Apocalypse $H_2O$
Case studies on Puma and Rio Tinto

How companies are accounting for the true value of water
40% of the world’s population already live in areas with moderate to high water stress.1

5.5 billion people – that’s two-thirds of the world – will live in water stressed areas by 2025 according to the United Nations.

21 years The World Bank says global demand for water is doubling every 21 years.

20 years If water consumption continues without reform or regulation over the next 20 years, 40% of global demand will not be met.2

X2 In India future demand for water is expected to climb to levels that are double today’s supply by 2030.3

40% of Fortune 1000 companies said the impact of a water shortage on their business would be ‘severe’ or ‘catastrophic’ – but only 17% were prepared for such a crisis.4

US $2.15 trillion The cost of environmental damage caused by the 3,000 largest publicly-listed companies (7% of their combined revenues).5

2400 litres of water to make just one hamburger.6

50% of global wetlands have now been lost or totally eradicated. Worrying because one-third of the world’s drinking water comes from wetland areas.7

---

1 International Year of Freshwater 2003 Fact Sheet, December 2002, United Nations
2 Charting Our Water Future: Economic frameworks to inform decision-making, 2009, 2030 Water Resources Group
3 Ibid
4 Marsh Centre for Risk Insights and ‘Running Dry’, The Economist, August 21 2008
5 Universal Ownership: Why environmental externalities matter to institutional investors, 2011, UN Principles for Responsible Investment and UNEP Finance Initiative
6 Stockholm International Water Institute
7 www.earth-touch.com

---

Authors
Sandra Rapacioli, CIMA
Roger Malone, freelance writer
Water is more essential to industry and daily life than oil. But fresh water, like many other natural resources once considered abundant, is running low.

The World Bank says global demand for water is doubling every 21 years and the United Nations estimates that by 2025 two-thirds of the world could face water ‘stress’ situations. In China, more than half the cities are already struggling to get clean water to their residents and recent water crises have shut down entire regions there.

The environmental and social challenges are clearly immense and constricted water resources may quickly change the way we do business. The availability of raw materials, production methods, investor sensitivities and capacity levels that shift in the wake of constrained water supply could threaten many successful business models. As potable water becomes scarcer, even in developed regions, prices will also rise.

Many organisations have started to respond seriously to water risk. They are measuring their water consumption and reducing it. They are examining the water footprint of their core operations and throughout their supply chain. They are also looking more broadly at how to protect biodiversity and ecosystems. Healthy ecosystems are needed to control erosion and water run-off, to provide natural water purification processes and maintain appropriate water flows through a community. The invisibility of the value of biodiversity has encouraged inefficient use or even destruction of the natural capital that is the foundation of our economies, according to a report from The Economics of Ecosystems and Biodiversity (TEEB) study in 2010. Recent attempts to put an economic value on nature’s services valued the world’s wetlands at US$3.4 billion per year and the contribution of insect pollinators to agricultural output at US$190 billion per year.

This report focuses on two companies that are leading the way in the area of water management and valuation. In May 2011, Puma was the first organisation to put an economic valuation of the ecological impact caused by water consumption and greenhouse gas emissions along its value chain. Rio Tinto, one of the world’s largest mining and resources companies in 2005 began to take a more strategic view of water, including accounting for the value of water. There are approximately 50 CIMA members and students working at these two leading organisations.

For both Puma and Rio Tinto, financial impacts were a critical part of their water risk evaluation. It is essential that management accountants understand the business risks and the potential impact on company performance posed by natural resource shortages. Management accountants have the skills needed to help their companies create sustainable models. Risk management, analytics and forecasting are vital as companies review their environmental impact and the business ramifications of diminishing resources. Focusing on water, there are key questions that should be asked, and these are outlined below.

**Questions financial professionals should ask**

- Has your company traced water inputs, flows, and outputs throughout its operations?
- Has your company analysed the water usage and other environmental impacts all along its supply chain?
- Has your company written water management plans for each of its operational centres?
- How would short or long-term water shortages impact your company’s operations?
- How would price increases for water or other diminishing natural resources impact operations?
- Is your company exploring the value of water beyond the purchase or procurement price?
Sportswear giant Puma gets traction with environmental profit and loss (P&L)

Global sportswear brand Puma became the first major multinational to issue an environmental P&L account in early 2011. The project, supported by parent PPR SA, examined the greenhouse gas emissions and water consumption not only of Puma’s core operations – design, logistics, warehousing, retail and administrative services – but all along the supply chain from raw material production to manufacturing.

‘Getting a better understanding of the source of the natural goods and services that Puma relies on and the declining availability of the basic resources required for our business growth will help Puma build a more resilient and sustainable business model and ultimately better manage its impacts on the environment,’ said Jochen Zeitz, Puma CEO and Chairman, who also serves as Chief Sustainability Officer at PPR.

Puma is one of the world’s largest sportswear manufacturers, best known for its athletic shoes, casual footwear and clothing. Based in Herzogenaurach, Germany, on the outskirts of Nuremberg, Puma reported global sales of 2.7 billion euros in 2010 and net profits of 202 million euros. The majority of sales, 1.4 billion or 53%, came from footwear, while apparel accounted for 941 million euros or 35% and accessories for 340 million euros or 13%. It has about 9,300 employees worldwide. Puma is a subsidiary of PPR, a French holding company that owns a 71% stake. The sportswear manufacturer sources almost all of its products from Asia Pacific, primarily from China and Vietnam, but also from Indonesia, Cambodia and Bangladesh.
Total environmental impact valued at 94.4 million euros

By clearly identifying the environmental impacts of operations along the length of its supply chain, Puma will be able to ‘develop solutions to address these issues, consequently minimising both business risks and environmental effects,’ the company said as it announced the environmental P&L.

Puma’s global environmental impact through greenhouse gas emissions and water usage was valued at 94.4 million euros, of which 7.2 million euros was directly linked to the company’s core operations. The bulk, 87.2 million euros, was attributed to the four tiers of Puma’s supply chain:

- product manufacturing
- outsourced processes such as printing and embroidering
- raw material processing
- raw material production.

The overall impact was roughly divided equally between greenhouse gas emissions and water consumption. Putting a monetary value on the environmental impacts also prepares for potential future legislation, such as disclosure requirements and creates a metric against which the company can judge the success of its efforts.

Dr Richard Mattison, CEO of Trucost, an environmental consultancy that worked with Puma in completing the water valuation, said the sportswear company was also unusual in that it looked at indirect costs, for example the impact on ecosystems and the difficulty to replenish supplies; as well as the direct costs, such as extraction and processing, that companies commonly examine. ‘These indirect impacts are generally not valued into the market price,’ he said.

Puma focused on greenhouse gas emission and water consumption because they have the most significant impact on the environment. For the valuation, Puma estimated the value of a tonne of carbon dioxide emissions at 66 euros and water consumption at 0.81 euros per cubic metre. Among other facets, the values placed on water include consideration of factors such as fresh water replenishment, ecosystem maintenance and water nutrient cycling as a result of water consumption in Puma’s entire supply chain and its own operations. Values were adjusted by local incomes and water scarcity and scarcity was the primary driver of value.

Bulk of impact early in supply chain

By far the greatest water-related environmental impact along Puma’s supply chain was at the furthest point from its core operations. Raw materials production – cultivating and harvesting cotton, cattle ranching and natural rubber production – accounted for 52% of the water consumption identified by the study with an overall impact value of 24.7 million euros.

Figure 1: 2010 water-use by value chain source (millions euros)

Source: PUMA’s environmental profit and loss account, adapted by CIMA
The environmental impact P&L is the first stage of a three-prong effort by Puma to examine the environmental, social and economic impact of its operations and supply chain. The final results from the first stage will be released in late 2011 and include performance indicators for areas such as acid rain and smog precursors, volatile organic compounds, waste and land-use change.

‘Companies that understand their dependence on natural resources along the value chain are well placed to manage underlying risk from the rising cost of raw materials and scarcity of supply issues,’ Mattison at Trucost said when the environmental P&L was released. ‘Companies are already facing increased input costs as a result of rising commodity prices related to climate change and water availability.’

Talking with CIMA, Mattison used the Russian drought of 2010 as an example, which cut the country’s wheat production by about a quarter. The drought caused wheat prices to increase, which had a direct impact on cattle. It takes about eight kilograms of wheat to produce one kilogram of beef, he noted. Beef prices rose, and as a result leather prices too. The rise in leather prices had a direct impact on Puma’s costs and profits. ‘This goes beyond a purely environmental issue,’ he said, ‘water is essentially the ramification of a changing climate and these issues are here and now.’

The environmental P&L is a significant step forward in efforts to create a sustainable organisation and it builds on other efforts at Puma to safeguard the environment. In 2010, the company introduced its sustainability scorecard, which it used to set targets including a 25% reduction in water use by 2015. It has been working with its closest suppliers – its manufacturers – to reduce environmental impacts. It is also seeking ways to collaborate with companies further down the supply chain, looking for ways to allocate responsibilities and costs linked to water usage and exploring new materials and products that are more water efficient.

**Part of a larger sustainability effort**

As part of this effort, Puma and other sportswear companies are working with their manufacturing partners to identify weak points in their operations and aided by sponsored training programmes, to make the needed improvements independently. While the company has worked to ensure their immediate suppliers adhere to environmental and social standards, it has also begun soliciting guarantees that their suppliers’ suppliers follow the same guidelines.

In addition, Puma has set a goal that by 2015 half of the company’s international collections will be manufactured in accordance to its internal sustainability standards, which would mean for example using more sustainable materials, such as recycled polyester, and reducing the environmental impact of raw material production for its products.
PUMA launched The Clever Little Bag in November 2010. The Clever Little Bag is the next generation in shoeboxes. It takes 65% less paper to make and reduces water, energy, and diesel consumption during manufacturing by over 60% a year. Switching to The Clever Little Bag also reduces Puma’s carbon emissions by 10,000 tonnes a year.

Figure 2: The Clever Little Bag
Mining leader Rio Tinto focuses on three-prong water strategy

Rio Tinto, one of the world’s largest mining and resources companies, in 2005 began taking a more strategic view of water. Working in co-operation with the Sustainable Minerals Institute at the University of Queensland, the multinational started building a better understanding of the monetary and non-monetary value of water.

‘For more than a decade we at Rio Tinto have sought to improve our water performance and to be a responsible water manager... Since 2005, we have adopted a more strategic approach that accounts for the social, environmental and economic aspects of water management,’ Tom Albanese, CEO wrote in 2009.6

Albanese continued, ‘Companies, including Rio Tinto, cannot afford to regard water as an inexpensive commodity; rather it is a shared resource and we must collaborate to ensure society uses it to the greatest benefit.’

Before embarking on the new course, Rio Tinto’s response to water issues was often centred on crisis teams pulled together to address a local water shortage or other problem.

‘Until recently, like all mining companies, Rio Tinto’s approach to water issues was ad hoc and reactive... The challenge was to be more proactive... There is now a positive tension in the business—we know what we want to achieve. We want to be seen as a responsible water manager,’ Kristina Ringwood, a water strategy specialist at the company said.7

---

Rio Tinto posted group revenues in 2010 of $60.3 billion and net income of $15.2 billion. The group, with headquarters in London and Melbourne, Australia, has interests in aluminium, copper, diamonds and minerals, energy and iron ore, and it has about 77,000 employees worldwide. Its primary operations are in Australia and North America, but it also has assets in Africa, Asia, Europe and South America. Rio Tinto’s businesses include mines, mills, refineries and smelters.

---

6 'Rio Tinto and water,’ 2009, Rio Tinto, p.2.
Three elements of water strategy

The water strategy Rio Tinto developed in 2005 in collaboration with outside experts features three key elements: improve water performance, account for the value of water and engage with others on water issues. Taken together, the strategy offers clear guidance to business unit managers as they move toward water sustainability.

Figure 3: Water strategy framework

Source: Rio Tinto and Water report

1. Improving water performance

Improving water performance is often the first and most obvious step as companies tackle water issues. At Rio Tinto, improved water performance is expected to lead to reduced operating costs and less environmental and social impact from its operations. Among other efforts, Rio Tinto has reduced water usage by recycling on average 17% of the water used across the group, with some sites recycling as much as 70% of their water. They also substituted high-quality, potable water with poorer quality water where appropriate.

The company has developed a number of programmes to drive improved water performance. Three in particular stand out:

- A water standard that sets minimum water management expectations for all operations within the group. Under these standards each operation must have a water balance (an accounting of water inputs, flows and outputs) a water management plan and staff skilled in water management and appropriate water infrastructure. Operations are audited every two years.
- In 2003, Rio Tinto set a five-year water target of reducing freshwater use per tonne of product by 10%. In the first few years after setting the goal, Rio Tinto met the target through production increases using the same volume of water and expanded recycling. However, by 2008 some of these improvements were offset by climatic events, particularly in Australia, and the final reduction achieved was 6.3%.

While many businesses have found a water target challenging to reach, it has helped drive water efficiency actions at operations, raised the priority of water and developed better data collection systems, baselines and projections,’ the company reported.
A water risk review was deployed in 2005 and has been conducted at dozens of operations throughout the company. The review judges an operation’s performance against several aspects of water management, including technical elements such as water balances and water treatment, management elements such as monitoring, measuring and shareholder engagement, and corporate requirements such as water targets.

2. Accounting for the value of water

Accounting for the value of water takes water management to the next level of sophistication and complexity. ‘Society values water in different ways. The cultural value an indigenous community may place on a water body may not match that held by others. Perceptions of water can change as conditions change. In times of drought, communities, governments and businesses place great importance on water conservation. This concern often diminishes quickly following rains,’ the report Rio Tinto and Water said.

To help navigate this terrain, Rio Tinto conducted an 18 month study with representatives from industry, agriculture and conservation groups to explore various methods being used to put a true value on water. Part of the work identified a framework to help consider the level of risk and opportunity associated with water issues. Risks could include factors like an operation’s impact on a stream that has substantial recreational value for the community, while value could be, for instance, benefits brought to the environment if a mine uses modern water-saving techniques. Rio Tinto expects to incorporate its findings on identifying and mitigating risk into its existing risk assessment processes.

In addition, some of the company’s operations have tested different approaches to valuing water. In one example, Rio Tinto Alcan’s operations in Weipa in Northern Queensland, Australia, created a hierarchy of value for water taken from various local sources. As a result, the first options for supply are tailings dams (reservoirs for discharges from mining operations) and captured rainwater. Next on the hierarchy are shallow aquifers, which replenish relatively quickly and easily, and last is the deep water Great Artesian Basin, which recharges more slowly. Other Rio Tinto operations have looked at valuing water by estimating the costs of lost production caused by water shortages and conducting a cost-benefit analysis that considers environmental, social and economic consequences of water management approaches.

These projects help Rio Tinto understand the different values of water and how they can be incorporated into decision making and management approaches. A further complication is the impact of water use on a community’s overall ecosystem.
3. Engaging with others on water issues

Engaging with others on water issues offers multi-faceted benefits for Rio Tinto. By being part of the conversation with other businesses, government agencies, non-government organisations, community groups and others, Rio Tinto has the opportunity to better understand the myriad concerns about water sustainability and to incorporate this knowledge into its operations and strategy. In addition, engagement helps position Rio Tinto as a leader in the field, giving it influence in guiding the discussion and, in times of shortage, perhaps helping it secure access as a proven prudent user.

Among other efforts, Rio Tinto is working with the World Bank and United Nations to help communities obtain safe water supplies and sanitation facilities. The company supports the National Water Initiative in Australia and other government sustainability efforts and it is a leading member of the World Economic Forum water initiative.

Figure 5: Brumby Creek Dam in Queensland near Hailcreek Coal Mine

Environmental vacation student taking water samples from Brumby Creek Dam. This dam is upstream from Hail Creek mine and forms part of the clean water diversion around active mine areas. The use of recycled water is one of the many ways in which mines can be more sustainable. Hail Creek has decreased their raw water consumption in the Coal Handling and Preparation Plant by 30%. The need to increase use of recycled water and reduce usage of raw water is driven by the fact that they are currently suffering serious fresh water shortages in the area due to a seven year drought, thus conscious efforts to save water are of key importance.

---

I always emphasise that water is not just an environmental issue, but is a strategic business issue. This means we should be looking a decade ahead, while at the same time working to make sure that we are implementing the strategy at all our operations.

Elaine Dorward-King
Head of Health, Safety and Environment
Rio Tinto
