companies to approach water risk first and foremost from the perspective of reputation. For companies of a certain size, a single operational facility being jeopardised by physical water risks will not strongly register on the global balance sheet. Even regulatory risk, which could impact operations across an entire jurisdiction, may not be significant for corporations with production spread across scores of countries. Reputation, however, is arguably a motivation for action even for these companies – consumer preferences and concerns increasingly transcend borders thanks to social media, with the potential for real or perceived malpractice in a single country to lead to global consumer boycotts.

Other considerations may be at play. According to the Managing Director of Coca-Cola's Water Stewardship programme (cited in Newborne 2011) the fact that water is a 'strategic business imperative' for the corporation stems from two key characteristics:

1. Coca-cola is a non-diversified business, producing only beverages. Water is inevitably critical and is strongly associated with the company in public opinion.

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[6] The 'Guiding Principles on Business and Human Rights' provide an example of evolving expectations, stating: "Laws and policies that govern the creation and ongoing operation of business enterprises, such as corporate and securities law, directly shape business behaviour. Yet their implications for human rights remain poorly understood. *For example, there is a lack of clarity in corporate and securities law regarding what companies and their offices are permitted, let alone required, to do regarding human rights. Laws and policies in this area should provide sufficient guidance to enable enterprises to respect human rights, with due regard to the role of existing governance structures such as corporate boards*" (UN 2011: 5, emphasis added).

2. Coca-cola is manufactured in c.1000 bottling plants worldwide, for local markets. It is therefore dependent on localised water resources, and needs to demonstrate to the local market that it has concern for local resources.

Prior experience would appear to inform this position – a localised public opinion battle over Coca-Cola's operations in Kerala, India generated criticism of the company nationally and internationally, and the company reacted in defence of its brand and its licence to operate in that specific context (Brown 2003, Ecologist 2010). For critics, the perceived prominence of general and local public and regulatory opinion in Coca-Cola's actions may increase the tendency to perceive a strong role for external relations, in the company's engagement on water.

Are there quantified indicators for how seriously companies take water-related risks? The extent to which there is senior (board-level) oversight of water issues is one of the markers of progress picked up by the Carbon Disclosure Project's Water Disclosure initiative. The 2012 report found that, of 185 respondents among the 'Global 500' companies (the FTSE Global Equity Index Series), board-level oversight on water is hovering at around 58%. The CDP Water Disclosure reports are in turn released 'On behalf of 470 investors with assets of US$ 50 trillion' (Deloitte, 2012:1). This indicates how motivations for engagement on water, at the 'internal' corporate level, play out along chains of authority running from the individual plant operator, to managers, to director and CEO level and thence, in turn, to investors. Along this chain of authority (if not command) motivations will still vary, but there is perhaps a greater likelihood that, where a major investor desires to contribute meaningfully to water security, it could have more widespread influence than the actions of a single operational manager.

Ultimately, however, it is difficult for those outside the business world to fully comprehend the different motivations faced by corporations, as well as the individual decision makers within them, and how these motivations lead to action of different kinds. For such outsiders, often the best available evidence is provided by corporations' own reports, and as long as there is a suspicion that reputation is playing some role in how businesses present their action, such reports are unlikely to be interpreted as straightforward reflections of reality.

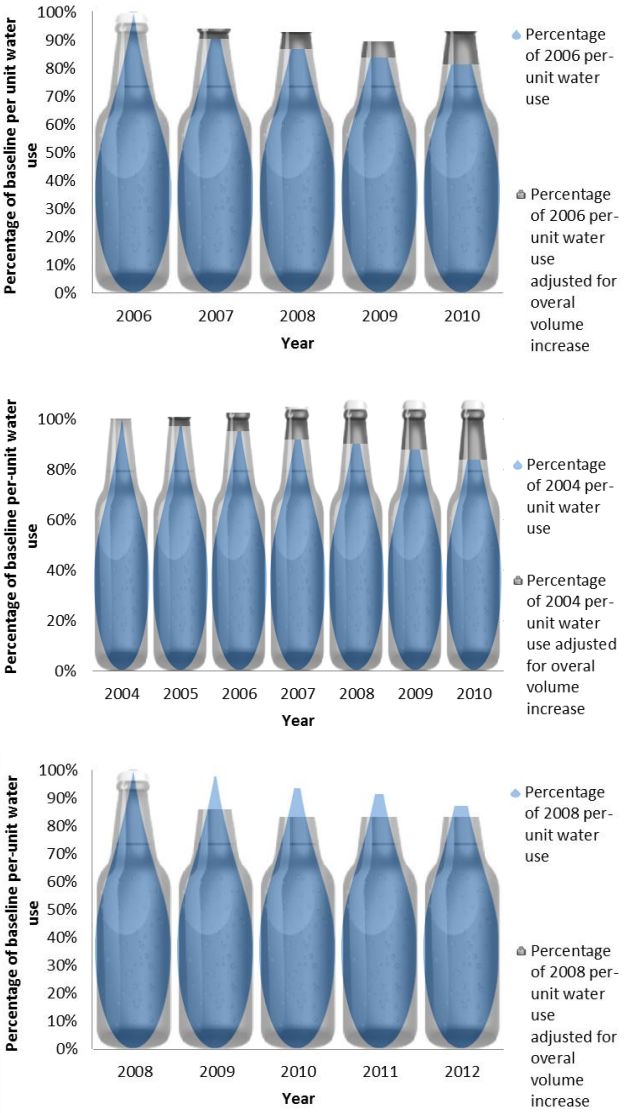
Thus the first area for action around the institutional aspects of corporate engagement on water, relates not so much to corporations' operational facilities, as to their internal governance and decision making structures. On the one hand, this requires non-corporate actors to better understand the incentives and constraints which are faced by a given corporation, and the different actors within it (for example, how operational level concerns translate up to executive directors and shareholders, and vice versa). This echoes the point made above, that more work is needed from non-corporate actors to comprehend the political economy of corporate engagement on water. On the other hand, this endeavour would be made easier, potentially for the good of all concerned, if companies were more willing to engage in constructive dialogue with outside actors, and help tease apart where their action and presentation is motivated by public relations, and where it is not.

2.2 Information

As described above, the type of action that corporations can take at the level of their internal operations, as compared with actions extending into the wider environment, often involves in-plant efforts to reduce the water intensity of processes and enhance the quality of wastewater discharged. In terms of information, too, these activities might appear internally-focused, and of less interest from a public policy perspective. Review of the presentation of these efforts, however, suggests a need to interrogate what substantive outcomes might arise for other water users.

Brewing and beverage companies provide a particularly interesting case, because of the increasingly common practice of expressing water efficiency savings in terms of litres of water used per litre of product. Such 'water use ratios' at first sight tell a story of, for most of the companies concerned, progressive year-on-year reductions in the amount of water used in

Figure 3: Reduction in per unit water use by PepsiCo (top), Coca-Cola (middle), and SABMiller (bottom): reported (droplets) and adjusted for overall growth in volume of product sold (bottles)



Source: PepsiCo (2008, 2009, 2010, 2011a, 2011b); The Coca-Cola Company (2006, 2008, 2011a, 2012); SAB Miller (2009, 2010, 2012b, 2012c)

creating a bottle's worth of, say, soft drink or beer. But this kind of presentation can underplay a key issue for water efficiency savings – namely whether, in situations where water resources are constrained, they increase availability for additional uses. For the multi-national corporations concerned the imperative to grow the business and increase shareholder returns remains. As a result, water saved per bottle of beverage may effectively be diverted back into the growing overall product volume of the business as a whole, and may not translate into an overall saving that would free up water for other users.

Figure 3 makes the comparison. The droplets indicate per-unit reductions in water use, against the various baselines PepsiCo, Coca-Cola and SABMiller have set for their water efficiency improvement plans. For all companies, these show year-on-year reductions in the quantity of water used to produce a specified quantity of finished product (in most cases a litre or multiple thereof). Similar charts are presented in the respective companies' sustainability reporting. The bottles behind show per-unit water efficiency gains adjusted by the growth in the companies' sales volumes – in effect, the amount of units they are producing overall. This presents a different story, in each case. For PepsiCo (top), the trajectory of the droplets shows decreasing per-unit water use, while the bottles (adjusting for the increase in sales volume) show a decline from 2006 to 2007 but an increase in 2010. In the case of Coca-Cola (middle), increasing product volumes mean that per unit water use adjusted for volume-growth increases, year on year, in stark contrast to the year-on-year reduction in per-unit water use. For SABMiller, meanwhile, a significant contraction in product volume from 2008 to 2009 means that adjusted per-unit water use (the bottles) initially falls comparatively more than the per-unit water usage (the droplets), and then remains largely constant from 2010 to 2012.

It should be noted that some of the corporations concerned do document their overall water use or abstractions. In the case of SABMiller this is displayed alongside the per-unit presentation (SABMiller 2012c).[7] However, it is often presentations of per-unit efficiency increases, which

[7] The figures, presented by SABMiller and PepsiCo, do not tally with the figures calculated by multiplying per-unit water use by the overall volume of units produced (presumably because the company is simultaneously reducing consumption of water outside main production processes). For SABMiller the trajectory of 'total water consumption used for clear beer is similar (though different in absolute terms) to the trajectory for adjusted per-unit water use in Figure 3 (SABMiller 2012c). For PepsiCo total water consumption for beverages is reported to have risen in 2008, declined in 2009, and risen again in 2010 (PepsiCo 2012)

receives the greatest emphasis in corporate public reporting. As a result, corporations may sometimes be open to criticism that they are 'cherry-picking' the operational information which they are generating on water, to tell a particular story. This is of concern where the end-outcome in terms of overall water usage, and whether water savings are being reabsorbed by the company, or are potentially available for other users, is unclear.

The corporations concerned, meanwhile, might respond that, even if per-unit water savings are reabsorbed by growth in their overall production volume, this constitutes increased 'water productivity'. As such, efficiency improvements can be argued to generate economic value, strengthening the position of the company and securing jobs. This position needs, however, to be debated on its own merits. Ultimately, the argument advanced here does not deny the positive role water efficiency can play in moderating a corporation's overall water use, but rather reflects on how transparently absolute vs. relative water savings are presented.

Narrative presented by the droplets and bottles in Figure 3 is, of course, constructed at the level of the entire corporation. But water efficiency gains play out at a local level (they are time and place specific) and relative per-unit savings and overall water-use, as well as the implications for other users, need ultimately to be calculated and reviewed at the level of individual plants. The approach of Diageo is interesting in this regard. Diageo argues explicitly that 'Since the production of our brands necessarily involves using water as an ingredient, we believe that measuring the *efficiency* of our water use is a more meaningful indicator than the total amount of water that we use' (Diageo 2012). Nonetheless, while the headline target is framed as a 30% improvement in water efficiency across operations between 2007 and 2015, it has an additional target for a reduction in water wastage at 12 sites, identified as being located in water stressed areas in a global mapping exercise (with all such sites being in sub-Saharan Africa). A key informant for this paper indicated that the 'water wastage' target essentially equates to a reduction in absolute water consumption: i.e., for those particular sites where water stress is deemed very high, the company seeks to reduce consumptive water use in absolute terms.

The second area for action noted is therefore to enhance the transparency of water-related data pertaining to internal operations. This may mean presenting data in a raw (or rawer) form rather than only as 'finished' charts and figures designed to tell a particular story. It also means increasing data availability in relation to particular operational sites: not only if and how per-unit savings make water available for other users; but also when this availability arises – given that the marginal value of any amount of water saved increases during seasonal periods of low flow.[8]

2.3 Investment

Assuming that, in water-stressed catchments, water saved through efficiency savings is put to productive use by other users, there is an argument that companies' investment in water saving research and development, and hardware, is itself a valuable contribution to water security.

But the imperative for corporations faced with risks of insufficient water to make reductions in the water intensity of their processes and the overall water dependence of their business, may be diluted by other available options with a perceived lower opportunity cost. Insofar as water-related risks are perceived in financial terms, as potential costs to the business, then financial instruments may appear to offer a viable alternative to physical reductions in water use. Insurance for water and weather-related risk is one well established mechanism. Another option that is gaining

[8] A further consideration is whether corporations could share the technological innovations, which they are developing to increase operational water efficiency in their internal operations, with local enterprises – particularly in developing country contexts where multinational corporations can play important roles as conduits for technology transfer. This possibility is given more detailed treatment at the scale of supply chains, below (Section 4).

prominence is weather derivatives (Larson et al. 2012). These essentially allow businesses facing weather-related risks, including rainfall, to hedge against adverse hydrological conditions. In contrast to insurance, derivatives are useful against low-impact, high probability events. Larson et al. describe how weather derivatives are increasingly being traded over-the-counter on exchanges, or negotiated privately by two parties, including outside the traditional markets in North America and Europe. The authors cite Environmental Finance (2012) as claiming that the global weather derivatives market increased by 18% from 2009/10 to 2012, when it was valued at US$11.8 billion. They observe that the largest end-users have, so far, been in the power and gas sectors – which face significant cost-risks from water supply interruptions, for example where wet-cooled thermal power stations are forced to de-rate (reduce power production) if cooling water is insufficient or interrupted. Larson et al. argue, however, that for rainfall derivatives, “agriculture is the most obvious and common application... since unusually dry (or wet) growing seasons can have big impacts on agricultural productivity”. In this sense, then, the issue of derivatives also has a bearing for how far corporations will be willing to invest in water use reductions in their agricultural supply chains (Section 4).

For the corporation, the opportunity cost calculation, in comparing physical water use reduction with financial instruments like derivatives, will be context-specific. Accuracy of weather forecasts permitting, purchase of sufficient derivatives could reduce the financial cost to business of a water supply interruption and allow a corporation to offset the cost of lowering production, or even to buy-out other water users, where spot or formal water markets exist. But at the extreme, where water scarcity becomes a key issue for public concern, a portfolio of rainfall derivatives will not convince a concerned and sceptical public that the corporation is doing anything to help alleviate local demands on water.

Overall, the emerging role of financial instruments and the relative incentives for corporations to choose these over action to reduce water risks in a physical sense, appears not to have been widely investigated by the water community at large. The third area for action is therefore directed towards corporate and non-corporate actors alike. Non-corporates actors can begin to better understand the instruments available in the corporate and financial world to manage water risk and how these can best be harnessed in the interests of the water security of all. Corporate actors, meanwhile, can contribute by clarifying the relative scale of their different investments to mitigate water-related risks, and how and when different instruments might be appropriate, individually or in combination.

3 Community and catchment

3.1 Institutions

As noted, the factory fence provides an analytical boundary. However, while there may be limited instances where corporations can secure their reputation, reduce physical water risks, or satisfy regulatory requirements through action in their internal operations, many are realising that it can be more effective (and cost-effective) to look to the wider environment – both hydrological (catchment) and social (community).

In doing so, corporations are taking an important step, from water use, towards water management. The public good characteristics of water have been long debated, often in relation to the privatisation of urban water services and development of market systems for allocation (Perry et al. 1997, Rogers et al. 2002). But in most countries, overall management has been entrusted to public agencies. The public WRM role involves different components – convening stakeholders, mapping needs and risks across these stakeholders, and allocating water and water-related investments, accordingly. In general, it is the first components in which corporations have engaged to date: mapping and understanding water risks and bringing stakeholders together. Few would publicly state that they are making, or actively influencing, decisions about water allocations – who gets how much water, where and when. However, both at the local scale of individual catchments in which their operations sit, and the broader river-basin and national scale (Section 5), mapping risk and convening stakeholders can shape the space in which the 'big-decisions' of WRM, including around allocation, are made. Where disparities of power and voice arise, as they might be expected to between highly organised, well-resourced international businesses and poor and marginalised local people, it is important to consider whether this decision-making and influencing space is constructed and managed in an equitable and accountable manner.

At this catchment and community scale, the number of potential players increases dramatically. Even in a relatively small catchment in a developing country, there may be many different stakeholders with interests in how the resource is managed – resident or transient people that depend on the water body for basic needs and food production; water utilities whose role it is to supply water; businesses ranging from small farmers to the local operations of other MNCs; government agencies responsible for coordinating, regulating and developing water resources and water-dependent sectors such as agriculture, tourism and energy; and non-governmental or community-based organisations advocating around specific issues, from biodiversity to social development. Key, then, are the frameworks within which these many different stakeholders interact, and the goal must be to create spaces for decision-making that are conducive to water security for all, and do not involve reducing one constituency's water risk, at the expense of increasing another's. In this respect, the label of 'partnership', which is often attached to corporations' activities at the catchment scale, or their work with communities, is of particular interest.

Coca-Cola's activities at the catchment and community scale can be broadly subdivided into two types. First, there is the aforementioned mandate for all bottling plants to complete a round of risk assessment and mitigation under the heading 'Source Water Protection'. 'Source Vulnerability Assessments' are required to map water risks incurred by the company, as well as those imposed on communities – Coca-Cola states that the resulting 'Source Water Protection Plan' must include 'an evaluation to determine if the facility's water use limits the availability and quality of water for the people in the local community' (The Coca-Cola Company 2012: 10). All plants are required to have commenced implementation of their plans by 2013 and to update them on a five yearly basis. Coca-Cola states that: 'Often these plans include engagement with local government, water agencies and non-government organizations as partners in addressing water challenges' (The Coca-Cola Company 2011b: 7).

The second type of activity undertaken at this scale by Coca-Cola is the company's 'Community Water Partnerships'. These constitute discrete philanthropic projects across four broad themes: 'education and awareness', 'access to water and sanitation', 'watershed protection' and 'water for productive use' (The Coca-Cola Company 2012: A1). Review of the project portfolio as of 2011 (nearly 400 projects) indicates that many, especially in the latter two categories, would appear to require engaging with other stakeholders around water management at catchment scale. For example, in China's Tarim River basin, Coca-Cola is undertaking a 'water resources management program [that] is improving water management and allocation, enhancing local capacity in ecological agriculture, and improving the management capacity of local decision-makers, stakeholders, and farmers in water resources management' in partner with an anonymous multilateral institution (Ibid.: A5). According to its terms, the project seems to be aiming to contribute to the public good of improved WRM.

Many such projects are designed to contribute (via an in-house accounting methodology discussed in the following subsection) to the company's target to 'replenish the water used in our finished beverages by participating in locally relevant projects... to produce a volumetric benefit equivalent to our global beverage production volume... by 2020' (Ibid.: 6). At the same time, some of Coca-Cola's Community Water Partnerships also arise as a response to specific water risks encountered/ imposed by bottling plants, as identified under Source Water Protection.[9]

There is thus, to third parties at least, a somewhat opaque overlap between different forms of Community Water Partnership involving catchment-level activities: on the one, those motivated by the 'Replenish' target (arguably oriented to secure brand reputation); and on the other, those which form part of Source Water Protection (oriented towards operational continuity). Philanthropic projects aiming at watershed protection may well provide certain water security benefits to local communities, as well as to the company in reputational terms. But Source Water Protection is arguably more interesting from a water resources management perspective, because of the greater potential for competing interests. Managers of bottling plants undertaking Source Water Protection have a powerful 'innate' incentive to mitigate the water risks they face, where these threaten business continuity (which sits alongside the top-down requirement for all plants to begin implementation of Source Water Protection by 2013). As such, the facility's interests are directly at stake, and while there may be situations in which genuinely 'shared' risks can be managed in a mutually beneficial way, there may also be instances of intense pressure on the resource, where tradeoffs arise between the needs of the facility and local communities. At the same time, the fact that business interests are immediately at stake may be a motivation to dedicate greater resources to tackling water risks. Where tradeoffs can be managed, and both risks and benefits from any response are genuinely 'shared', this could be positive (to be carefully judged according to the criteria adopted for this analysis, i.e., are the institutional arrangements accountable; is information transparent; are investments leading to equitable and sustainable outcomes?). This contrasts with those Community Water Partnerships that are detached from any Source Water Protection planning, where the interests of the communities in question are not in direct tension with those of a Coca-Cola bottling plant, and a less tangible reputational motivation is at work.

Corporate efforts to engage in water resources management at catchment scale are tied more explicitly to operational water risks in the case of the Water Futures Partnership, which currently comprises the brewer SABMiller, the German international cooperation agency Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the international environmental NGO, World Wildlife Fund, UK (WWF-UK). The Water Futures Partnership has 'an aim to reduce shared

[9] According to The Coca-Cola Company (2012) Community Water Partnership projects are 'identified as part of broader Replenish strategies that consider: Engagement within the communities and watersheds where we manufacture products; Partnerships and philanthropic priorities; Risk management priorities, as identified through source vulnerability assessment and source water protection planning; Growth projections for our business; Geographically relevant water issues, or themes, such as water and agriculture, water and cities, water and women, or water and nature'

water risks in watersheds by proving the business case for private sector engagement in promoting the sustainable use and management of water' (key informant interview). Importantly, the differing motivations for each stakeholder are explicitly acknowledged – 'The success of our partnership stems from the fact that each partner brings different skills and competencies to promote water security, despite differing underlying motivations' (SABMiller, GIZ and WWF-UK 2012: 5) – although the potential for trade-offs and tensions is still not explicit. The Water Futures Partnership aims to work on a phased basis in the countries where it engages, tailored to the specific institutional circumstances facing each local partnership. A key informant for this paper presented the process as follows: the Water Futures Partnership usually commences with a participatory shared water risk assessment, 'which helps to build a common dialogue between the businesses and local stakeholders around the concept of water risk'; integrates 'a significant amount of local knowledge'; and consolidates 'common understanding on the causes and consequences of risks, improving stakeholder buy-in to need for collective action'. The risk assessment is followed by development of water risk mitigation plans and scoping of intervention 'projects'. The key informant argued that 'doing this in a participatory manner, or better still, with government leadership, helps to identify creative solutions, increases support for action and legitimises the whole process in the eyes of the government, other businesses and civil society'. The final phase is implementation of the scoped activities.

In practice, the functioning of the model is invariably more complex. In different countries, expected core partners have sometimes lacked resources or incentives to engage, while other apparently periphery players show greater willingness than the businesses. The actions that arise from the risk assessments are diverse. Some involve specific interventions in collaboration with local public agencies such as municipal water suppliers and river basin offices. Others seem geared to providing an entry point for advocacy towards government and influencing broad water resources management decisions. For example, in Tanzania, the local SABMiller subsidiary Tanzania Breweries Ltd. aims ''to become a member of the Basin Water Board or National Water Board and thereby contribute to their strategic and operational decision making' (SABMiller, GIZ and WWF-UK 2012: 13). Such an endeavour may raise the concerns for those who believe this is essentially lobbying action, geared ultimately to safeguard the corporation's interests against competing water uses. But it can be argued that companies regularly engage in bilateral lobbying of government. In this case, the involvement of a public agency and NGO, albeit ones of the international rather than truly local variety, plausibly provide counterpoint perspectives. Here, future reporting from Water Futures Partnership could perhaps offer greater transparency around who is funding and participating in specific activities, since this will often determine how much influence any one partner is able to exert in a given water management space.

A further important feature of the Water Futures Partnership is a willingness to reflect seriously on the challenges involved in this kind of work. Though calls for multi-stakeholder action are common, working examples are still rare, and the internal learning undertaken to date is therefore particularly valuable. Lessons have been drawn from case studies, undertaken by a third party, across the countries in which the Water Futures Partnership is active to date. Although these case studies have not yet been released due to the inherent sensitivities involved in 'live partnerships',[10] they provide important initial lessons (Box 4). It is to be hoped that the results of such evaluations are made public, and succeeded by others that interrogate the equity and sustainability of outcomes, as well as the quality of process and working relationships

Box 4: The Water Futures Partnership: early lessons

Case studies of the Water Futures Partnership work in Peru, South Africa, Tanzania, Ukraine, Colombia, Honduras, India and USA by a third party non-profit organisation, indicate important considerations for the design of effective partnership arrangements:

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- The need for commitment by local offices of the corporation, rather than relying on mandated requirements from international head offices
- The importance of government and the role of different stakeholders, particularly experienced and networked development agencies, in brokering relationships with government and navigating the complex institutional arrangements around water
- Expectations of different actors, including for commitment of funds, which may impede progress
- The sheer time and resource demands required to make meaningful partnerships work, including the very necessary investment to establish a shared commitment
- At the same time, the relatively quick wins that can be provided by good personal relationships
- The importance for both large and small businesses to have a strong, scientifically supported business case that draws on local evidence rather than generic global data and examples
- The importance of rapid, visible progress to provide an incentive (especially for private sector actors) which may justify some more short-term, fast-turnaround projects initially.

Source: Case studies were provided on a confidential basis by Robin Farrington, GIZ. The above points are therefore drawn from the case-studies without indicating specific countries or partners

A key informant outlined that the Water Futures Partnership intends to expand in 2013 to act as an 'international resource base and support platform' with the aim of increasing the pace with which local partnerships on water are established and yield results. This next stage of the Water Futures Partnership will be open to a range of partners, beyond GIZ, SABMiller and WWF. The second phase aims 'to utilise the lessons learnt to capacitate new partnerships' and 'secure financial and technical resources to support watershed level partnerships through their phases of implementation'.

Some of the observations in Box 4 are arguably generic to partnership working of any sort. But they are critical first steps in an exercise which constitutes the fourth area for action: to actively try out new models for partnership and invest resources in learning from the experience. Such models should be clear about the relative motivations and strengths of the different players, and aim to understand and use these to deliver equitable and sustainable water security outcomes. If such partnership models are to convincingly demonstrate such outcomes, the concern with shared risk needs to be matched by providing a share in the benefits of use, across as a broad range of stakeholders as possible and with a particular focus on those local communities who tend to be bypassed by mainstream economic development (Newborne 2012).

3.2 Information

Assessments of water risks conducted by private corporations help to bridge the water security information gap, insofar as they provide new information (or old information in a useful new way), and are made available to a broad range of stakeholders. The Water Futures Partnership makes a distinction between 'watershed risk assessments' and 'business water risk assessments'. This reflects the fact that, while some of the underlying information – e.g. on water availability, variability and quality – will be the same whether communicating to a corporate audience or to a broader range of stakeholders, other aspects will be of differing relevance to each audience. According to a key informant, the watershed-level assessments help construct a broader economic case for action, which goes beyond the narrow business case and can have traction 'with important decision makers in government'. Nonetheless, although there is a danger of setting up parallel processes, existing systems for information collection, analysis and communication on water are

often inadequate even in developed countries. As a result, interventions by the private sector to collect and publicly share clear, reliable information on water are to be welcomed.

What is less straightforward is the emerging phenomenon of water offsetting – whereby corporations engage in complex calculations about their positive and negative water impacts. As noted, Coca-Cola's Community Water Partnerships contribute towards its 'Replenish' target. The company has released a manual, developed in cooperation with the NGO The Nature Conservancy, detailing how it derives an estimate of the volumetric water benefits (including quality benefits such as erosion control) from its various Community Water Partnership projects (Limnotech 2010). However, these workings remain somewhat behind the scenes for the average reader of Coca-Cola's water-related sustainability reporting. The company's 2012 flagship report on water states that it is on track with the replenish target, with 54.8billion litres, or 35% of product volume, currently replenished through community water partnership projects (The Coca-Cola Company 2012). PepsiCo has a similar target to achieve 'positive water balance', and indeed claims that it has achieved this in India, as verified by the audit and accounting firm Deloitte (PepsiCo 2010). In addition to the opaque calculations which lie behind these two water-accounting practices, the target-driven approach may be expected to entail an emphasis on new infrastructure, at the expense of sustainability.[11]

There are, furthermore, serious conceptual difficulties with a number of water offsetting calculations. Comparison with carbon offsetting is instructive. Water impacts do not aggregate at a global level in the same way as the impacts of carbon and other green-house gases. In the case of carbon offsetting, a given reduction in emissions or a volume of gas sequestered can, crudely, be assumed to have the same net impact on global climate change risks, and thereby the risks faced by each individual, wherever it takes place.[12] In the case of water, however, a given project can only derive water-related benefits in the specific catchment in which it takes place.[13] Even where these projects achieve tangible increases in the amount of usable water available in that catchment (for example through rainwater harvesting) these increases cannot simply be aggregated and set against the company's aggregate water use, except in the most ephemeral sense – a form of water 'atonement' where injuries of water over-exploitation in one location are balanced against reparations in another. Put more simply, for those impacted by the company's water use, 'good water deeds' undertaken in a distant catchment are unlikely to be relevant, and certainly provide them with no discernible increase in availability of, or access to, water.

PepsiCo, together with The Nature Conservancy, appears to be wrestling with this issue in proposing 'positive water impact' as an evolution from the 'positive water balance' concept – calculating the water offsetting potential of its projects by watershed, and not attempting to aggregate at the global level (PepsiCo and The Nature Conservancy 2011). Another approach where the water offset is calculated at the level of a single sub-basin, this time from a corporation in the chemicals sector rather than food and beverages, is considered in Box 5.

If calculating water offsets at the level of single basins begins to get to grips with the spatial aspects of water, it still leaves the temporal dimension: the fact that the relative value of water is (to an extent) a function of its scarcity. The costs of water use or pollution by the corporation, and the benefits of projects to increase availability or access for others within the catchment, will have different value to stakeholders if they are achieved at a time of relative water scarcity, than if they are achieved at a time of relative abundance. Effective water accounting at catchment or

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[11] One key informant argued that the emphasis on high-profile water offsetting targets, in support of a commercial brand, not only reduces managers' ability to dedicate resources to assessing and reinforcing the sustainability of interventions, but also to undertake more time-consuming, but potentially more significant, institutional engagement

[12] Notwithstanding certain anomalies around, for example, emissions of some greenhouse gases from aviation at altitude

[13] Leaving aside the issue of interventions to reduce 'virtual water' use – which are very difficult to quantify and are generally not the focus of corporations' water 'offsetting' projects discussed here

watershed level therefore requires consideration of *when* the impact or offset takes place, as well as where.

Last, but not least, Coca-Cola and PepsiCo's calculation of the water impact to be offset in the first place, appears to be confined to abstraction and wastewater associated with operational plants. As Section 4 explores, this is often a fraction of the overall water impact a company exerts through the value chain, particularly in growing product ingredients such as sugar.

Box 5: A rationale for corporate, donor and local government partnership on water in South Africa

In South Africa, the global fuels and chemical company Sasol has entered into partnership with Emfuleni Local Municipality (ELM) and GIZ to reduce the supply-demand gap faced both by the company and others in the Vaal River basin, itself part of the Orange-Senqu river system. The project has received joint seed funding from SASOL New Energy (a subsidiary business unit responsible for exploring new opportunities around carbon and water) and GIZ.

Studies by South Africa's Department of Water Affairs suggest demand already outstrips sustainable supply in the Orange-Senqu system (which is of huge economic significance to the country). As part of the nationally mandated policy response, municipalities have been charged with reducing water use by at least 15% by 2014. Currently, ELM's water losses are estimated at 44%, equating to significant lost revenue. However by itself, the municipality lacks capacity and resources to reduce these water and financial losses. Sasol is one of the largest water consumers in the area and its facilities sit downstream of ELM. For Sasol to support ELM with a water-loss reduction programme is therefore logical to both parties.

WRP, a company contracted to undertake the engineering components of the project, provides ELM with pressure management and related services on a loan basis, recouping the cost from part of the savings associated with resulting water loss reduction, and assisting ELM to reinvest the remainder in further loss-reduction (an expected US$2.3 million from total anticipated savings of US$7.6 million).

With support from the German, British and Australian governments, the project has followed rigorous tendering procedures which have in some cases caused delays, but broadly helped all parties buy into the process.

The conceptual framework for the project is essentially for the downstream company to invest its water use reduction efforts 'offsite' – in this case upstream in Emfuleni – so that it can benefit as a downstream user. In contrast to some other water offsetting approaches mentioned in this section, there is greater conceptual clarity here, about how and where the water savings (by ELM) relate to the corporate water use (by Sasol). It will be interesting to see whether this approach is able to take account of the temporal variation (and frequent mismatch) between water availability and demand – put another way, whether a unit of water saved by ELM in the wet season is worth the same as a unit of water used by Sasol in the dry season. There may also be questions around whether in the long run, water offsetting in this guise is open to some of the same criticisms as carbon offsetting – whereby offsets become a 'license to emit' if they are not framed within an overall envelope (for emissions or water use) which is reduced over time. As a model of donor-corporate-local government cooperation, however, the partnership approach used here certainly merits further attention.

Source: Case study provided by Robin Farrington, GIZ

Given the many conceptual pitfalls around water offsetting, the fifth area for action is a call for greater transparency and straightforwardness, while we are still relatively early in the development

of tools, concepts and approaches. The analytical capacity which corporations bring to the table is a significant resource. An open, informed dialogue between public and private sector expertise could help advance the science of water accounting in general – for example the System of Environmental-Economic Accounting for Water proposed by the UN also wrestles with peculiar spatial and temporal characteristics of water (UN DESA 2012). But until the intellectual legwork is further advanced, corporations may need to exercise restraint in how they present the results. Concepts like 'replenishment' and 'water balance' tell a simplified story for the purposes of external relations, but they do not do justice to the complex reality of who gains and looses wherever increasing demand for water meets locally constrained availability. Third party verification, as performed for PepsiCo's positive water balance in India by the consulting firm Deloitte (2010), is to be welcomed. But such verifications need to make very clear the underpinning conceptual challenges of water offsetting methodologies, as well as simply checking the numbers.

In addition to focused, collaborative work to develop water accounting theory, corporations can also bring their risk-assessment capacity to bear. This can include sharing data and assessments – at a broader scale, Coca-Cola has provided its data on water as an input to the World Resources Institute's Aqueduct tool, including projection of water stress over timeframes of more than 80 years using Intergovernmental Panel on Climate Change scenarios (Jenkinson, 2011). Because of the highly localised nature of water data, such information sharing is likely to be still more advantageous, accurate and relevant, if it is computed at the more localised scale of the catchment. Furthermore, and as suggested by a key informant, rather than an in-house risk assessment exercise that is then shared with communities, corporations could give real meaning to the idea of 'shared risk' between corporate operations and local communities by entering into a full participatory risk assessment. With neutral facilitation by an experienced, independent third party, such an assessment would merge quantitative, probabilistic risk assessment methods with discursive approaches to identify and discuss differing perceptions and value-judgements from as wide a range of stakeholders as possible. Done in the right way, i.e. as an in-depth, genuinely participatory exercise, such an approach might help to interrogate the institutional challenges which often lie at the heart of water insecurity, but which often prove the most contentious and subjective.

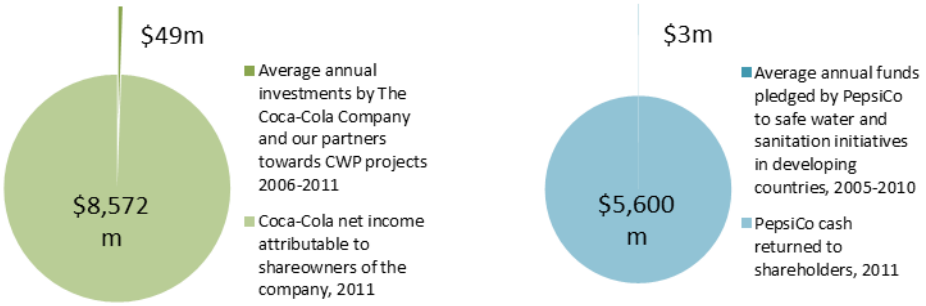
3.3 Investment

The funds which corporations are contributing to water-related activities at the catchment level are not insignificant. Coca-Cola reports that it, together with partners, has invested US$247 million over five years in its community water partnership projects (The Coca-Cola Company 2012). PepsiCo reports that it, and 'the PepsiCo Foundation', have made pledges of over US$15 million to 'safe water and sanitation initiatives in developing countries since 2005' (PepsiCo 2010). There are numerous caveats around these headline figures reported in the respective companies' flagship water reports.

First, they need to be put in context. Water is a key productive input for Coca-Cola and PepsiCo's businesses – at the most basic level they are engaged in turning water into much more valuable beverage (and food) products. For illustrative purposes, a relevant comparator might therefore be the value extracted for shareholders in a given year, by the companies as a whole. In the case of Coca-Cola, the average annual investment in community water partnerships (US$49m) translates to roughly 0.6% of net income attributable to shareholders in 2011. In the case of PepsiCo, the average annual pledge to water and sanitation initiatives (around US$3m) is 0.05% of cash returned to shareholders in 2011 (The Coca-Cola Company 2011a and 2012; PepsiCo 2010 and 2011a) – a proportion which hardly registers in Figure 4. The numbers are crude and comparison between the two companies is redundant – PepsiCo mentions projects specific to safe water and sanitation, while Coca-Cola's community water partnerships includes other interventions for example watershed protection, and the actual contribution by Coca-Cola vs. its partners, moreover, is not revealed. There is, finally, no legal obligation for corporations to undertake philanthropic

work, and it should again be emphasised that the combined amount of over US$260m is, at some level, a contribution to bridging the yawning water security investment gap.

Figure 4: Comparing investment in water-related projects (US$millions) with shareholder returns – The Coca-Cola Company (left) and PepsiCo (right)



Source: As extrapolated by the author from the Coca-Cola Company 2011a and 2012; PepsiCo 2010 and 2011a

The second caveat concerns the need to consider what kinds of projects are being undertaken. Coca-Cola does not give a breakdown of what it spends on different categories of community water partnership projects. However, the company indicates that US$30million was provided to the Replenish Africa Initiative (RAIN) which is dedicated to providing safe drinking water access alongside sanitation and hygiene, like PepsiCo's reported US$15m of pledged funds. Water supply and sanitation projects can certainly contribute to the water security of the beneficiary communities, but they are somewhat separate to other interventions (e.g. watershed protection) which are more explicitly about management of water resources, and therefore the key focus for this paper.

The third caveat is yet another reminder about the complex multiplicity of motivations at play. According to research by the Committee Encouraging Corporate Philanthropy (CECP 2008), 55% of surveyed CEOs considered that new business opportunities should be placed equal or above social concerns in importance, when prioritising corporate philanthropy funding. As such, new business opportunities join a growing roster of motivations for engagement on water, including license to operate, global and local brand reputation, regulatory compliance and maintaining access to water as a key operational input. But when looking at corporate investment at catchment and community scale, is not always very clear what is undertaken, and funded, by the business itself, and what is being funded through their affiliated philanthropic foundations. This distinction matters for beneficiary communities. Companies investing in specific water management activities in the catchments where they operate, for direct operational reasons, have a clear stake in the community's water. As noted, this stake carries with it greater concern that corporate and community interests over water may, at some point, come into tension. At the same time, activities funded though foundations are likely to be legally prohibited from benefiting the core business, and will thus fall largely at the reputational end of the spectrum. Ultimately, beneficiary communities need to have clarity about what part of the company is providing the investment, so as to diagnose the likely motivations and risks attendant on that investment.

Taking a step back from this difficult terrain, what are the implications for action in this, our sixth area? First, there is a need to better map and quantify how much corporations are contributing, to what sorts of projects – distinguishing between the mainstream commercial companies and their associated philanthropic foundations (Newborne and Mason, 2012). But a much broader concern is to identify new models for this investment. Such models need to go beyond philanthropic

projects, retaining an explicit emphasis on the business case (so as to be clear about motivations) while safeguarding equitable outcomes and checking against 'capture' – both of influence, and water itself. To the extent that, as discussed in Newborne and Mason (2012), most MNCs with broad international or global operations are still at present bound by legal and normative obligations to put investor interest first, this requires a paradigm shift in the fundamentals of how businesses are structured, regulated and run. Even without such a shift (which would ultimately need to be led by investors and governments) corporations may be free to experiment with new forms, such as community interest companies, and new models of ownership, including giving local communities an equity stake (Newborne 2012).

4 Supply chain

4.4 Institutions

The supply chain is harder to demarcate, spatially, than the other three scales discussed in this paper, yet it is where the vast majority of many companies' water impacts occur. While there will always be contestation over the boundaries at which the responsibility of corporations diminish, supply chains are a major focus of corporate sustainability efforts, in general, and are likely to remain so (Cisco 2010). There are strong ethical and commercial imperatives on MNCs, as lead institutions in global markets, to use their influence to improve practice down the links in their supply chains, including in relation to water. The bottom line is that corporations that fail to identify and manage risks in the water-dependent portions of their supply chains are jeopardising long-term sustainability, especially where they have long-term contracts and purchase agreements with particular suppliers. Coca-Cola, for example, has purchase agreements for certain products that last over a decade (Newborne 2011).

Depending on the nature of the business, and how many links in the chain are being considered, the supply chain can extend as a fine web over innumerable 'waterscapes'. To provide workable frame of reference, this section considers relations at two or three removes in global supply chains for global food and beverage products: MNC's global and developing country operations; major retailers (such as supermarkets in the US and Europe) which lie 'upstream' in the chain but exert a strong influence on production choices; agribusinesses that trade in agricultural commodities and, ultimately, farmers. Arguably, it is farmers that are responsible for the vast majority of the world's consumptive freshwater use[14] – all the 'green water' (soil moisture) and around 70% of blue water (extractable liquid from surface or groundwater sources), a total of 90% (Allan 2011). Focusing on MNCs potentially omits the many more farmers, particularly in the developing world, who are farming primarily for their own food security or limited local market participation, and who are not yet integrated into global food production systems. However, according to Sojamo and Larson (2012: 619), 'although only some 15% of the global agricultural output is traded internationally, a Western corporate-dominated agro-food system has emerged after the Second World War that influences agricultural production frameworks, market dynamics and consumption throughout the world'. It might therefore be argued that resource management norms set in commercialised agriculture and globalised food production will have an influence on the practice of subsistence farmers.

Apparently because of a disconnect between the water and agricultural communities, little thinking has been done to-date around the importance of agricultural supply and value chains for water management. Relationships between large retailers, food and beverage companies, agribusinesses, and the farmers who supply them are thus poorly understood when it comes to implications for water. From a given MNC's perspective, the strength of these relations will depend on many factors – factors that are situational (e.g. the number and location of actors involved), internal (e.g. the importance placed on fostering long-term supplier relationships), and external (e.g. consumer-oriented or -driven campaigns and certification schemes). As an example, one key informant pointed to the comparatively lower leverage a small-volume spirit beverage company will have over its suppliers compared to a company producing higher volumes of soft-drinks or beer, even if overall sales value is similar – because the latter's contracts for raw ingredients are likely to be larger.

Sojamo and Larson's paper is a still-rare attempt to apply theory around value-chains and governance, developed in relation to the agro-food system in general, to the specifics of water. The

[14] Consumptive use refers to the portion of water evapotranspired or otherwise not returned for downstream users

authors draw on Clapp and Fuchs (2009) who propose a typology of the pathways, or forms of power, through which MNCs can influence agro-food governance: 'instrumental power (e.g. influence via political lobbying and financing), structural power (bargaining position in value chains and in wider political agenda setting supported by material structures), and ideational and discursive power (ability to frame certain issues and debates) in the global political economy context' (Sojamo and Larson 2012: 623).

All three pathways are relevant to understanding how MNCs can be expected to influence water management practice through their supply chains. Sojamo and Larson elaborate their thesis through case studies of the global agribusinesses Bunge and Cargill, and Nestlé, the world's largest branded food company. Drawing on documentary analysis and key informant interviews within and without these corporations, the authors determine that Nestlé is the most progressive of the three analysed, reporting on a range of projects to enhance rainfed and irrigated water management practice among farmers. Nestlé's 2010 sustainable development report explicitly acknowledges that the company 'can have a significantly greater overall impact on water resources by helping farmers to reduce their water consumption. Good water management is fundamental to the livelihoods of the 556 600 farmers who supply us' (Nestlé 2010: 69). However, it is not yet clear if these activities are part of a long-term, business-wide shift, or isolated projects undertaken mainly for external relations purposes. Independent verification (for 2011) of Nestlé's reporting on rural development identifies a need for more coherent objectives and a consistent methodology for measuring impacts across markets (Bureau Veritas Solutions 2012, cited in Sojamo and Larson 2012).

Bunge and Cargill, meanwhile, have recognised their self-interests lie in understanding the water risks associated with their sourcing of agro-food commodities such as sugar, grain or oil. However, they are deemed not yet to have acknowledged their own power to influence practices and norms with regards to water management at the farm level. The authors also report that Bunge and Cargill traders express a reluctance to engage farmers around corporate social responsibility issues including water management, on the grounds that to 'suggest that farmers should manage water differently... would create problems that may affect the ability of the company to do business'. This would appear to be an attempt to portray farmers, rather than the MNCs, as the bottleneck for change. More work certainly needs to be done to understand what is constraining action on water security through agro-food supply chains and to work out how to present the agenda in a way that does not jeopardise supplier relations and acknowledges the many competing pressures facing farmers, especially in developing countries. But this should be a starting point for action, not a justification for inaction. Sojamo and Larson also observe that the current terrain is inherently asymmetric, in that the resources, capacity, voice and bargaining power that MNCs have at their disposal is often vastly greater than those of others further down supply/ value chains, including farmers. As such, there is an imperative and justification for these corporations to show leadership, and wield such leadership in a transparent and equitable manner.

MNCs in retail arguably possess significant power to influence supply chains by shaping and responding to consumer preferences. Among them, the UK supermarket Marks and Spencer (M&S) is notable for producing a guidance manual on water stewardship for its agricultural suppliers in collaboration with WWF (M&S and WWF 2010). To borrow the above typology, the manual appears to draw on the company's structural and ideational power (as winner of various industry awards for sustainability – M&S 2012) and provides a straightforward introduction to the main issues, as well as outlining certain practical steps which suppliers could take as they set out on their 'water stewardship journey' (M&S and WWF 2010: 5). Marks and Spencer, along with GIZ, has also supported the Alliance for Water Stewardship to pilot the Water Stewardship Standard in Kenya, with horticulture, floriculture and coffee producers. The Water Stewardship Standard is 'an international market standard, similar in ways to the Forest Stewardship Certification scheme, which will set out the actions required by suppliers and producers to deliver catchment level sustainability targets' (Hepworth et al. 2011: 12).

The supply chain is the most expansive frontier of private sector engagement on water, but the paucity of research to date suggests it is the poorest understood, especially when the full extent of the supply chain is considered – from brand-name food and beverage corporations, forwards (to supermarkets and consumers) and backwards (to agribusinesses and thence farmers). The seventh area for action therefore calls upon water experts to invest in understanding the particular place of water in the much broader political economy of supply chain governance. As such, it will be essential to consider the influence and motivations of different actors at each link in the chain, and how they interrelate. From here, new institutional models will be required to incentivise the mix of actors to collaborate effectively towards water security outcomes, combining informal institutions such as negotiation and relationship building, with more formalised ones including purchase agreements and certification schemes.

4.5 Information

At the level of the supply chain, water footprinting is the most conspicuous area in which the private sector is engaging, with implications for the water information gap. Chapagain and Tickner (2012) reflect on the evolution in application of business water footprints by companies including SABMiller, Coca-Cola, Puma, Marks and Spencer and Unilever. The overall trajectory reflects the utility of water footprinting as a methodology 'that looks not only at direct water use of a consumer or producer, but also at the indirect water use', mapping 'water consumption volumes by source and polluted volumes by type of pollution' – and separating out blue and green water components, as well as 'grey water', the volume of water required to assimilate pollution (Hoekstra et al. 2011: 2).[15] As such, water footprinting is suited to (and indeed is one of the few available options for) mapping likely hotspots for water impacts and risks across a supply chain; at the same time, it is an extremely complex approach which is still evolving, including in successive applications by corporations. Moreover, to really understand impacts and risks, initial 'hotspot mapping' using a water footprinting approach needs to be followed up with further qualitative and quantitative analysis.

Chapagain and Tickner delineate various phases in the evolution of business water footprinting. Beginning with attempts to develop headline figures for supply chain water impact (a volumetric numerator over a temporal denominator), the companies concerned have realised that the real utility lies in the breakdown of the water footprint in space and time, where relative impacts can be set in their particular context. As a simplistic example of why this matters, two soft drink beverages could have broadly similar water footprints at the headline level, but if the sugar for one is grown using irrigation in Southern Africa with significant agro-chemical inputs, its production will have different implications for the freshwater environment and other water users, than one for which the sugar is grown in a temperate region using rainfed methods and minimal agro-chemicals.

Water footrprints of specific products provide powerful communication devices that may well be just as useful to engage stakeholders within the business, as those outside it. Coca-Cola, for example, has attempted water footprinting studies of a Coca-Cola bottled in the Netherlands, and Minute Maid orange juice and Simply Orange products produced for a North American market (The Coca-Cola Company and The Nature Conservancy, 2010). The former revealed that more than two thirds of the total water footprint of a half-litre bottle of Coca-Cola in the Netherlands is incurred in growing sugar beets, while for orange juice, green and blue water consumption are strongly affected by whether the oranges are grown in Florida (where irrigation predominates, requiring blue water) or Brazil (where most production is rainfed, i.e. reliant on green water). Work by the Brazilian cosmetics firm Natura with the Water Footprint Network, indicates that for their products a significant part of overall water impact lies in the grey water footprint component, in domestic

[15] Defined by Hoekstra et al. (2011) as 'the volume of freshwater that is required to assimilate the load of pollutants given natural background concentrations and existing ambient water quality standards'

wastewater after customers use their products in the bathroom (Francke and Castro 2012). In this way, Natura is extending the water footprint analysis to look not only backwards down the supply chain, but forwards to the eventual use of the product.

Although the conclusions of Coca-Cola and Natura's analysis are not revelatory for water experts, for those who are unfamiliar with the intricacies of water issues, they provide a concrete example with which to tease apart some of the complexity of water risk through the supply chain, and how it is moderated by the 'what', 'where', 'when' and 'how' of production. As such, Chapagain and Tickner argue that water footprinting 'has been particularly useful... for motivating CEO and Board-level engagement in efforts to address water related risks' (2012: 575).

The water footprint network argues that 'the water footprint is an effective tool only when used in a rigid manner, not when used as a metaphor' (Water Footprint Network 2012). This points to a possible trend towards more standardised, certifiable approaches. In addition to the Water Footprint Network's own assessment manual (Hoekstra et al. 2011), the International Organization for Standardisation (ISO) also has a new standard for water footprinting under development, ISO 14046 (ISO 2012). There is also the above-mentioned Water Stewardship Standard, though this appears to aim to look beyond footprinting, to water use and impacts at site and watershed scale, within core operations and among suppliers (Hepworth et al. 2012).

Moreover for water footprints to go beyond conceptual frameworks and become decision making aids for better water management, requires integration with non-water considerations. Presumably, corporate CEOs are not going to develop their business strategies on the basis of water footprints alone. Even leaving aside the bottom line, a water intensive production process located in a water scarce region may be preferable in business terms to one which has lower impacts, if there are significant benefits in terms of social development (e.g. employment) and other environmental considerations (e.g. carbon). There is considerable thinking to be done here, in both public and private sectors. At the corporate frontier in this regard, are efforts by PUMA to undertake integrated accounting of a range of environmental impacts across its enterprises and supply chain. This 'Environmental Profit and Loss Account' classifies suppliers into four tiers (for example shoe manufacturing/ outsole production/ leather tanning/ cattle rearing) and considers environmental impacts under the categories water use, greenhouse gas emissions, land use conversion, other air pollution and waste (PUMA 2011).

The next area for action (number eight) identified with regards to the water information gap at the supply chain level, is therefore to develop business-relevant approaches to water footprinting, that go beyond the 'water box', yet are fully transparent and verifiable by independent third parties. This will require consideration of other environmental externalities, as per PUMA's methodology, but also social ones (e.g. the extent to which a water-related investment is 'inclusive' of local development – Newborne 2012), and mechanisms to permit comparison with the financial bottom line.

Even as the thought-leaders develop such approaches, there is scope for the multitude of companies that are not yet considering water risks in any detail to undertake more basic water footprints, as a comparatively straightforward entry-point to the complex issues.

4.6 Investment

Once a company has undertaken to map water risk through its supply chain, through water footprinting or equivalent methodologies, it is faced with a choice about how to manage those parts of the supply chain which incur significant risk. Should it switch suppliers, to ones located in areas of lower risk, or endeavour to work with its existing suppliers to reduce their water dependence and impact? In some cases the risk will be such that switching is the only viable option – for example where agricultural production is located in an area where water demand already exceeds renewable supply by a significant margin, and the government has a stated policy to reduce water

allocations to farming in favour of municipal and industrial uses. But in many cases, even though switching suppliers is less expensive than relocating the corporation's own facilities, it can still carry a significant transaction cost, especially if new tax and legal regimes need to be navigated or investment put into bringing production up to assured quality. The bottom line motivation to stick, and work, with existing suppliers, may also be complemented by corporate social responsibility motives – certainly from the perspective of existing suppliers, losing contracts with an MNC could be catastrophic for them and for local producers.

So if a company wishes to secure its existing supply chain against water risks, what are the options? The first thing to recognise is that investment is not limited to dollars spent on hard infrastructure and technology. Looking beyond this narrow view of investment, technology transfer becomes an issue for consideration – in the broad sense of 'dissemination of knowledge about technology practices' (Foray et al. 2011: 12). Corporations that have taken innovative steps in their own operations to reduce their water impacts and dependence accumulate important technical and human capacity, which could also be invested with their suppliers. This could be especially valuable where existing capacity for sustainable water use and management is limited, as it is in many developing country contexts. High-tech engineering and process optimisation to reduce water usage at the factory level may be relevant in some instances, but so too are 'low-tech' methods, especially in agriculture – for example low- or no-till farming or rainwater harvesting by controlling runoff with earth dams.

There may also be a role for public support, in terms of finance and creating an enabling environment – since commercial incentives for the private sector to transfer technologies which solely serve the public good may be limited. This logic is behind the WTO Trade-Related Intellectual Property Rights (TRIPS) agreement, which calls for developed country members to "provide incentives to enterprises and institutions in their territories for the purposes of promoting and encouraging technology transfer to least developed country members in order to enable them to create a sound and viable technological base' (TRIPS Article 66.2, cited in Foray et al. 2011:12). However, those considering technology transfer in the case of water management need to be careful not to import lessons wholesale from the pharmaceutical sector, where the issue has been debated in the context of patented anti-retro virals, for example. For corporations reliant on water there is a clear business case for helping suppliers to reduce water use, insofar as the benefit (risk reduction) outweighs the cost. Unlike in the case of pharmaceuticals, they are not losing out on a potential market by sharing water productivity technology or expertise. Hence corporations should themselves be encouraged to invest in capacity building and related aspects of technology transfer, in their own interests. Any public funds, international or local, should be directed towards catalysing and facilitating the technology transfer process, in support of projects and endeavours which are self-sustaining in the long run.

An interesting test case is the effort by SAB, the South African subsidiary of SABMiller, to reduce water risks in its supply chain for hops in the Western Cape. Hop growing conditions are not optimal in the region, and there is an increasing supply-demand gap for water, with limited options for supply-side development. Nonetheless, SAB's commitment to locally sourced hops means it has decided to tackle its supply-chain water risk in-situ, rather switch to producers in another country. Following water footprinting, and stakeholder meetings including the hop farmers and others, a program of activities has been drawn up including improved irrigation efficiency and dam management, reduction in water leakages, and groundwater monitoring. As part of the Water Futures Partnership, funds and inputs are contributed by GIZ and WWF, but SAB has also provided a dedicated budget (SABMiller, GIZ and WWF, 2012; key informant interview). As per the Water Futures Partnership rationale, the initiative will ultimately need to be judged on the strength of the business case: will SAB continue to invest in mitigating supply chain risks through the proposed projects, for straightforward commercial reasons, if GIZ and WWF were to phase out their involvement?

At the other extreme from investing in human and technical capacity, corporations may contemplate investments of a more tangible kind, especially in agro-food supply chains: by buying or more likely leasing land. The way this phenomenon is often referred to, as 'large-scale land acquisitions' or 'land grabs', makes land the apparent driver and target. But an increasing body of research is beginning to understand how 'land grabs' are at once 'water grabs' (Mehta et al. 2012, Allan et al. 2012). Investors often acquire explicit or implicit rights to water along with the leased land (Woodhouse 2012). From the investor's perspective, this purports to give assured access to land and water, bringing within their control the associated risks (e.g., for water, scarcity and variability). Investors can argue that, given lease rather than purchase is the norm, any water infrastructure they invest in – for example for irrigation – will one day be returned to public hands. However, with lease terms in many cases lasting decades (if any limit is stated), host countries would do well to consider the discount rate on such future infrastructure gains carefully.

Critics of large-scale land acquisition have been concerned to dispel the myth that the land acquired is 'marginal', i.e. that it is underutilised, and that its appropriation is not a misappropriation of existing rights of smallholders and pastoralists. In the case of water, the 'fluid and fugitive' quality of the resource makes it even less likely that implicit or explicit allocation of water rights to new investors will have no impact on other users. The logic can be summarised as follows. Where companies make a direct investment in land (and water), they will want to see a return. This implies that, if the lease is to pay for itself, any improvements in per-unit water productivity will need to be matched by overall production increases, for as long as available water permits. Greater production in turn implies greater water consumption. Even an increase in green water consumption (greater uptake and evapotranspiration of water by plants from soil moisture, via their roots) will decrease the amount which would ordinarily percolate to groundwater or subsurface runoff, and therefore can decrease the amount available downstream. In the case of withdrawals for irrigation, the impact on downstream users is even more apparent. Put simply, for large-scale land leasing to be commercially viable (assuming a 'fair' price is paid for the lease) it implies the lessee would seek to increase their production with a resulting net increase in water consumption, making it extremely difficult to avoiding impacting on other users downstream.

Such issues become especially complex when seasonal flows are considered – with an attendant increase in the risks that other water users will be disenfranchised. van der Zaag et al. (2010) compared the areal extent of irrigated land in Mozambique's Limpopo basin, for which the government was seeking investors, with the available water. Critically, rather than just taking the average annual flow of the Limpopo, and the water stored in the Massingir dam (on the Limpopo's tributary, the Elefantes), their analysis factored in seasonal and inter-annual variability. By looking at rainfall records it is possible to calculate the probability (referred to as 'assurance' by irrigation specialists) that a given amount of water will be available for withdrawal in any growing season. Their calculations suggest that, even with an 80% probability of sufficient water (i.e. risk of failure one year in five) the maximum area that could be irrigated was less than what was being proposed for acquisition and irrigation development by the Mozambican government at the time. Bossio et al. (2012) attempt to derive crude estimates of the water impacts of a number of irrigation schemes involving foreign direct investment in Ethiopia using lease information and crop modelling. The Ethiopian government, like that of Mozambique, is keen to rapidly expand the extent of irrigated land and is looking to foreign direct investment to do so, including from the private sector and foreign governments. Bossio et al. conclude that the water implications of the schemes analysed are significant, both from future schemes and those already underway, particularly in terms of cumulative impacts of many schemes, and seasonal mismatches between water requirement and availability.

These points underscore the significant risks for local people incurred by land (and by extension water) acquisitions, but also that the business logic in the medium term for companies to follow this path as a water risk reduction strategy is flawed. First they are likely to need to *increase* water consumption, as they seek to maximise return from their investment in the lease by ramping up production, which makes no sense if the aim is to reduce exposure to risks of water scarcity.

Second, hydrological variability means that calculations of required vs. available water need to be made very carefully, taking account of growing seasons or other temporal determinants of demand.

This leaves aside the considerable reputational risks which are accruing around the issue of 'land grabbing'. The opacity of large-scale land acquisition makes it difficult to understand which MNCs are involved either directly or indirectly, though research by Oxfam argues that the largest agribusinesses (Bunge and Cargill as well as Archer Daniels Midland and Louis Dreyfus – collectively the 'ABCD' companies) are investing directly in land, either through the parent company or financial subsidiaries which then lease back the land (Murphy et al. 2012).

This is undoubtedly an opaque and contentious area, with little in the way of detailed case studies or quantitative work on the water impacts of large-scale land acquisitions by MNCs, specifically. The studies cited above suggest that, if existing local water users are likely to lose out, national governments of the investment destination countries are often complicit in the deals (echoed also by Bues and Theesfeld 2012 and Hertzog et al. 2012). This suggests that the phenomenon cannot necessarily be understood in simplistic, neo-colonial terms, whereby transnational entities, headquartered in the global North, are duping Southern countries into giving up their water and land. It is, however, important to note that even if national governments are consenting partners, local users – often with limited voice, power and financial resources – may not be.

Overall, then, the area for action with respect to the investment gap at the scale of supply chains (number nine in this paper) is not so much based on confirmed existing practice, but rather an incipient risk. It calls on corporations to avoid unilateral responses to challenges of water risk and insecurity, which involve investment-as-appropriation, in favour of collaborative approaches, which invest locally in human and technical capacity. For corporations and their partners, this means concretely identifying the returns from investing in better water management throughout their supply chains, and pioneering new ways to support farmers and other producers to reduce their exposure to water risks. For the public sector, notably developing country governments and their donors, it means ensuring public policy safeguards to protect the poorest amid a rush to acquire land, and with it, water.

5 Basin to national scale

5.1 Institutions

Review of corporate efforts towards better water management at the catchment and community level (Section 3) indicated the importance of understanding motivations in the development of partnerships, risk assessments and project-based initiatives. This message is even clearer at the basin to national level, where corporate engagement has the potential to shape decisions about much greater volumes of water, on which many more users rely. This section is therefore concerned with models of corporate engagement which target the apex public water management institutions: river basin organisations, sub-national regional authorities and national ministries of water.

The most conspicuous manifestation of such engagement is the 2030 Water Resources Group (WRG), which identifies itself as:

An innovative and neutral public-private-expert-civil society platform that provides a partnership to help government water officials and their partners accelerate reforms that will ensure sustainable water resource management for the long term development and economic growth of their country

2030 Water Resources Group 2012a: 9

According to the WRG website as of December 2012, members include recipient governments (Jordan, Mexico, Mongolia, South Africa and India at federal and Karnataka state level); supporting donors and multilaterals including the Inter-American Development Bank, International Finance Corporation (which hosts the WRG), and the Swiss and US development agencies; and corporations including Nestlé, PepsiCo, SABMiller and The Coca-Cola Company. The current civil society member is WWF. The WRG states that it also collaborates with the Global Green Growth Institute and the World Economic Forum (its former host).

The WRG describes its model to achieve this objective as Analysis, Convene, Transform (ACT). First, a 'fact-based economic analysis' is developed which frames future demand and supply scenarios and considers different approaches to meeting the gap on a cost-curve basis (considered further in Section 5.2, below). Second, the WRG aims to convene public, private and civil society stakeholders 'to react to the analysis... and help develop ways forward based on best-practice'. From here, it will 'support the government... in developing specific public-private transformations in the water sector' (2030 Water Resources Group 2012a: 9). As such, the WRG appears to explicitly aim at contributing to shaping public policy on water resources management. The third part of the ACT model – 'transform' – is potentially the most far reaching yet the hardest to understand from available documentation. An examination of reported progress to date in the various countries is instructive. An example is the WRG project 'Accelerating Water Sector Transformation in Jordan', which 'aimed to provide a fact-based analysis of how Jordan can take an economy wide approach to water, ensuring the most economically and socially productive use of this scarce resource'. As such, WRG has been invited by the Jordanian government 'to support the creation of a 'National Water Council', a cross-ministerial, cross-sector group to plan and manage water resources' (Ibid.: 11).

For external observers, the potential for the WRG to enable corporations to influence the water management trajectories of the involved countries, with positive or negative outcomes for wider water security, 'demands much greater scrutiny' (Hepworth 2012: 554, Newborne and Mason 2012). The WRG incorporates WWF as an important civil society player, and is actively seeking

others to join the international platform.[16] It also aims to incorporate NGO and civil society members on its governing council (2030 Water Resources Group 2012b). But for resource management decisions, having people at the table is only a first step. Equitable outcomes cannot be achieved without actively ensuring that funds and prestige do not tilt the table in favour of the best-resourced players. While International NGOs like WWF have an important role to play as watchdogs for the inclusion of environmental and social considerations, their mandate is primarily drawn from their funders and members, who reside predominantly in the global North. At a country level in the global South, it is home-grown civil society networks that are arguably best place to represent local concerns. The available reporting from WRG on its stakeholder events suggests that local civil society organisations have been represented at WRG hosted workshops (2030 Water Resources Group 2012a).

However, it does not appear that these organisations (such as farmer representatives and NGOs with a dedicated social or environment focus) have been integrated into the country-level steering groups, which usually comprise WRG members (including the supporting corporations); relevant government departments (including ministries of water); representatives of local chambers of commerce or industry bodies; and affiliates such as the World Economic Forum. The potential for a single organisation's voice to be heard in a plenary workshop of over one hundred is probably limited. As such, they may not be 'at the table' when the most significant influencing opportunities arise, losing out on the chance to present alternative narratives about water's value and management, from those which corporations and other stakeholders present. In contrast, it might be expected that steering group members are much better placed to shape the emerging agenda of the platform, as well as to influence the involved public agencies (as the formal custodians of WRM).

The first page of the WRG's first report states that its members are 'concerned about water scarcity as an increasing business risk, a major economic threat that cannot be ignored, and a global priority that affects human well-being' (2030 Water Resources Group 2009: 1). The issue for those approaching water resources management from the conventional perspective of the public sector, is the priority given to each of these framings of water scarcity. Certainly, the rationale for viewing water scarcity as a business risk is, as this paper has emphasised, extremely strong. It provides a motivation for business engagement on water, and thus underlies the promise as well as the challenges, which this engagement gives rise to. Recognition of water scarcity as 'a major economic threat' is arguably also overdue – indeed, the success of the WRG in engaging ministries of finance and other sectors like energy, should serve as a wake-up call to public sector water managers, who have arguably failed to conclusively demonstrate water's importance to national economic development. But this does not obviate the need to question whether the WRG or equivalent platforms have the necessary breadth of membership, or legitimacy, to shape decisions about water for 'human wellbeing'. Where member corporations are seeking to secure water for business purposes, and encouraging governments to view water primarily as a factor of production supporting economic growth, what becomes of social and environmental value and uses of water? Where tradeoffs are encountered, it is better to acknowledge them as such from the outset, and ensure a balanced and representative group gathers at the table.

The tenth area for action is therefore to ensure platforms such as the WRG do not become top-down vehicles for a limited number of players, dominated by MNCs, to influence WRM regimes in their favour. Beyond international NGOs, this will mean reaching out to local organisations, and giving them a seat at the centre of the process, rather than inviting them to workshops as a few consultees among many others. Such an undertaking will invariably reveal contentions about which civil society organisations are included and what their specific interests and mandates are. But

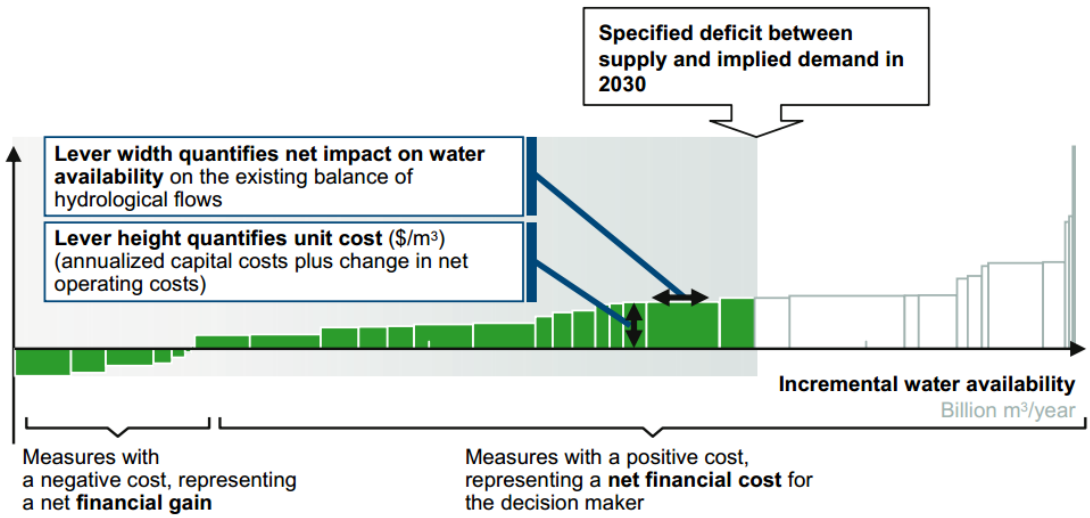
[16] According to Anders Berntell, Executive Director of the Water Resources Group, in statements made at the side event 'Public Private Partnerships for Water Resource Management', 30 August, 2012, Stockholm World Water Week 2012.

such concerns can be managed, through a transparent process and enabling the representative members to act as conduits for other views on environmental and social aspects of water resource decision making. Indeed, membership of different private and public sector organisations, and their ability to represent different views, should be similarly contested in an open process. The work of such platforms also needs to respect the autonomy of public agencies, as having legitimacy and responsibility for core aspects of WRM, especially allocation of shares of bulk water. This may mean refraining from closed-door sessions between core platform members and public agencies, even if the ostensible purpose is to provide analytical support.

5.2 Information

The contribution of WRG to bridging the water information gap is not necessarily in terms of providing enhanced raw data, but rather analytical capacity. Supported by the Management Consulting firm McKinsey, a major pillar of the WRG's 'Analysis' component in the various countries it has engaged with, is the 'Water-Marginal Cost Curve'. The water-marginal cost curve is developed from other cost curve methodologies such as expert-based marginal-abatement cost curves. It shows the unit cost (annualised capital costs plus change in net operating costs) per m^3 reduction in the country's aggregate supply-demand gap. Technical responses from no-till farming to artificial recharge are arrayed along the horizontal axis. The height of each block represents the unit cost of the measure; its width the potential net impact on water availability, up to a defined point which equates to closing the total projected supply-demand gap. Measures which drop below the x axis have 'a negative cost, representing a net financial gain' (2030 Water Resources Group 2009: 72). Figure 5 shows a stylised version of the cost curve outlining the various dimensions it tracks.

Figure 5: The WRG water-marginal cost curve and specific supply demand deficit: Net marginal cost in 2030 ($/m^3)



Source: 2030 Water Resources Group (2009)

The marginal-water cost curve is only the most prominent product of the overall analytical approach applied by the WRG. Others include:

- Calculating the projected supply-demand gap to 2030: at a global level, on the basis of population and agricultural production (demand), and renewable water resources accounting for current (2010) infrastructure development; at a country level, with additional analysis of country plans and strategies across various sectors to extrapolate country-specific water development and demand impacts.
- Analysing technical measures for the number of decision makers involved as a proxy for ease of implementation

- Deriving a ‘payback curve’ for the technical measures, to show the payback period for each measure to a generic end user

Nonetheless, the water-marginal cost curve is the most widely-cited product of WRG’s analytical approach, and has sparked considerable interest in the water sector and elsewhere, both for its apparent innovativeness, and for concerns that it privileges a narrow view of water resources management, based mainly on arguments of economic efficiency. It is therefore worth considering it in more detail.

Marginal-abatement cost curves, used to prioritise different emissions reduction measures, have been available for longer and consequently have been more extensively critiqued (Ekins et al. 2011, Vogt-Schilb and Hallegatte 2011). Some of the issues read across in the case of water. First, critiques of marginal abatement cost-curves have argued that there may be ancillary benefits to certain technical measures, which are ignored if the focus is on unit reductions in emissions. In the case of the marginal-water cost curve, the cheapest measures to achieve a given increment in water availability jump out as the most obvious policy choices. But more expensive measures (further to the right of the cost curve) may have significant benefits beyond the associated water impact. On a similar note, historic under-investment in certain water-related infrastructure or institutional capacity may mean that remedying that past lack of proper expenditure is initially expensive, but nonetheless important. The counter-argument is that the analysis is merely a tool – it must be used in the right way to tease apart the other factors that will determine what measures should be pursued in what order. Visually, however, expert-based marginal cost curves inherently draw viewers’ attention to the left hand side, starting with those measures which apparently generate a net financial gain.

Second, marginal-abatement cost curves have been criticised for concealing future uncertainty: the WRG marginal-water cost curve proposes technical measures to reduce a supply-demand gap over two decades (i.e. to 2030). Long term stochastic processes such as climate change make it difficult to project water resource realities over this time frame. Similarly, possible path-dependency, potential for innovation, and the inertia inherent to certain technical responses (i.e. investment lead-time) appear largely to be ignored, in order to derive a simple schematic that puts interventions in a neat order of preference. Again, the response may be that the marginal-water cost curve, as presented, is only the opening gambit in a conversation, which needs to play out over time and in which those party to discussions will consider the more nuanced underlying reality, and limits to predictive certainty. Nevertheless it is likely that such an opening gambit will tend to indelibly shape the ensuing conversation.

Marginal cost curves derived from McKinsey have also been criticised in that they tend, at least insofar as they are released in public documents, not to reveal important aspects of the methodology and underlying assumptions (Ekins et al. 2011, Hepworth 2012), even as the analysis is presented as ‘fact-based’ (WRG 2009: 20 and elsewhere). However, a key informant for this paper indicated that in the case of the marginal-water cost curves, all underlying data, assumptions and models were provided to the WRG, which is now considering how best to share them more widely. Given the use of international public finance (e.g. IFC) in supporting the WRG and ultimately in sponsoring the analysis, public disclosure is perhaps to be expected.

A key informant for this study made a number of points in support of the marginal-water cost curves, arguing that they have helped move the debate away from managing demand through pricing (which, at least in the case of bulk water, has been shown to be technically problematic even in advanced economies) towards explicitly acknowledging the important role for public policy and investment. Additionally, the first report from the WRG concludes that a mix of technical measures ‘which required the action of a few central decision-makers would come at significantly greater cost than a solution incorporating all available measures’ (2030 Water Resources Group: 25). In the view of the key informant, when this is worked through with government, it leads to the realisation that demand-side measures (such as more productive water use by farmers) will in

many instances be preferable to supply-side measures (such as building large infrastructure) – both because they are cheaper in the immediate term and, by allowing supply-side development to be deferred, permit governments to seek better terms on infrastructure lending. On this note, it was argued that the WRG approach is rooted in an understanding of the economic realities facing government, including parts other than the ministry of water resources, such as ministries of finance.

Without being party to the discussions at country level between WRG members and the governments with which they have worked it is difficult to verify either the criticism, or the arguments in support of the marginal-water cost curve analysis. What is important to recognise, for all parties concerned, is that no analysis is value free, and all are capable of shaping norms. Portraying a water availability gap in a certain light, implicitly prioritising certain measures, or emphasising the economic importance of water, are all likely to condition the direction of policy responses.

The eleventh area for action identified in this paper, is therefore for those promoting such analytical approaches to put fully worked, independently verifiable examples into the public domain. The wider water academic and research community will then need to undertake rigorous and informed critique, analagous to that which has been applied to marginal-abatement cost curves in the case of climate change. Only then can the potential risks be fully understood and managed.

5.3 Investment

At the scale of river basins and watersheds, the role of private sector investment is perhaps the biggest unanswered question of all. The water resources management community is only now awakening to this question, which has long been asked in relation to water supply services. In that case, the relatively narrower boundaries of the problem have probably helped (without detracting from the enormity of the challenge of providing everyone in the world with affordable, clean drinking water). At least the size of the investment gap can, at a very general level, be estimated for WASH – drinking water, sanitation and hygiene (Hutton 2012). In the case of water security, broadly understood, there are several prior questions before we can ask, in any absolute sense, how far the private sector can contribute to bridging a national basin-level investment gap. Namely, how do we define and measure water security outcomes; and what is the overall cost of achieving those outcomes?

Moreover, the direction that debates have taken in relation to water supply also provide a caveat – after many years of polarisation and polemic, private participation, whatever the potential efficiency gains, does not appear to be bringing significant additional capital investment to the sector. According to the World Bank Private Participation in Infrastructure Database, total private investment in water (supply) infrastructure from 2000-2010 was half what it was from 1990-2000 (US$29bn), and was limited, throughout, in Sub-Saharan African and South Asia. Additionally, while the number of projects increased steadily from 1990 to 2007, it has tailed off sharply since the financial crisis (Perrard 2012). Private involvement in irrigation and drainage systems (more commonly associated with the WRM domain because of the significant volumes of water involved) has seen even less private investment. This is not least because the risks – problems recovering user fees from farmers, political and social sensitivity, and physical water risks – are all arguably higher (Darghouth et al. 2007).

Any expectations that private investment will come flooding in once the water security investment gap is identified and total need established, should thus be viewed with considerable scepticism. The sectors are, of course, very different. For MNCs involved in water service provision, water is entirely central to business, and the return on investing in commercial and physical water efficiency is comparatively straightforward (all other things being equal). For MNCs which are significant water users, water is often one concern among several as an input to production processes, which may occur at some remove from the company itself (e.g. for agricultural commodities). The impact

of interventions relating to water-resources management may be dispersed and difficult to evaluate. For such reasons, the hard financial 'business case' for MNCs to invest significant funds in the institutions and infrastructure for better water resources management is not yet proven, even if the intuitive logic is clear.

While MNCs can continue to work with partners to develop the business case (as per the Water Futures Partnership), and try to catalyse local action, it is country governments which must set the terms of the debate. This means developing a coherent, cross-sectoral vision for water resources management, with broadly agreed objectives (whether or not these are labelled 'water security'). The cost to achieve this vision then needs to be rigorously calculated and stress-tested against different scenarios. Thereafter, the specific contributions for MNCs and private investment can be identified, and invited in, within an effective public policy framework that aims to incentivise rather than cajole, but maintains effective safeguards against capture of the resource by any narrow set of interests. It goes without saying that this is no small undertaking. But as it stands, the risk is that MNCs are driving the water policy agenda, with WRM in developing and emerging economies increasingly framed around a narrative of productive efficiency and high value uses, rather than equitable allocation and sustainable, broad-based growth.

To achieve these ends, country governments in the global South will of course need substantial support. A coordinating role to provide this support can be played by development agencies of accountable and elected governments, bringing in expertise from the civil society and academia as well as from MNCs and other private sector actors. This will in turn require better policy coherence on the part of Northern governments. Currently, while the development assistance arm of Northern governments likely have the best interests of their partner countries in mind, there is still much policy incoherence from other departments, such as those dealing with foreign trade. For example, insofar as contracts around large-scale land acquisitions permit analysis, investment agreements between Northern and Southern governments (such as bilateral investment treaties) may be underpinning inequitable outcomes associated with large-scale foreign investment in agricultural land and water (Smaller and Mann, 2009).[17]

The unspecified investment gap for water resources management in many countries means the allure of attracting private finance is considerable, both for national governments and a number of development agencies and institutions. But caution is needed – there can be no certainty that the new engagement on water by MNCs heralds a significant surge in private investment. In specific contexts where the business case is proven, there may well be a role for additional private funds. But it is important to keep in mind the reasons *why* such a business case would exist – the end-game of most corporate models is still to safeguard long-term business viability and shareholder return, which means safeguarding access to key inputs including water, even as reputational and regulatory concerns are managed by increasing per-unit efficiencies. As such, where physical scarcity is an issue, companies will continue to energetically defend claims to their (often substantial) share of the resource, and in some cases will seek to capture additional shares in order to grow the business (Newborne and Mason, 2012).

As such the twelfth, overarching area for action is to ensure leadership for identifying the investment gap, and ways to bridge it, rests with the government of each country in question. If support is needed, it should be brokered by development agencies of legitimate partner governments who can draw on expertise in MNCs, but also other institutions. The model of the WRG and others has, to date, ultimately been driven by MNCs – a natural response to the extremely challenging and slow nature of public water resources management reform in many countries, and the desire to 'get things done'. But as it evolves, a rebalancing is required so that the WRG relies primarily, not on the 'knowledge, experience, insights and convening power' of the

[17] Negotiated to give investors from one country certain protective terms that operate above the level of the law of the destination country

private sector (2030 Water Resources Group 2012: 4), but on the strong and capable leadership of government at national and sub-national levels. As such, a fully balanced platform would place partnership between governments at the centre, with the private sector, civil society and other specific interests contributing equally in supporting roles. While this in many ways is an old-fashioned paradigm, it remains the best available option to ensure legitimacy and broad-based and transparent outcomes.

6 Conclusions

Many of the points made in this paper require a position on a normative, and often emotive, debate – one which concerns how far the private sector should influence the management of public goods. These points by no means dismiss the possibility that MNCs can contribute to water resources management that is accountable, transparent and equitable – and that contributes to sustainable, broad-based growth in developing countries, protection and regeneration of ecosystems, and safeguards the water needs of poor people. But a fundamental contention of this paper is that the public sector remains the logical custodian of water resources. Given the huge importance of water to all stakeholders, only democratically elected governments have the legitimacy to perform this role. Other stakeholders including, but not limited to, MNCs, may play a supporting role, as long as they make clear exactly how and where their interests come into play. Generic references to 'shared water risks' are insufficient, as they do not tell stakeholders precisely how, when, and where risks are shared, and how each stakeholder's risks will be reduced or exacerbated by a given response.

The corporations considered in this paper, principally food and beverages companies, have in many respects 'put their heads above the parapets' in acting as thought and practice leaders in the field. In critiquing their efforts, therefore, it should be emphasised that many are grasping the complexity of water issues to a much greater extent than other corporations and business sectors. As such, they are also much further ahead in the challenging task of reconciling the different possible motivations – regulation, reputation, heritage, employee engagement, or straightforward operational continuity – and the different courses of action which these may entail. Insofar as companies publicly disclose the tensions that arise, rather than focusing only on mutual synergies, they are setting an important example to those business actors which are slower to respond.

Ultimately, however, all stakeholders that seek to contribute to WRM and ultimately water security – including government, civil society organisations, as well as MNCs and other private sector entities – should be judged by the same rigorous criteria. This paper has proposed transparency of information, accountability of institutions, and equity and sustainability of investments, as relevant criteria. In instances where the 'frontiers' are energetically pushed by vanguard corporations in a manner that is not fully transparent, threatens to unbalance accountable relationships between existing stakeholders, or jeopardises equitable and sustainable outcomes, restraint is needed.

As a key informant for this paper suggested, many MNCs need to review their accelerating engagement around water, if they are to move beyond pilot projects and relatively narrow brand or philanthropic motivations, to offer meaningful support to governments in their vital task. The public sector and research community, meanwhile, have some catching up to do, to delineate how and where this support can best be provided.

By way of concluding remarks and recommendations, the paper returns to the analytical framework presented in Section 1, to summarise the various action points proposed across the four scales (internal operations, community and catchment, supply chains, and basin to national), in relation to each of the three identified gaps (institutions, information and investment). As the summary Table 1 makes clear, these areas for action are directed at different audiences – some to vanguard corporations, some to their more slow-moving peers; some to non-corporate stakeholders; and still others which will require further, improved coordination between all actors, with the central coordinating role played by governments of low- and middle-income countries, as ultimate custodians of their water resources.

Table 1: Proposed areas for action to enhance prospects of equitable and sustainable outcomes from new corporate engagement on water

Hydro-geographical scales	Key water security gaps: Accountable institutions	Key water security gaps: Transparent information	Key water security gaps: Equitable and sustainable investment
Internal operations	1. Development by non-corporate water actors of an enhanced understanding of the incentives, constraints and internal decision processes within MNCs; MNCs can assist by entering into robust dialogue about the relative weight of motivations e.g. reputational vs. core operating risks	2. Enhanced transparency on the part of MNCs for data related to relative (per-unit) and overall water savings in their operations, including recognition that simplified numbers and graphs produced for external relations purposes tell a powerful story but often omit more than they include	3. Greater understanding of the different instruments internally available to MNCs to manage water risk, including purely financial instruments, and how this variety may condition the type and limits of investment by MNCs towards water security outcomes
Community and catchment	4. Further evolution of new partnership models for multi-stakeholder water resources management at catchment level, with each partner playing a role according to strengths, and with a share in the benefits of use guaranteed to local communities and ecosystems	5. Further development of participatory risk assessment approaches with more transparent presentation by MNCs of the stake they have, as a business, in engaging in catchment and community-scale projects	6. Improved mapping of the total contribution of private sector investment delineated by type of water resources management project and longer-term intervention; Experimentation with new corporate models and vehicles which allow them to invest in such a way that gives equal emphasis to interests of local stakeholders alongside those of investors
Supply chain	7. Improved understanding from the water management community of the place of water within the political economy of broader supply chain governance; and development of appropriate institutional models and incentives to encourage actors at all tiers to play appropriate roles	8. Evolution of independently verifiable approaches for mapping of water risks across the supply chain (e.g. water footprinting), integrated with consideration of other environmental and social externalities, as well as the financial bottom line; further encouragement for other corporations to map their supply chain water risks and consider how they can improve water management within them	9. Further development of the business case for collaborative responses to supply chain water risks (i.e. investment in technology transfer for enhanced WRM) and appropriate policy frameworks to encourage this; matched by discouragement of unilateral responses e.g. large scale land/ water acquisitions, which jeopardise access and rights of poor people
Basin to national	10. Enhanced transparency and legitimacy through participation of civil society, particularly local civil society, in partnerships such as the Water Resources Group that are seeking to support and influence water resources management at basin and national scale	11. Full public disclosure of analysis and advice provided to governments in low- and middle-income countries by MNCs and their partners; Informed technical critique of the details of the relevant analytical frameworks and methodologies by the academic and research community	12. Reorientation of partnership models at basin to national level, with country governments taking the lead to frame investment needs; with support, coordinated by development partners, drawing equally on private sector, civil society and other stakeholder groups

The final overarching conclusion returns to partnerships, at all scales. If they are to work, each actor needs to perform its role according to its internal incentives and operating model – doing what it is designed to do best. This does not mean resorting to stereotypes. MNCs do not only seek to maximise profit; as one key informant argued, in many developing countries MNCs are perceived as possessing considerable integrity and may be well positioned to challenge non-transparent water-related transactions and investments by others. Similarly, civil society organisations do not always need to be viewed as playing a watchdog or blocking role, and *local* civil society actors will, in any case, be better positioned to perceive both the need for economic development and sustainable and equitable management of the resource. Ultimately, however, democratic national governments, as the longest-term institutions, need to continue to be supported to take a leadership role.

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