

CHAPTER 10

Water scarcity risks: Experience of the private sector

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ABSTRACT: While almost everyone recognizes water scarcity to be a *public bad*, the manner in which water scarcity impacts government and business through complex social and ecological systems is less well understood. Risks associated with water scarcity can be classified as those which arise from insufficient water resources to meet the basic needs of people, the environment and business, risk from the consequences of insufficient water resources, and risk from poor water management decisions taken in reaction to water scarcity, often with negative consequences for some or all users. Yet risk is a concept that has multiple meanings and interpretations, and accordingly can motivate actors in different ways. Yet from the private sector (corporations and representative bodies/forums) there is an emerging recognition around their vulnerability to water stress throughout the supply chain. This chapter explores notions of risk, how risks manifest to companies and briefly discuss how aspects of the business sector have responded to their *water footprint* including interest in water public policy.

Keywords: water scarcity, risk, business, public policy

1 INTRODUCTION

An aversion to risk is one thing that rational people have in common. This chapter emphasizes the risks associated with insufficient water quantity, addressing the social and ecological problems that arise when water is scarce, as well as the problems created by disingenuous decisions in the face of water scarcity. The collation of risks that affect different people in different ways is highly specific, and involves the loss of certain *fine-grained* and often crucial information about the risk to specific stakeholders (Vatn & Bromley, 1994).

Aggregated water scarcity maps are useful for raising awareness, but reveal little about the implications of water scarcity for people and ecosystems. How does one go about identifying the regions and stakeholders that are most likely to be affected by shortages? How do we begin to understand the problems that water scarce regions and their people are likely to confront? The problem can only be understood, and action can only be effectively tailored, by focusing at the local level. Global and national scale macro assessments are useful for raising awareness, but do not reveal the dynamics, components and the biases within the water scarcity phenomenon.

Whilst exposure to water-related risk primarily manifests at the river basin or local scale, the origins of water scarcity and its impacts derive from the interaction of natural biophysical cycles, and the actions and decisions of people in a variety of sectors at local, national and international levels. While almost everyone recognizes water scarcity to be a *public bad*, the manner in which water scarcity impacts government and business through complex social and ecological systems is less well understood. What is more certain are that threats to people and all they value, necessitates a determined approach to exploring risks associated with water management failures (Kasperson & Kasperson, 2001).

Highlighting and explaining how securing adequate water supplies leads to major risk reduction, means engaging the diverse set of stakeholders who benefit from water use, and are often, unwittingly vulnerable, to water scarcity. An emerging consensus on the importance of water to society, as reflected through initiatives by NGOs, global business fora and in the increasing coverage of water issues in the media, provides impetus for challenging and redefining traditional paradigms of water management and public policy. Yet, there is a specific challenge in facilitating this paradigm shift, due to the generally differing languages and expectations of these groups around needs, time-frames and modes of communication. This chapter uses a risk lens to look at the rapid increase in private sector activity around water issues and makes a distinction between private sector companies who face water related risks, *versus* private equity investment or private water service delivery.

2 WATER SCARCITY

Ensuring a sustained supply of water to people and their economies became a matter of global concern at the United Nation's 1977 *Mar del Plata Conference*. Initiatives arising from the Conference had little impact upon water security, but did usher in a better understanding of the problem. There is an estimated $37 \times 10^6 \text{ km}^3$ of fresh water on the planet, $8 \times 10^6 \text{ km}^3$ of which is stored as groundwater. The World Health Organisation (WHO) believes that 25 L/day per person is the minimum required for domestic purposes¹. The available resources are more than adequate for domestic consumption and washing, but this constitutes an insignificant fraction of total water use. When agricultural and industrial requirements are considered, between 1.4 m³/day and 4.5 m³/day per capita seems to be a critical current requirement. Yet water scarcity is caused more by the nature of demand and the allocation of water than the general availability of water, and is an issue best addressed through better water management and governance. Water scarcity is a "governance crisis, not a resource crisis" (Rogers *et al.*, 2006), and: "In the developing world, the problem is more often caused by policy and institutional failure, rather than by technical failure" (Castro, 2004).

Availability of sufficient water at the *global* level should not detract from the fact that at specific local levels, water is often acutely scarce and responsible for a wide range of adversities. What is more, the problem appears to be increasingly widespread and there are a number of reasons to suspect that the effective management of water will become more difficult:

- a) Water consumption has grown at more than twice the rate of population expansion in the past century. The increasing demand is attributed to growing industrial demand, and more affluent lifestyles that consume more water. Increasing animal protein diets are more energy intensive. Also urbanisation which requires mass storage and concentrated supply of water must be factored into any view of shortages. On aggregate, a 13% increase in water consumption is anticipated in the first 25 years of this century (Rosegrant *et al.*, 2002a; 2002b).
- b) Water use and distribution is uneven and many of the areas expected to experience the greatest *shortage* of water in the future are also the areas in which population *growth* is expected to be greatest.
- c) The influence of anthropogenic warming is anticipated to cause increasing aridity over much of the mid-latitudes. In the short term, over-abstraction of water is often a problem distinct from climate change induced shortages, but in the longer-term, anthropogenic climate change and associated aridity will exacerbate problems caused by water mismanagement. It is that mismanagement which will undermine crucial environmental capacity and resilience that would have aided adaptation to climate change.

¹ Peter Gleick (1996) claims that 5 L/day were required for drinking, 20 L/day for sanitation services, 15 L/day for bathing and 10 L/day for food preparation.

3 USING RISK TO DESCRIBE WATER SCARCITY THREATS

Identifying the nature and location of future water scarcity risks requires imagination as well as knowledge. As the global insurance firm Swiss Re points out: “Emerging risks are not even being called risks. They are more like uncertainties that you have to search for”. Nevertheless, Swiss Re has identified one big [emerging] risk: “the global unavailability of water” (Zanetti *et al.*, 2005). Risks associated with water scarcity can be classified as follows:

- a) Risk from insufficient water resources to meet the basic needs of people, the environment and business, which in turn leads to . . .
- b) Risk from the consequences of insufficient water resources, such as higher energy prices, loss of competitive advantage, political and economic instability, population migration, or lost economic opportunities to name a few; and as a result . . .
- c) Risk from poor water management decisions taken in reaction to water scarcity, with negative consequences for some or all users. Such decisions may be a result of political or economic expediency, short-term thinking, lack of knowledge or capacity or simply desperation and lack of choice.

Discussions of risks imposed by water scarcity must involve those who are responsible for, and those who are affected by, the problems of water scarcity. Water is a public², a private and a social good, and a water scarcity event will have both private impacts and public repercussions on stakeholders. Accordingly, it is necessary in any risk analysis involving water to establish: *risk to whom?* With the understanding that the risk to an individual differs from societal or business risks and certain groups will be more vulnerable than others. It is also necessary to ask: *risk of what?* With the understanding that water scarcity is a subjective concept. For a farmer, the danger may be back-to-back years of below average rainfall. For the owner of a processing plant, the risk might be a temporary, sudden cessation of stream-flow during peak operation time. For a government, risks might include the increasing costs of accessing water for utilities and the implications of higher energy costs, or failing to deliver on economic growth and development pathways because of poor water management: failures that are passed on to business communities entrenched in various ways.

Most stakeholders have some means – formal or informal – of coping with water scarcity, and whilst water scarcity tends to impose costs on those who can least afford them, in some instances it can provide the catalyst for effective adaptation to a less risky state. In reality, judicious and the adoption of water-saving technologies might reduce risk even as people become more affluent, better able to adapt, and adopt water saving technologies, but thresholds exist beyond which hazards overwhelm societies or ecosystems, and water scarcity risk increases suddenly and unpredictably. These thresholds depend on location, value and activity (Parry *et al.*, 1996) and are difficult to predict. Incorrect threshold projections (including those of Malthus to food security, the Ehrlichs’ to biodiversity in the 1980s, and UNEP to desertification in the 1970s) underpin many of the incorrect assessments of environmental risk.

Critically, water scarcity imposes risks on markets and social stability. In addition, the manner in which people respond to water scarcity (using groundwater more intensely, the opportunistic breaching of legislation, violation of environmental flow requirements, pursuing unilateral strategies of self-protection, and becoming embroiled in conflict) involve additional risks, many of which are not attributed directly to water scarcity. Analyses of such issues tend to under-represent the problem by ignoring the feedback loops that often compound water scarcity risks. It is also important to note that risks arise from water scarcities which are not directly related to the human

² Water supply is a public good because in most instances the supplying of water to one person does not prevent delivery of water to another. Similarly the ecological goods and services made possible by water can be consumed jointly. In cases of water scarcity such allocation issues do become critical. The opportunity cost of water increases imposes direct costs and benefits on individuals and companies. In these instances water is a private good.

use of water. For instance, scarcity and consequent reduction in river flows can increase the risk to subsistence and commercial fisherman; and reduction in groundwater levels can cause forest dieback, putting the livelihoods and businesses of another set of stakeholders at risk. A failure to consider indirect risks further distorts the time-scale of water scarcity events. Inadequate access to water (for people and business) is the obvious, but by no means the only, risk arising from water scarcity.

A more general problem with risk analyses relates to understanding of risk itself, and the fact that the influences of risk are dependent on perceptions. Levitt & Dubner (2005) compare the deaths caused by kitchen germs and BSE (Bovine spongiform encephalopathy, commonly known as *mad-cow disease*), and domestic swimming pools and domestic weapons respectively, and quote Peter Sandman³ in noting that the “risks that scare people and the risks that kill people are very different” (kitchen germs and swimming pools being the less scary but more dangerous, in the respective cases). The authors note that risk could as easily be depicted as hazard + outrage, and that effective risk communication involves increasing or attenuating outrage depending on the issue. Applying this notion to this study it should be noted that there is very little natural outrage over water scarcity (much like climate change). As such, water scarcity events tend to be un-dramatic and silent. The threat of water scarcity is often perceived as being in the future or manageable by those people that have access to the public discourse, unlike for example, a terrorist attack that is largely uncontrollable, unpredictable and sudden and accordingly is associated with levels of outrage and perceived in popular mindsets to be a greater risk. When the hazard is high, but outrage is low, people tend to under-react. This situation could be redressed; that is, the risk of water scarcity could be increased to represent the actual hazard, through effective communication of how water scarcity impacts upon societies, people, businesses and the environment.

4 WATER-RELATED RISKS TO BUSINESS

There is increasing scrutiny of the manner in which companies, most notably multi-nationals, exploit natural resources. Public discourse highlighting the amount of water used by Coca-Cola, newspaper coverage of the impact of Kenya’s cut-flower industry on that country’s water resources, or the negative publicity given to the Spanish strawberry industry has given rise to greater business concern over reputations and actions. PricewaterhouseCoopers now emphasizes the need to consider environmental risk as a *portfolio issue* in the light of media vigilance; that is, fund managers should minimize their investment exposure to sectors and companies perceived to be at a high risk of an *exposé* or of litigation.

Today, there is an emerging recognition by the private sector (corporations and representative bodies/forums) around their vulnerability to water stress throughout the supply chain. Importantly, businesses from a range of industries and sectors are simultaneously engaging on water issues, from the food and beverage manufacturers concerned about upstream agricultural water requirements, through household chemical manufacturers concerned about negative water impacts through their products’ use, to financial institutions concerned about the risk to their investments. Likewise, there are general categories of risk that will impact companies differently, depending on the purpose of the water use, amount, timing, location, price of water supply and discharge requirements. These factors differ greatly among sectors and companies *yet all* of these risks can hit companies’ direct operations as well as their supply chain, ultimately affecting their operational costs, profits, and future growth.

Physical risk is directly related to too little water (scarcity), too much water (flooding) or water that is unfit for use (pollution), each of which is associated with the management of a water resource. Risks can be associated with water resources at the river basin level, or at the supply level; namely sanitation and other infrastructure systems. Even where water is readily available, physical

³ See [<http://psandman.com/index.htm>].

risk can emerge from poor management of the resource from actors outside the direct control of companies.

In 2002, Swiss Re reported an increase in claims against *business interruption cover* as a result of periodic water shortages, suggesting that the problem had become more severe (Zanetti *et al.*, 2005). While this may not be the most prevalent or even the most immediate concern for most business operations today, there is every reason to believe that this risk will only increase in the future as demand for water from other users increases. Progressive companies have developed means of buffering themselves against water shortages, but always at an additional cost, and typically without guarantees. The purchase of water licenses has been a feature of asset management plans in Southern England since the 1980 droughts (SEI, 2006). The declaration of a drought triggers a series of costly interventions for water companies, including intensive monitoring, restrictions and public relations programmes. In 2005, for example, Vittel, the bottled water company, was forced to purchase US\$ 9 million worth of land, and had to pay land owners an additional US\$ 24.5 million in subsidies, simply to protect the supply of clean water to its French bottling plant (Perrot-Maitre, 2006).

Agriculture is commonly perceived as the most vulnerable sector with relation to absolute water shortages. Flower growers on the shores of Lake Naivasha (Kenya) have highly risky futures due, in part, to their own exploitation of the water resource on which their businesses depend, but to an even greater extent, to the cumulative impacts of the industry in a poor management framework. Although 70% of fresh water withdrawals are used in agriculture, industrial uses are also high. In California, for example, the electronics manufacturing industry used 24% of the available water in 1994/1995 (Faruqui, 2003), with every 30 cm of silicon computer chip requiring 8,622 L of de-ionised freshwater (Figuères *et al.*, 2003). In South Africa, the beer producer SABMiller was forced to halt production at one of its plants in 2007 due to water shortages, while Chile's flagship copper industry is being threatened by insufficient water to maintain operations (WWF, 2009).

Reputational risk with regard to water scarcity refers to the exposure of companies to censure and a resulting loss of customers due to perceptions around company decisions (WWF, 2009). Reputation is one of the most important corporate assets, and also one of the most difficult to protect. Reputational risk is harder to manage than other types of risk, largely because of a lack of established tools and techniques, and confusion about who is responsible for it.

The reputational risk to large water-using companies is greater where a catchment is in danger of habitat collapse; an exotic species is in danger of becoming extinct, or where water governance breaks down leading to a *tragedy of the commons* type race to the bottom. Where this scrutiny translates into public *outrage*, companies face dramatically amplified risks, especially when they are judged to be profligate or irresponsible (JPMorgan, 2008; CERES, 2010). Where such crises unfold, there is a tendency for governments and the media to apportion blame, sometimes fairly and sometimes opportunistically. High profile, multinational companies are easy targets for such blame regardless of their relative contribution to the problem.

Regulatory risks: both physical and reputational pressure for water use and discharge can result in more regulation, price increases, and even loss of operating licenses. Most businesses thrive in a stable regulatory regime, and change, particularly when unpredictable, can be a serious problem. Regulatory risks arise when a change in law or regulation increases the costs of operating a business, reduces the attractiveness of investment and/or changes the competitive landscape. Change to the regulatory regime around water can be one such risk. With increased recognition that water and environmental resources are threatened, many companies accept the need for reasonable regulation, as long as it is coherent, predictable and consistently applied. In some cases, business engagement is shifting to cooperative advocacy for regulation of water allocation and licensing from water resources and for regulation of water supply, sanitation access, and pricing in urban settings (WWF, 2009). Regulatory risks also arise when those charged with water management are incompetent, or where that particular water sector is open to corruption. In both cases, the lack of transparency and consistency undermines legislation and its reinforcement, and raises the level of uncertainty as to the long-term viability of business activities, spreading disincentives for future investment.

Financial risks: water shortages translate into higher energy prices, higher insurance and credit costs, and lower investor confidence, all of which further undermine business profitability. Water shortages translate into higher energy prices, higher insurance and credit costs, and lower investor confidence, all of which further undermine business profitability. More common than the risk of not having enough water is the risk that businesses find their comparative or competitive advantage undermined by cost water scarcity-driven cost inflation. As water becomes scarcer, water tariffs and other pricing mechanisms tend to increase, due to greater competition for water between sectors, higher water search costs, the need to drill deeper boreholes, higher pumping costs and the need to recoup the cost of expensive water transport schemes. Water scarcity also adds to energy costs. For example, cold water is essential for the cooling of coal-fired and inland nuclear power plants, and water shortages leading to higher water prices increase the cost of power generation from these plants. Switzerland is forecast to experience a 25% decrease in nuclear power generation by 2020 due to declining water supplies from glaciers which ordinarily power those facilities (OcCC, 2007). This problem became acutely clear in Italy in May 2007, when power plants in the Po Basin were forced into outages due to a lack of water. Ongoing water shortages in Australia, caused by below average rainfall with excessive water use could disrupt power supplies from the Snowy Hydro plant, responsible for 3.5% of Australia's grid energy. Shortages would raise energy costs and threaten almost half of the energy supplied to Canberra (WWF, 2009).

5 COMPANY ACTION ON RISK

Other risk categories have been described related to market requirements, geopolitics and investment criteria (Pegram, 2010) and have a bearing on how companies respond to risk incidents and water scarcity. Increasingly, companies are recognizing these risks and the importance of water in their production and supply chains. As the interest and research in risk has increased, a number of corporations have adopted water footprint studies as a first step (see SAB Miller & WWF, 2009). While business uptakes of water footprint measures has led to water requirements and discharges being better accounted for in terms of direct operations and value chains, the complex characteristics of the water cycle necessitate best practice in areas such as policy engagement, as well as measures and assessments if meaningful and lasting outcomes are to be obtained.

JPMorgan is applying the water risk concept to key sectors and studying the implications for financing; and arguing for increased disclosure of water dependencies in supply chains. At the same time, the mainstreaming of water scarcity and climate change risk in the popular media has increased public awareness of water issues. It is apparent that certain companies may feel the water squeeze at an operational level and throughout their supply chains, from investors who are wary of risk. Governments that are managing stressed water resources will do so in the increasing glare of media coverage and customer awareness.

At a particular moment in time, the risk exposure of a company to water may be acceptable, but it can change rapidly. Historically change has generally not impacted much on business operations, because they are generally involved in higher value or strategic use of water than agriculture, as the dominant use and therefore storage has been developed and/or water has continued to be allocated, even in stressed watersheds. This buffering is not guaranteed to continue, because an increasing number of river basins internationally are already stressed or *closed* to further development and growth. Consider also:

- a) Further population and economic growth, together with increasing climate variability will exponentially increase stress.
- b) Globalization and communications technology has increased communities' power to exert political and reputational pressure
- c) Awareness, understanding and application of environmental, social and economic regulation by governments is improving (albeit marginally).

The consequence is that acceptable risk today may become unacceptable under changing contexts. With physical water stress, communities, interest groups and politicians become more vociferous (particularly where poor water management arrangements exist). The associated dispute and conflict often leads to poor (knee-jerk) water management decisions, inappropriate regulatory responses and/or unfair targeting of large water users, with corresponding physical, regulatory and reputational risks, respectively.

6 BEYOND FOOTPRINT: ENGAGING PUBLIC POLICY

Public policy attempts to define the rules, the intent and the instruments for government to implement water management. Public policy functions that have direct bearing on companies' interface with water include: development of policy and legislation around water, planning and implementation of water resource allocation and management, water infrastructure development and operation, management and delivery of water supply and sanitation services, and protection of water resources and natural systems.

While it is clear that many firms have sought to drive down risk through activities such as community engagement, or efficiency measures, for most some level of engagement *beyond footprint* is inevitable. That is, certain activities outside the policy arena serve to maintain a social license to operate and buffer against sudden shocks in water use, pollution or regulation. However, where uncertainty remains, the consideration of public policy engagement for stability and consistency is strong. Deciding how much uncertainty a company may be willing to live with, *versus* spreading risk to search for potential new areas of sourcing or manufacture are key considerations. While regulatory compliance (or even exceeding requirements) in a company's operations is a necessity to manage these risks, it is typically not sufficient. Engaging in a public policy process allows for opportunities to articulate the common interests of stability and cooperation, as opposed to merely competing over a resource that is becoming scarcer and therefore more socially, ecologically, and economically valuable.

Moreover, there is a growing recognition by businesses that they can and should play a larger role in achieving water-related policy goals, as well as increasing expectations by society for businesses to transparently participate in regional and international water governance efforts⁴. Especially in the regions under high water stress, or where substantial populations lack safe and affordable water for basic needs, work with local stakeholders including water agencies, community groups and other industry water users to share and manage limited resources more equitably and efficiently may be both desirable and expected.

There are various drivers for corporate engagement in public policy such as:

- a) To manage short-term (physical) water risks: when accident or natural disasters cause disruption of local water supply, government and business have shared interest and need to quickly address impacts, requiring collaboration such as information sharing/dissemination, management support, financial contribution.
- b) To reduce mid- to long-term (physical and regulatory) water risks: systemic water-related risks and uncertainty in water supply and quality may be reduced by helping government establish and implement stable and effective water resource policy. Activities include ongoing policy engagement with local/state government and formulation of water policy through multi-stakeholder fora.
- c) To reduce reputational risks: alignment of corporate water management strategies with public policy/public interests in reliable and accessible clean water supply will reduce risk.

⁴ See: UN CEO Water Mandate, part of the UN Global Compact and the Guide for Responsible engagement in public policy, as well as World Economic Forum debates.

The engagement can take various forms, including advocacy or lobbying, self/voluntary regulation, partnership with government and local authorities, financial support to build water infrastructure and/or to advance police objectives, etc. These can be done at different levels, ranging from local, to catchment/regional, to state/national level.

7 CONCLUSION

Risk is a language that the private sector understands well. The complex nature of water has become real to many companies and the recent upsurge in sectoral attention to the issue, while one of opportunities for investment is also one of great uncertainty. Risk is transferred when water is poorly managed and there are varying degrees to which a stakeholder can cope. Companies are generally well equipped to handle such events, but in responding to crisis might be accused of capturing gains through access to power and debate. Water is ideally managed in the public interest which places many sectors into cooperative as opposed to competitive environments with poorer users, other sectors and the environment.

It must be noted that global trade and investment in agricultural commodities is increasing from private sector interests. Their risk exposure differs greatly from those companies who face consumer boycotts, media attention or have large sunk capital in water scarce environments.

Outstanding questions remain over their activities and the potential to exacerbate water policy, water trade, water management or policy capture, and to what degree these activities are interpreted in the media and regulatory environments, potentially increasing and transferring risk on to those least able to cope, including more risk exposed private sector entities.

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