INSTITUTE OF DIRECTORS
SOUTHERN AFRICA

Water as a risk to business

Sustainable Development Forum

Position Paper 6 - March 2012

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1.1 Introduction

Water scarcity is becoming one of the most critical risks threatening social and economic development throughout the world. Access to appropriate quality and quantities of water can either impede or enable economic growth and affects the supply chain of most companies, not only those for which water is a primary input or production requirement.

The relative scarcity of water, quality concerns and the potential impact of climate change with the expectation of frequent extreme weather events, all create an uncertain environment. Therefore, it is essential to identify and evaluate water-related risks that could have an impact on consumers, businesses and government.

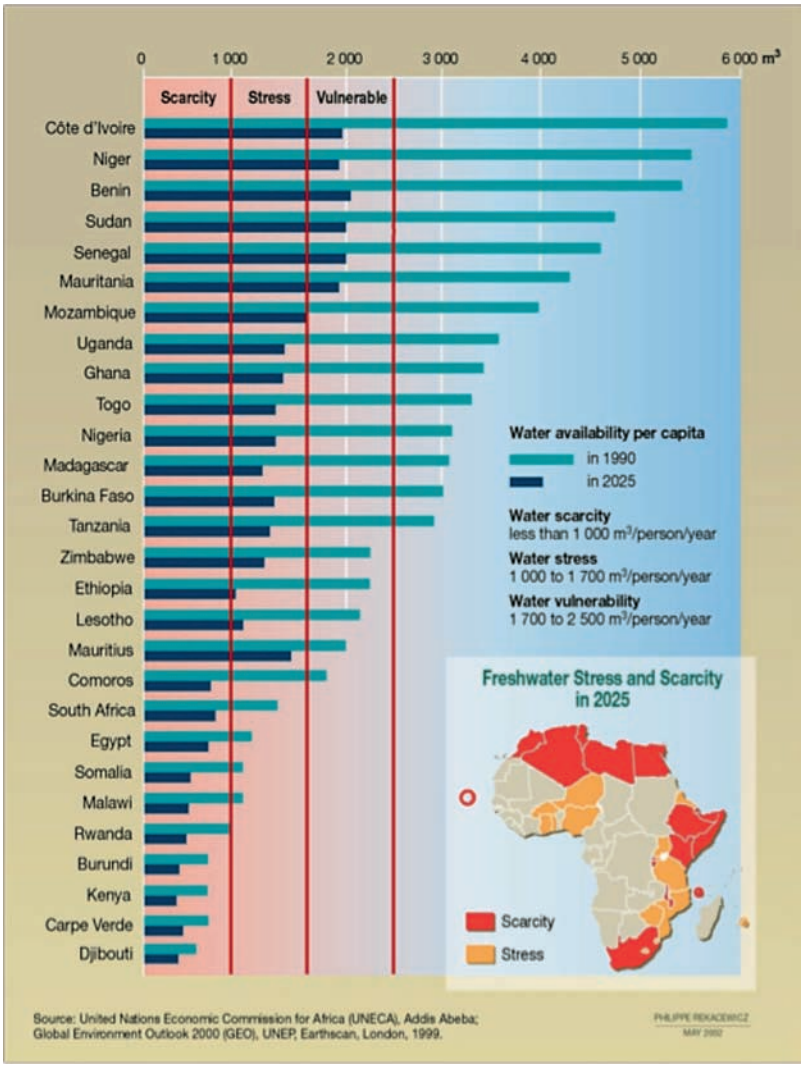
This paper unpacks the intrinsic link between water, energy and food security within the context of climate change. These linkages inform the underlying water-related risks to business. The paper answers the question of how business can respond to the ever changing and uncertain water environment.

1.2 Water availability in South Africa

South Africa is currently classified as a 'water stressed' country. This is largely due to climatic conditions in South Africa in combination with human settlement patterns. South Africa is characterised by relatively low annual average rainfall combined with high evaporation rates. Therefore, only 8% of SA's rainfall is converted into runoff [1].

Figure 1 illustrates the relative scarcity of water resources in Africa for 1990 and contains forecasts through to 2025. Water scarcity is presented by analysing water availability per capita for each country and classifying this as scarce, stressed or vulnerable. It is forecast that by 2025, South Africa will be one of ten African countries that are water scarce with access to less than 1 000 m^3 per capita annually. By 2025, it is forecast that 85% of African countries will be water stressed, with the remaining 15% being vulnerable to water scarcity.

Figure 1 – Relative water scarcity in Africa, 1990 and 2025



South Africa is divided into 19 Water Management Areas (WMAs), by 2000, 10 of these WMAs had negative water balances[2]. In addition to the relative scarcity of water in South Africa, the location of human settlements developed around mineral deposits as opposed to water resources. As such, water supply is heavily dependent on a complex system of inter-basin transfers that transports water to the centres of water demand at significant cost.

The Department of Water Affairs (DWA) estimates that by 2025 there will be a national water deficit of about 234 million m^3 of water; therefore, water demand is forecast to exceed supply by 1.3%. However, it must be noted that not all areas will be similarly affected and in some areas, the changing patterns indicate greater likelihood of rain, some of it delivered in extreme conditions and not all of it resulting in usable water resources. Growth in water demand and increased urbanisation will require water to be re-directed from rural to urban centres[3].

To address deteriorating water quality the DWA has introduced the Blue (potable water) and Green Drop (wastewater) certification systems. These are incentive-based regulation systems for drinking and wastewater respectively.

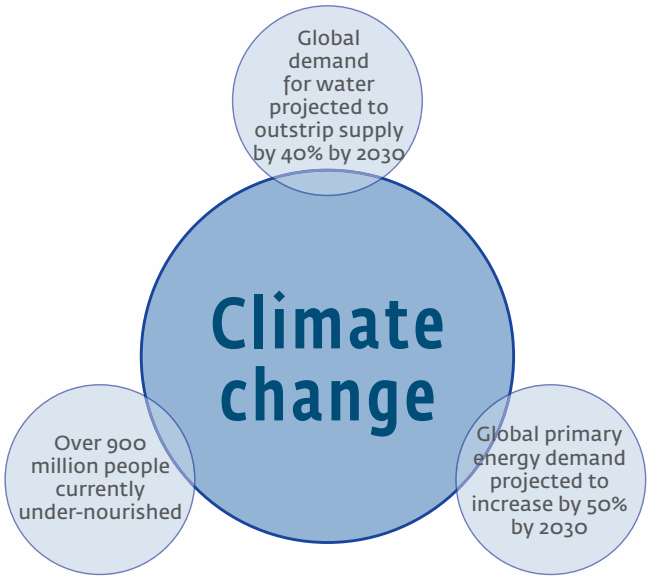
The 2011 Green Drop Report[4] revealed an improvement in the overall management of municipal wastewater systems from 37% in 2009 to 45% in 2011[5]. Although there is an improvement, the overall score remains below 50% and reflects the existing challenges in wastewater management. The 2011 Blue Drop Report[6] also exhibited an improvement in the management of municipal drinking water systems from 51% in 2009 to 73% in 2011[7].

1.3 Water, energy and food security

Water, energy and food are all inter-connected and all are affected by climate change and clearly linked to one another. Water is a crucial input into energy generation as well as food production. As average global temperatures rise, water quality and local availability is predicted to become more unreliable.

The impact of water does not stop at these industries, however, but also has an impact on tourism, manufacturing, for example.

Figure 2 – Global forecasts for water, energy and food



Source: 2030 Water Resource Group, International Energy Agency, 2006

Water is essential for sustaining life, and there are no substitutes. The human body, for example, contains more than 70% water. Water security is at the heart of the relationship between energy generation, economic growth, development and food security. Water plays a crucial role in an economy, serving as an input to production and the basis for sustaining life; however, the price of water does not reflect the underlying value that we derive from the resource.

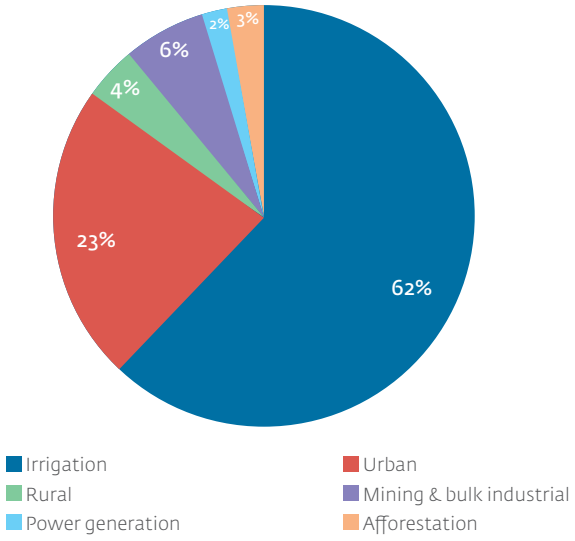
Climate change is predicted to have a direct impact on the availability of water resources globally. Climate scientists predict that South Africa's rainfall patterns will change significantly and will vary by region with the western part of the country, including the Cape becoming drier and the eastern part of the country experiencing wetter conditions. Both of these will impact on the type of crops that can be grown successfully and the related industries which can be supported. Staple crops like maize and wheat are expected to be impacted.

Although the global demand for water is forecast to strip supply, it should be noted that water availability varies widely from one region to the next. A recent Africa Earth Observation Network (AEON) report predicts that climate change implications for southern Africa could include:

- 70% reduction in runoff
- 50% increase in the frequency of drought occurrence
- 40% reduction in maize crop yields.

Food security is highly dependent on the availability of water resources and certainty in its supply. Global volatility in food prices over the past few years is indicative of the future that awaits us as uncertainty of water supply increases. Increased demand for food leads to increased demand for water to produce food, as does the uncertainty of supply in relation to climate change and increasing global temperatures.

Figure 3 - Water demand composition, 2000



Source: Department of Water Affairs, 2004

Both agriculture and the energy sector are dependent on water resources, with irrigated agriculture accounting for 62% of current total water demand in South Africa. Increased variability in water supply would have a large impact on the agriculture sector and thus on domestic food security. Small-scale farmers who rely on rainfall for irrigation would be particularly vulnerable to variability.

South Africa's dependence on coal-based energy also has significant implications. Power generation and mining use about 10% of water available in the country. As such, the consequences for water resources are twofold. Vast amounts of water are already transferred between basins to supply the power stations. More reliance on coal-fired power stations will increase overall water use, even if dry-cooling technologies are used. The mining industry is also a significant water user, both in its extractive and processing dimensions and is linked to the acidification of many water bodies.

Water quality is another important factor to consider in light of the potential social and economic implications of reduced water quality, resulting from poor land use and agricultural practice as well as acid mine drainage. The costs of clean up are significant and Treasury is already setting aside significant funds to deal with the problems in the Central Witwatersrand basin. There is, as yet, no unanimity on the solution or the cost though scientists believe there are both short and long term actions required.

The challenges and opportunities emerging from energy, climate change and water conservation are inseparable, but at the same time, poorly understood. Internationally, the focus has been on reducing carbon emissions, an important mitigatory measure but on its own insufficient to deal with the challenge. It is crucial to apply a holistic approach to broader environmental and food production challenges.

1.4 Water-related risks for business

Water plays a crucial role in the economy, serving as an input into production. However the price of water does not reflect the underlying value that we derive from the resource.

In an environment of increased water scarcity and uncertainty of water supply, business will be dramatically affected on two fronts. Businesses that are relatively water intensive in nature will bear a direct impact of reduced supply and increased prices, which will inevitably be passed on through the supply chain. Secondly, there will be a vast range of socio-economic impacts, some of which would include issues around prioritising water consumption to fulfil basic human needs, as well as health and hygiene impacts from reduced water availability and quality. All businesses would be affected by these socio-economic challenges.

Specifically within the South African context, some of the key risk drivers include:

- **Policy environment:**
  The water sector is governed by a complex myriad of legislation, regulation and policies that enable the creation of water institutions and are based on a range of water management principles. Much of this legislation and regulation remains unimplemented and there are gaps in respect of the institutional environment and governance structures within the water sector. A revision of water policy is planned to take place over the next few years. The rights to water and permitting processes, tariff structures and pricing may all be affected. However, the current hierarchy of water rights - a reserve for environmental wellbeing, individual needs and then business - is likely to prevail, given both the essential nature of water for life and for sustaining the environment in order that we can continue to reap the "free goods" that a healthy natural environment provides. Uncertainty in the policy environment erodes business' ability to make decisions based on knowledge and foresight in respect of any impending changes to the policy and regulatory environment.

- **Water infrastructure:**
  Much of South Africa's water infrastructure is ageing and in very poor condition. Skilled professionals in this field are in short supply. There is a current maintenance backlog of about R10 billion according to the Department of Water Affairs, and the existing Raw Water Pricing Strategy provides for exemptions, and hence a shortfall on cost recoverability of about R2.2 billion annually[8]. In future, there could be further erosion of existing infrastructure and increases in leaks. This would result in increased infrastructure costs that could further affect prices.

- **Water availability:**
  Water resources in South Africa are already characterised by relative scarcity. In future, water availability will most likely be further restricted as a result of climatic conditions and increased demand for water resources through population growth, urbanisation and economic growth.

- **Reputational Risks:**
  Reputational risk becomes more apparent as societies become more aware of their basic human right of access to clean water. The failure of businesses and governments to provide universal coverage of water services means that businesses may find themselves using copious amounts of water whilst people lack sufficient water to meet basic needs[9].

1.5 How can business respond?

It is most important that business strategically evaluate its exposure to water either directly in terms of changing availability, changing quality and changing prices as well as indirectly through its supply chains. It should also assess customer vulnerability to cost shocks in food and energy that may result from water issues.

A water footprint should be assessed within the broader context of where the water stress points are along the value chain within a business. In addition to this, water risks differ depending on the location of the business and the relative water scarcity of the location as well as the type of water resources being utilised. Thereafter, risk mitigation strategies can be provided with the aim of reducing exposure to water-related risks.

There are a number of international initiatives which may assist in this regard.

- *CEO Water Mandate as part of the UN Global Compact in 2007* – this is a public private partnership that was established to assist businesses by developing, implementing and disclosing water policies and practices. The CEO Water Mandate deals with the following six areas:

- *Water Disclosure Project. An extension of the carbon disclosure project was launched in 2010.* The intent is to increase the number of companies reporting on water use, water protection measures and vulnerabilities in order to drive improved internal understanding of value at risk as well as to provide data and insights into the investment risk and market opportunities arising from inherent water risk exposure.

- *Water Footprint Network (WFN)*. This 2008 initiative developed an international methodology for water footprinting and a detailed handbook (published in 2011). The WFN aims to promote the transition toward sustainable, fair and efficient water use.

Figure 4 – Definition of water footprinting

A water footprint can be calculated for an individual, community or business. It is defined as the total amount of freshwater used to produce goods and services. Water use is defined as the amount of water consumed and/or polluted over a given time period.

Source: Water Footprinting Network, 2010

Figure 6 – Case study

Adaptation in the extractive sector

Severe droughts in Australia in 2002 prompted calls for industries to decrease water consumption by 25%. It was expected that 50% water restrictions would be imposed within a year. Rio Tinto committed AUD2 million to seawater cooling technology, research into thermal desalination, and reverse osmosis. The investment was based on an assessment of the opportunity cost of AUD135 million in lost revenue because of reducing production to meet expected water restrictions. This experience emphasized to Rio Tinto the value of water and the need for a strategic approach to secure supply.

Source: Strategic Water Management in the Mineral Industry. Minerals Council of Australia

- ***Assess risks*** - The impact of companies' water use will vary according to its business processes, and the aridity of the environment. The absolute volume of water used will be less important than the timing and location of its use This is therefore a rationale for companies to extend water footprint data to information on key risk drivers. This emerging practice includes an analysis of some of the following issues:

    - **Physical risks:** local hydrological conditions (potential shortage risks, water quality risks, flooding risks, and possible impacts of climate change on future water supply and demand);

    - **Regulatory risks**: changes to water management policy and regulation, socio-economic conditions in as far as they relate to water (trends in regional demand, local water governance capacity, and regional water pricing) and potential regulatory costs;

    - **Energy related risks:** explicit and deliberate attention should be paid to understanding energy-related risks posed by water (and vice versa), as well as any potential competing demands that a business may have for water and energy. If possible, companies should also seek to align, if not integrate, their water and climate change risk assessments in all their risk management work.

1.7 Questions that business should be asking

In attempting to identify exposure to water-related risks, it is essential that business ask the following key questions:

- Who is the surrounding community and what impact does the company have on the socio-economic situation?
- Where along my value chain is there the most exposure to water risk from both a quantity and quality perspective?
- Where are my operations located? What is the level of relative water scarcity in that region?
- What kinds of water resources are used in my operations? What ecological and institutional risks are associated with these?
- What kind of infrastructure is involved in accessing the water used in my operations?
- What is the existing pricing regime? How important is water in the operation of the business and how will water prices impact from a financial perspective? What is the trade-off you would be willing to make between water prices and assured supply?

1.8 Conclusion

Water resources are already relatively scarce. Increased demand for water as well as the effects of climate change will result in further uncertainty in respect of water availability. Our world is characterised by fundamental resource constraints that will make it more difficult and costly to do business in future. As such, business needs to adapt to the changing environment by assessing what their relative exposure to risk is. Water is a crucial resource that enables life as well as economic activity. It is a resource for which there is no substitute, and is almost certain to be in short supply in the future. As such, businesses should understand their reliance on the water and develop strategies to respond to further scarcity in the future.

This position paper was drafted with the kind assistance of KPMG Services (Pty) Ltd and the members of the IoDSA's Sustainable Development Forum.

[1] *Metcalf-Wallach, J. 2007. 'Demand-Side Approaches to Water Scarcity and the National Water Act' in IDEAS Journal: International Development, Environment and Sustainability, November 2007.p.1-5*
[2] *Department of Water Affairs (DWA). 2004c. National Water Resource Strategy, First Edition.*
[3] *Department of Water Affairs (DWA). 2004c. National Water Resource Strategy, First Edition. Lumby, A., Matete, M. & Rwelamira, J. 2005. 'The Management of South Africa's Water Resources with Particular Reference to the Period 1956-1998', South African Journal of Economic History, 20(2), September 2005. pp. 83-108.*
[4] *Department of Water Affairs, 2011. Green Drop Report*
[5] *This overall performance indicator is comprised of a number of performance areas, some of these areas include: compliance to wastewater regulation, bylaws, monitoring and evaluation, treatment and collector capacity, process control, management and maintenance.*
[6] *Department of Water Affairs, 20011, Blue Drop Report*
[7] *This overall performance indicator is comprised of a number of performance areas, some of these areas include: drinking water quality compliance, monitoring and evaluation systems, process control, management and maintenance, credibility of sample results and submission of results.*
[8] *DWA, Presentation to the Parliamentary Committee on Water and Environment, Pricing strategy and funding model, 13th April 2011*
[9] *Ceres Report, 2009, 'Water scarcity and Climate Change, Growing Risks for Business and Investors.'*

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