
New Zealand: Preserving water through collaboration that works

*Local Government and
Infrastructure Matters*

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Foreword

It does not matter where you are in the world and it does not matter which sector you operate in. Access to water that's too dirty, too expensive or too little has an impact on the bottom line. This report considers how New Zealand, within a global context, has responded to water risks and the potential to improve our water management in the future.

The supply of usable water is fundamental to all governments and businesses – to source, heat, cool, clean or to use as an ingredient. Yet, water is perhaps the most problematic of resources. Think about the reliability and quality of the supply; the impact of drought and flooding; and the collaboration needed to share effectively with others. It's a challenge globally for the public and private sectors that needs active management.

New Zealand faces its own water risks, although the drivers differ from those in other parts of the world. Here, we are in a relatively fortunate position compared to many countries. While we have a very high amount of water use per capita – only the US and Chile use more – this is enabled by our relative abundance of freshwater coupled with a small population.

The public sector is taking steps to address our country's water needs. In local government there are more than 1,160 water-related infrastructure projects valued at \$16.07 billion, planned or already in progress through 2025. The biggest portion of these projects is related to wastewater.

In May, Primary Industries Minister Nathan Guy announced that irrigation projects will receive a kick-start of \$25 million in operating funding for five years from 2016/17 through the Irrigation Acceleration Fund. This funding is expected to help complete the investigation and development of new irrigation proposals on a regional scale with the hopes of boosting provincial economies.

But public funding is only one piece of the puzzle. The purpose of this report is to address the key issues globally and in New Zealand that we currently face relating to water risks, the effects on commerce and value chains, and the potential to improve water management through collaboration.

Whether you operate in the public sector, energy markets, agriculture or another key industry, we hope you will use this report as a tool to get conversations started in your networks. Please contact me if you want to discuss this report or how we can assist you in building partnerships that prosper.



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Too much, too little, too dirty or too expensive

Only a small proportion of water is usable

The world as a whole isn't running out of water. The planet has more than 1,400 million km³ of it. However, clean freshwater is not always available when and where people, ecosystems and businesses need it.

Surface water, the only truly usable source, represents only 1/100,000th of the planet's water (13,500 km³). This surface water is largely not in the same place as most of the global population – 85 per cent of the world's inhabitants live in the more arid half of the earth.

Disruptions to availability can have far-reaching consequences

Water is perhaps the most problematic of resources, due to issues with consistency of supply, quality, pollution, drought and flooding.

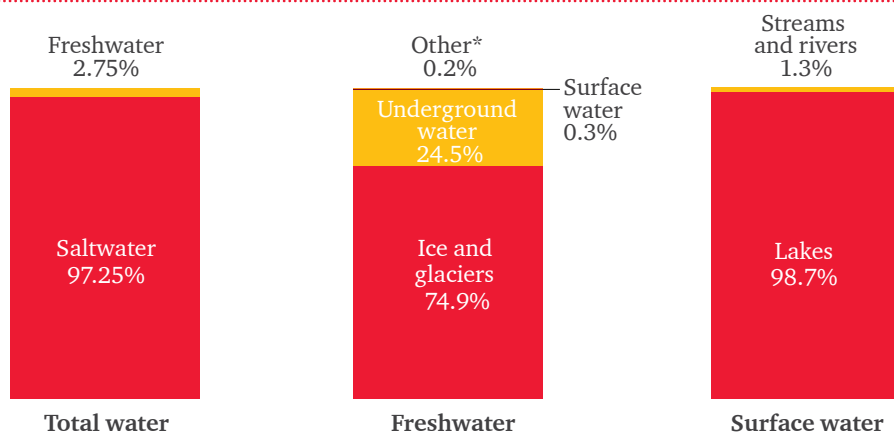
The possibility of water constraints and disruptions can translate into significant risks for businesses operating globally, with wide-reaching impacts. Even relatively localised risks can have global consequences as a result of the global supply chains.

For example, the 2010 drought in Russia led to restrictions on agricultural exports and pushed up the price of staple grains across North Africa and the Middle East.¹ Similarly, the 2013 New Zealand drought increased global milk prices by around 60 per cent, with flow-on consequences for the prices of all dairy products.²

Such supply problems can be overcome. However, in many cases this requires substantial investment in storage and reticulation assets and can only be achieved at significant financial expense.

Surface water is largely not in the same place as most of the world's population – 85 per cent of the globe's inhabitants live in the more arid half of the earth.

Availability of water on earth



* Other: Water present in the atmosphere and biosphere as moisture within the soil

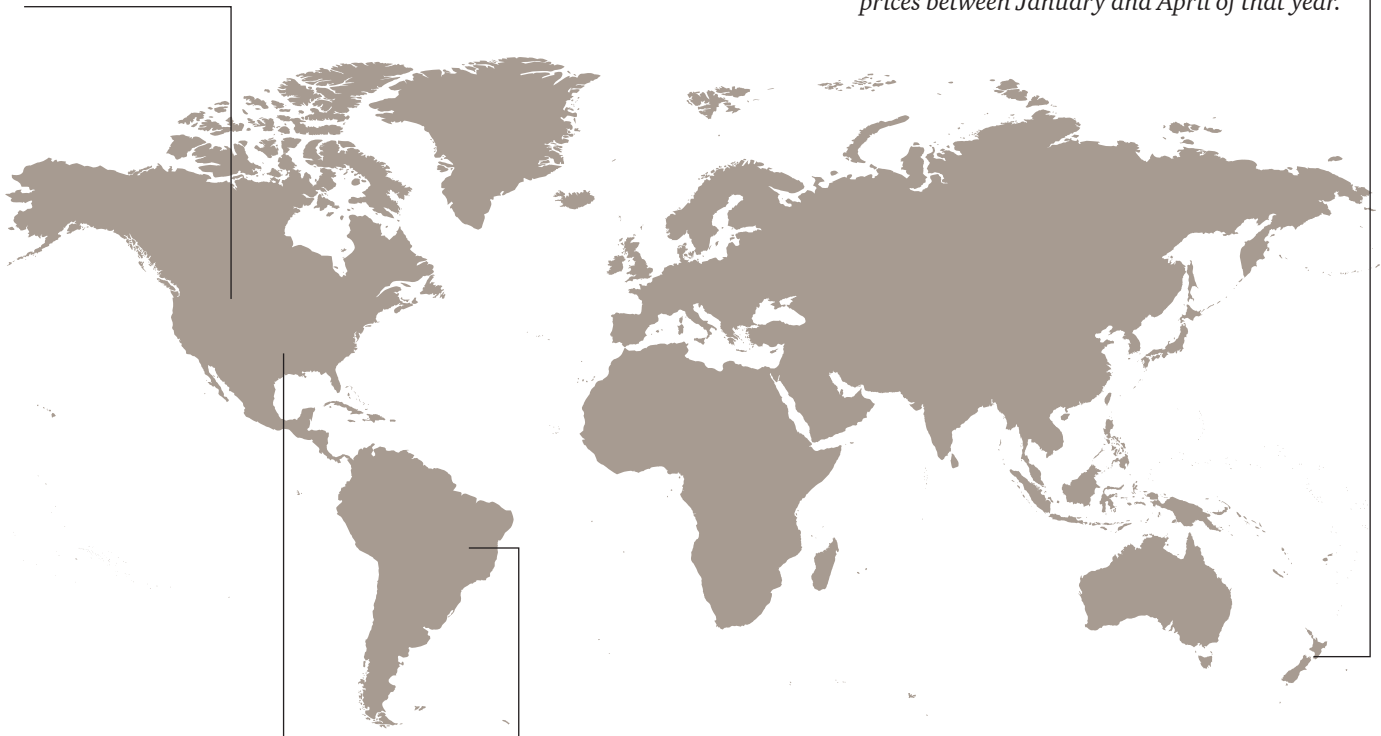
¹ World Economic Forum, Global Risks 2014: Understanding Systemic Risks in a Changing Global Environment

² GlobalDairy Trade

Recent examples

In 2012 a major North American grain handler issued a profit warning after drought in the US Midwest hit corn production. The company increased prices which in turn flowed on to companies, including chicken and pork producers in the US who are reliant on corn as animal feed.

Drought in New Zealand in 2013 saw the country's dairy production fall by 9 per cent in the last six months of the annual season. This contributed to a 28 per cent decline in operating cash flows at a major New Zealand dairy company compared with the previous year, and was also cited as a reason for a 64 per cent spike in whole milk powder prices between January and April of that year.



In 2011 the drought in Texas resulted in failure of cotton crops in the state, including a forecasted 50 per cent abandonment rate for crops in the High Plains region which normally produces two-thirds of the state's cotton. This was linked to a 22 per cent cut in full year profits for one US apparel chain and a 36 per cent decline in net income for the April quarter in another.

Drought in Brazil in 2014 caused coffee prices globally to rise by an average of 9 per cent and contributed to volatility in coffee prices. Some coffee retailers responded by increasing prices.

Global water risks

The increasing risks around water availability are being recognised globally. In the World Economic Forum's (WEF) Global Risks 2014 report, water crises was ranked as the third most concerning global risk, behind climate change and fiscal crises. In the 2015 report, risks from water crises were reclassified from an environmental risk to a societal problem and now it leads the list as the top concern.

Demand for water is increasing

In 2030, 47 per cent of the global population will be living in areas of high water stress, predicts UN-Water.³ The World Resources Group predicts that by 2030 there will be a 40 per cent shortfall between global water demand and the available supply.⁴

Top ten global risks in terms of impact in 2015



Source: WEF, Global Risks 2015

³2030 Water Resources Group (2009). Charting our water future: Economic frameworks to inform decision-making

⁴World Water Assessment Programme, 2009

In New Zealand, demand for water is growing in a number of urban areas as a result of population growth.

The main source of this problem is that water use has been growing at twice the rate of population growth in the past century – with increasing water use particularly prevalent in developing countries. Economic development drives demand for water through urbanisation, increased wealth, changing food habits (particularly an increased demand for beef) and greater demand for energy.

In New Zealand demand for water is growing in a number of urban areas as a result of population growth. Many rural areas are also demanding more water for commercial purposes, often requiring irrigation.

Supply is becoming more variable

The availability of freshwater is becoming more variable. Climate change is causing an increased number of extreme weather events, including droughts and flooding. Despite rising environmental regulation, contamination events are also more common considering expanded industrial activity. Distribution networks can also be disrupted. These and various other issues all contribute to an increasingly precarious supply of clean freshwater.

The World Resources Group predicts that by 2030 there will be a 40 per cent shortfall between global water demand and the available supply.

New Zealand's water risks

New Zealand is in a relatively fortunate position compared to many countries. While the country has high water use per capita – only the US and Chile use more – this is enabled by the relative abundance of freshwater and smaller population. Users in New Zealand only take around 1 per cent of available water each year.

New Zealand cannot afford to be complacent

Complacency over water supplies and their challenges can mask some important issues.

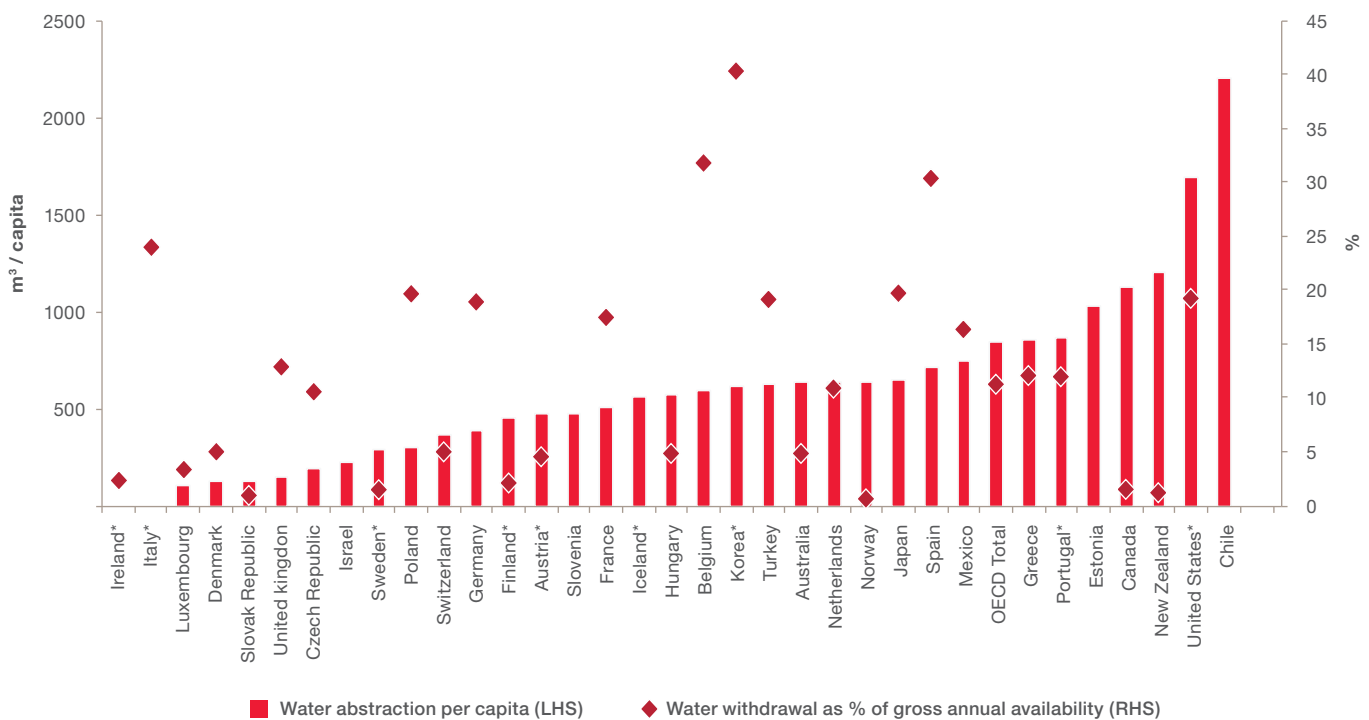
Much of the available freshwater in New Zealand is not where the population is concentrated.

The available water in the upper North Island is highly utilised but much of the South Island water sources are not.

The infrastructure is also not always in optimal locations. For example Hamilton's water treatment plant is on the south side of the urban area but the majority of the city's growth is in the north. Furthermore, the population growth forecast for New Zealand over the next 30 years is largely expected to occur in the areas which already have high populations and relatively high water stress.

The quality of many water sources is also deteriorating. Pesticides, herbicides, fertilisers and various other chemical compounds from farms, industrial plants and urban areas all threaten water sources.

Water use of OECD countries



Sources: OECD in Figures 2009 - OECD © 2009 - ISBN 9789264051997
 OECD Factbook 2011-2012
 * OECD Factbook 2010

A regional, or even centralised, solution may be required at some point in the future to avoid rural infrastructure deteriorating to the point where it becomes a risk to the whole country.

Businesses depend on water

A large portion of businesses depend on a reliable supply of water. Farming, forestry, electricity generation and many urban businesses all rely on water. This commerce represents a large proportion of the New Zealand economy and particularly the export sector.

The country's economy is, therefore, susceptible to water crises, even if the probability of such a crisis is lower than in other parts of the world.

An assumption has emerged over time that water is always available, when and where people and businesses need it. This may not always be the case in the future and both water providers and large water users need to be prepared.

Getting the system going

Successful collaborations don't just happen by themselves – they are complex systems that need planning and co-ordinating. As you begin, ask yourself: What frameworks will work? What kind of structure will the collaboration take? What policies do we need? What are the immediate priorities? What work streams and action plans need to be set up to achieve those? Do we have enough tools, people and funding?

In a new organisational constellation with new partners it's not easy knowing what funding, staffing requirements, contacts or other resources are necessary. Other successful approaches have started with a pilot study to test the waters. In New Zealand, the Waikato and Bay of Plenty councils came together to create an assessment of their river management and flood protection activities. This then became an input to a nationally consistent river management assessment framework.

Early on, in a collaborative setting, contingency plans need to be established for any number of disruptions. Conflicts are likely to occur, stakeholders may abandon the effort, some parties may partake in bribery and corruption, and the very natural disasters that cause water crises might strike unexpectedly. These are occasions that create much tension and emotion. Being ready for them will help ensure the resilience of any collaboration efforts.

Many councils in New Zealand are not fully funding their depreciation, implying that their funding will not be sufficient to replace existing assets at the same cost.

The local response

So how is New Zealand preparing for greater water risks in the future? Many stakeholders have already come together to collaborate, improving the management of water and avoiding the worst effects of future water crises.

The Land and Water Forum has brought together key stakeholders involved with the use, management and regulation of water to explore different ways of collectively addressing New Zealand's issues. The forum brings together industry groups, electricity generators, environmental and recreational non-government organisations, iwi, scientists and other organisations with a stake in freshwater and land management.

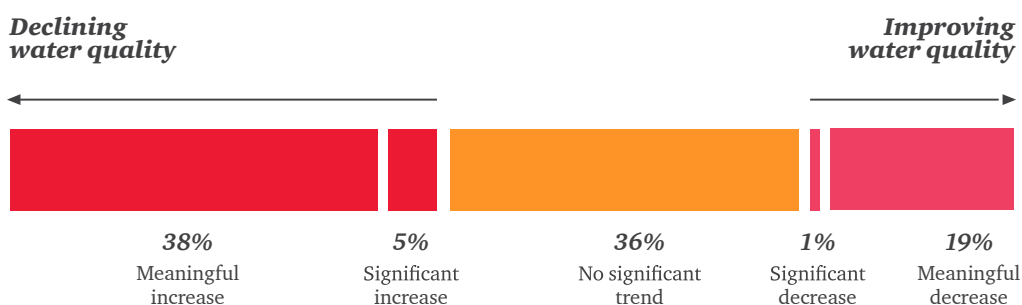
The forum launched its first phase of work in August 2009 which resulted in a report identifying a set of outcomes and goals for freshwater management and policy recommendations to achieve those. Its current remit from the Government is to provide a range of advice on key policy issues, including water resource allocation.⁵

While the forum has been operating on a national scale, many New Zealand councils have worked with their neighbours to improve their water-related services. Three councils in the Waikato are currently considering developing shared-service arrangements to provide water and wastewater across their areas more efficiently than could otherwise be the case. The Wellington councils are currently working towards the development of a comprehensive regional water utility.

In the Hawke's Bay, a private entity has been established to work with the regional council to provide water storage and irrigation in the Tukituki catchment as part of the Ruataniwha water storage scheme. Other regional councils are also working together to share information and improve services, across regulatory areas, and provide flood protection infrastructure and river management services.

There are currently 67 different providers of water services in New Zealand.

Nitrate trends at national network sites 1989 - 2007



Source: Ministry for the Environment and NIWA

⁵ Third Phase of the Land and Water Forum, Minister for the Environment, April 2015

⁶ As an example, see: Waikato District Health Board (March 2014), Ohura Water Supply, Health Impact Assessment

⁷ Local Government New Zealand (2014), Exploring the issues facing New Zealand's water, wastewater and stormwater sector

⁸ Watercare (February 2015), Franklin's water supply up to standard; Auckland Council (14 April 2015), Fact and Fiction, Presentation to public seminar: Institute for Governance and Policy Studies, Victoria University, Wellington

⁹ Citi's Top Economist Says The Water Market Will Soon Eclipse Oil at <http://www.businessinsider.com/willem-buiter-water-2011-7#ixzz3Fe0sM1xy>

“Water as an asset class will, in my view, become eventually the single most important physical-commodity based asset class, dwarfing oil, copper, agricultural commodities and precious metals.”
Willem Buiter
 Citi economist⁹

Infrastructure

Mitigating water risks will require additional infrastructure. This is particularly the case given population growth, economic growth, a variable water supply, more extreme weather events and greater discharge treatment requirements. And water infrastructure is not cheap.

Funding this infrastructure can be very difficult. Like many other countries, water and irrigation infrastructure is provided and funded at the local level. There are currently 67 different providers of water services in New Zealand. While urban councils can typically use their large rating base and large balance sheet to fund necessary capital works, those councils with largely rural population bases can have great difficulty raising the necessary funds. Areas with declining populations can also be left with too many assets that eventually become financial burdens.⁶

A 2014 Local Government New Zealand survey identified that many councils are not fully funding their depreciation, implying that their funding will not be sufficient to replace existing assets at the same cost.⁷ The survey also found that many councils currently have an unfunded future renewals profile.

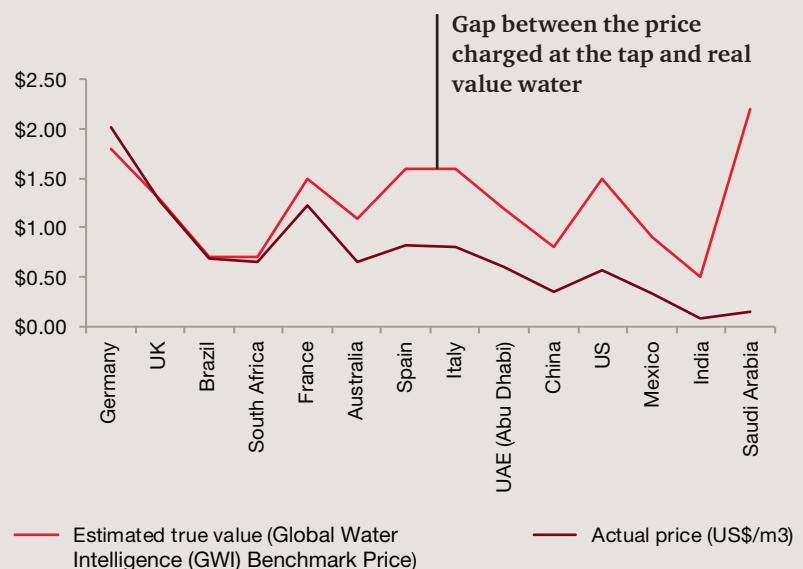
A regional, or even centralised, solution may be required at some point in the future to avoid rural infrastructure deteriorating to the point where it becomes a risk to the whole country. As an example of the benefits of regionalisation, drinking water quality has improved substantially in the Franklin and Rodney areas now that they have been subsumed into the much larger Watercare Services, while at the same time tariffs were reduced.⁸

How much do we value water?

Water is a vastly under-valued resource. However finding common ground on how to value it to give a true price of water to users is complex and global agreement hard to secure. As users, few think about the cost of extracting, transporting, chemically treating and providing water. And then there’s the cost to our ecosystems of removing water from nature, the cost of polluting rivers and so on. All of this has a price but access to water is a basic human right, so prices are kept low compared to the real cost.

While prices are kept low, it’s taken for granted and consumption patterns are difficult to change as there is little incentive. If prices were increased to reflect its true value, the reaction would be fierce – but behaviour would change.

The real value of water



Source: Water Asset Management

Measuring water footprints

The concept of a water footprint is more than just the amount of water use. It reflects the time and location the water is sourced from, the extent to which this use impacts the water source, the surrounding environment and other users. Reducing water footprints, particularly those of industrial users, can play an important role in improved water management.

The UN Global Compact's CEO Water Mandate initiative proposes a seven-step approach for reducing business water footprints.¹⁰ In New Zealand, the response has varied across different parts of the economy. While some areas have done well, there are clearly areas for improvement. There has also been a range of performance levels across New Zealand.

	Description	Estimated range of New Zealand performance
Step 1	Provide, and properly maintain, drinking water, sanitation and hygiene services in the workplace for the health and well-being of a company's workers.	
Step 2	Measure and monitor water management practices Track the extent to which direct operations use and affect water resources.	
Step 3	Driver operational efficiency and reduce pollution Implement water efficiency and pollution reduction measures that improve performance and begin to manage risks and negative impacts.	
Step 4	Identify and understand water-stressed and high-risk basins Identify and investigate those areas that are experiencing water stress or are considered high-risk.	
Step 5	Integrate water management into business strategy Think strategically about developing policies and programmes to address top water priorities.	
Step 6	Leverage improved practices throughout the value chain Address water risks and negative impacts in the value chain.	
Step 7	Advance sustainable water management and engage in collective action Engage externally to ensure long-term business continuity by contributing to the sustainable management of shared water resources on which the company relies.	

Poor Average Good

¹⁰ Pacific Institute (2014) Corporate Water Disclosure Guidelines: Towards a Common Approach to Report Water Issues

Other collaboration benefits

Collaboration to improve water management can lead to innovation opportunities and drive business growth.

Collaboration to improve water management is not always easy but it can lead to innovation opportunities and drive business growth. For example, some global companies are helping each other to better understand how changing water consumption impacts the way their products are used and how different products might require less water use. Other businesses are collaborating on developing products that save water.

Initiatives like the Land and Water Forum can also be prototypes for similar actions elsewhere. In fact, the Land and Water Forum itself borrowed elements from a number of processes internationally.

New Zealand-wide collaboration can also be useful for disaster resilience. This can be evidenced by post-earthquake Christchurch, where the city was supported by a number of councils across a range of areas, including incident response and building control. In the event of a future disaster, various councils and agencies will again need to band together to resolve issues. It will help if they are already well-connected, have opened lines of communication and have developed joint disaster response plans.

Initiatives like the Land and Water Forum can also be prototypes for similar actions elsewhere.

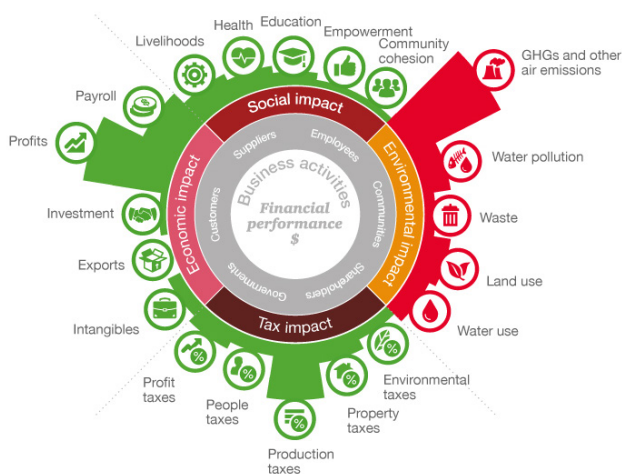
Decision making and finding optimal water solutions

It's impossible to please everyone all of the time but it is possible to identify the optimal approach to address a problem. It's a useful starting point for any discussion with stakeholders about change. PwC's Total Impact Measurement and Management approach allows impacts (negative as well as positive) to be measured and valued. So when it comes to decision making and weighing up the pros and cons of different options, it's easier to see the merits of viable options.

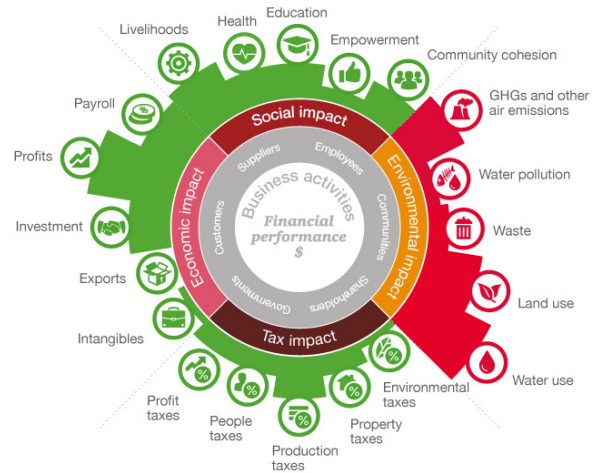
Example: A brewer is looking to expand into a new market. It could import barley or grow an alternative crop locally – the choice has significant consequences for water usage for the local community.

With a monetary value calculated and assigned to each impact, the impacts can be compared and the trade-off between decisions established. At first glance, the high water usage generated by growing the crop locally looks untenable. Water stress and scarcity drives up the real value of water. But it becomes a decision to discuss with the local community, because it's apparent that there are benefits to be had that might offset the reduction in water availability to some extent – boosted livelihoods, health, education, empowerment and community cohesion. Understanding what's important to the community and how water can be shared and distributed equitably is an important factor in the decision making process.

Option 1: Import barley



Option 2: Grow locally



Source: Measuring and managing total impact – strengthening business decisions for business leaders, PwC 2013
Find out more, visit www.pwc.com/totalimpact

Conclusion: The next steps

While New Zealand is relatively well placed to manage future water-related risks and problems, there are a number of areas and initiatives for further consideration.

Many of the recommendations of the Land and Water Forum remain unimplemented. As the output of a stakeholder-led forum, they represent the best consensus recommendations for acceptable change across the industry. In particular, it seems that eventually New Zealand will have to tackle the various difficult issues around abstraction rights, over-allocations and the pricing of takes.

More efficient pricing and charging for water could also be considered for consumers of reticulated systems. The few areas of New Zealand which have metered consumption and volumetric charging have been able to achieve significant benefits – from increased water efficiency and demand management to better understanding of the demand on their networks and more information about leakage.

There may be benefits in combining certain elements of water and wastewater provision across council areas. For example, there is some merit in trying to build on the success of Watercare, and the incremental emergence of Wellington Water, to develop other specialist water utilities, particularly in urban areas. Such structures may better enable the source of funding for future investment and renewals.

Smaller elements of provision could also benefit from sharing. Laboratory services is an area where it may be possible to improve efficiency and effectiveness, and reduce duplication, by sharing resources across providers.

Many of New Zealand's lakes, rivers, streams and groundwater areas have experienced deteriorating quality, at least during some of the recent past. Improving the quality of freshwater, particularly in areas of high abstraction, would have significant benefits both in terms of overall usability but also resilience to declining and variable supply.

New Zealand has a number of large storage lakes, both natural and man-made. However, with future weather likely to be more variable than in the past, increased storage may be necessary. Increasing transportation of water between catchments, while expensive, may also be worth considering. This includes the seemingly left-field idea of exporting water to other countries. While this may not be economically viable at present, future circumstances could change the economics.

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