Water Shortages in Queensland: Are businesses ready to meet the Challenge?

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Abstract

Water shortages are often viewed as a problem facing emerging economies, but with changes in weather patterns developed economies are discovering that the water supply infrastructure that was designed to meet their needs is failing to provide an adequate supply of water for consumers. In regions were an adequate supply of water was taken for granted households and businesses are ill-prepared to manage water shortages. Many businesses are able to manage changing resource availability however responding to changes requires that they understand the risks associated with water shortages and they have sufficient time to implement operational changes to meet the scarity of water. The paper reports on the approach taken by an association of businesses in Australia to understand and manage the risks associated with ongoing water shortages.

Introduction

Queensland, and South East (SE) Queensland in particular, is experiencing extreme water shortages. As a result of the changing rainfall patterns the water available to users in SE Queensland has been reduced dramatically. In response to the water shortages the Queensland government has intervened in the supply and regulation of water and has established the Queensland Water Commission (QWC). The QWC in conjunction with water retailers such as Brisbane City Council has instigated severe water restrictions throughout SE Queensland. The restrictions currently at the maximum level (level 6) are aimed at reducing users demand for water and to decrease unecessary water use. Until November 2007 the focus had been on the household users but as further restrictions under level six are imposed, the focus has shifted more toward business users. The additional restrictions are likely to have

significant implications for many businesses in SEQ. A critical question that needs to be addressed is; Are businesses ready and able to meet the challenge of severe water restrictions? This paper sets out to examine the issues behind the water scarcity in SE Queensland and describes a process that businesses in SE Queensland used to identify the risks associated with an ongoing scarcity of water. It also identifies strategies that businesses believe are important to assist them in managing the ogoing scarcity and associated risks.

Water and Sustainability

There has been an increasing commitment to the sustainable management and development of natural resources such as water made by governments at State and National levels in the two last decades. As Appelgren and Klohn (1999) argue implementation has often fallen short in many instances, the response has too often been the proliferation of national and international institutions. In a world with an increasing focus on sustainability, politicians have been more or less responsive to the warning signals from the scientists but in more recent times in Australia long periods of drought and major weather events have forced decision makers to consider the reality of changing weather patterns and begin to consider appropriate responses. The sustainability concept does not imply radical changes from existing economic systems. According to Appelgren and Klohn (1999) serious commitments to sustainable management and development of natural resources have been made by many governments, particularly in the developed economies in the last twenty years, but implementation has been patchy, too often resulting in nothing more than the establishment of another regional, national or international institutions. Governments, particularly in developed economies, have been more or less responsive to the warning signals from the scientists concerning the sustainability of natural resources such as water. Faced with urgent social issues such as dire short and long term water shortages, politicians become responsive to these urgent issues because they can impact on the economic security and stability of large urban communities. However as Appelgren and Klohn (1999) argue they are less interested in longer-term issues of low political currency, such as demographic growth, environmental degradation and inequity.

While there is a general consensus that population growth will place increasingly heavy demands on developing economies' water resources, there is a growing concern about the lack of practical, implementable and effective options to manage water scarcity. Fredriksen (1996) maintains that most of the solutions put forward are questionable and build on faulty assumptions. As Appelgren and Klohn (1999) argue the option of re-allocations from lower- to higher-value uses through the market ignores many social and economic realities and can lead to secondary conflicts, with a high social cost. They further argue that options promoted in industrialized economies are often too complex and costly, and imply change and stress that require a high social resource capacity. Many proposed solutions, such as reallocation of population to areas of high water supply or the transfer of water over long distances and building of very large scale storage reservoirs, require adjustments that carry too high an economic cost and may not be socially acceptable.

We are only beginning to understand some of the characteristics of water scarcity. Governments in Australia, both State and Federal, have long supported sectors and industries that are large consumers of water with little thought of the long term

consequences. In an economy that sees high rates of economic development as essential and promotes the population growth to support economic development, little consideration has been given to water scarcity. In the last ten years it has become evident in Australia that water scarcity is not simply a problem for the farm sector in periods of drought, we now understand that water resources are unevenly distributed in relation to population concentrations and the demand from rapidly expanding economic activities in high growth regions such as SE Queensland. It has become very evident that a growing regional and local scarcity cannot be addressed by conventional supply-oriented measures.

Ohlsson (2000) suggests that in attempting to find appropriate strategies for managing water scarcity we need to consider at what stage a particular country or region is situated. Ohlsson (2000) has put forward a 3 phase approach to managing water scarcity. At the first phase the problem is seen as simply a scarcity problem that can be solved by supply-side management through large scale engineering projects such as reservoirs and desalination plants or low-tech solutions such as harvesting water using rain water tanks. Ohlsson (2000) argues that these solutions often lead to second order conflicts when people are displaced by dam-building projects, and the state. At the local and regional level what is occurring is viewed as environmental scarcity. This scarcity is seen as the result of demand-induced scarcity as a result of an increasing population needing more water and supply-induced scarcity as changing climate and weather patterns lead to rivers running dry, lowered water-tables.

In the second phase the problem is perceived as finding the mechanisms and social constraints, which encourage and enable the communities and individuals to reduce and manage an absolute scarcity, reappearing at a time when supply-side, large-scale engineering solutions no longer suffice to increase the available amount of water. The solution is to save water by doing more with every drop, that is, end-use efficiency, and the first stage of demand management. This can be achieved by an institutional framework that is changing rules and regulations, administrative bodies, and economic incentives and disincentives, aimed at bringing about water-efficient usage. In this phase water scarcity now becomes relative, since the available amount of water depends on the willingness of individuals and communities and the economic rationality of employing more labour and technology-intensive, but less water-consumptive modes of production including , recycling of waste-water, and water-efficient appliances and techniques.

In the third phase economic disincentives for water-wasteful production raises the issue of the second stage of demand management, namely allocative efficiency. When allocative efficiency is seen as the next logical step stakeholders argue that there is a need to maximise the economic return of every drop of water available within the region or state. So we find powerful pressure groups arguing that every effort needs to be made to redirect water to cities and industries, where the highest economic returns to water are available. At the same time many sectors such as agriculture and low return manufacturing such as food processing are placed under pressure to move to regions if not other countries where the cost of water is low. It is argued in this paper that SE Queensland is on the verge of phase three and it essential that industry as a critical stakeholder needs to understand the risks inherent in moving to an allocative efficiency model and the need to take a proactive stance in the management of water in SE Queensland.

The South East Queensland Water Scarcity

Water use in the SEQ region is dominated by residential users (76%) with light industry (4%), heavy industry (4%), and commercial users (7%) at the relatively small users level. However, at the state level the agricultural industry is the main water user consuming 12,191 GL per annum, (65% of the total use in 2004-05). Most of this water is used for the irrigation of crops and pastures. Households are the next biggest user, at 2,108 GL (11% of total use). By comparison, manufacturing and other industries use a relatively small volume of water (1,648 GL 8.8 %), as do the mining (413 GL 2.2%) and forestry and fishing industries (51 GL 0.2%). Water supply and demand is not evenly spread throughout the State and while there has been a focus on water use efficiency in SEQ there is unlikely to be any real exchange of water between users across sectors or regions. There has been some discussion but little investigation into the transfer of water from irrigation users in neighbouring catchments to domestic and business users in areas of high population density. There is, however, little real opportunity for such transfers to occur in the short term.

Any transfer of water from irrigation to domestic and industrial users would be strongly opposed as agribusiness contributes significantly to the Queensland economy. It is expected that any attempt to move to a water allocative efficiency approach and reduce the water allocation to the agricultural sector and transfer this water across adjoining water sheds to service the SEQ urban needs will have a significant flow on effects for many businesses in South East Queensland. Irrigated produce was estimated to have earned Australia around $9 billion in 2003-04 (about a quarter of the gross value of all agricultural output). About half of this came from irrigated horticulture, and a quarter from both irrigated pastures and broadacre crops. A recent survey by the Australian Bureau of Statistics (2003-4) revealed that on average, irrigators earned $220,415 per farm. Irrigated pastures earned just $152,539 per farm, while cotton farms earned an average of $1,264,716 (note that cotton farms are often larger holdings/businesses). It should be noted that these figures are for the gross value of irrigated product (GVIP) only and do not account for other sources of property income. (Australian Water Association 2007).

The Future of Water Supply

Due to the changes in the dynamic of water supply, demand and climate change, industries in SE Queensland are at a crossroad in terms of water reliability and cost. To ensure their long term survival businesses need to understand the new water supply dynamic and plan for a future that involves reduced availability, increased competition, increased cost and new and emerging policy frameworks and institutional arrangements that potentially will include cap. This is not unique to SEQ as Australia as a whole has experienced significant changes in weather patterns resulting in less rainfall, significantly reduced runoff and a decrease in reliability of supply in critical catchments. Evidence (see Beare et al., 2002,Jones et al., 2002 and Wright & Jones 2003)of this is reflected in the challenges facing the Murray Darling, Perth, Adelaide and Sydney water supplies.

The Bureau of Meteorology have mapped the changes to the long term moving average rainfall across Australia over the past 50 years(Gallant et al 2007). The trend evident from these historical rainfall figures reveals a decline in rainfall of 50mm per

decade or 250mm reduction in the long term average rainfall to date. The predictions are that this trend will increase and there is no current scientific evidence that it will change in the immediate future. The trend shows an escalation in the rate of change if the last 30 years is considered. So regardless of the causes of this decline, businesses whether, agricultural, industrial or commercial must learn to operate with a declining water supply. The impact of this decline in rainfall on runoff and stream discharge indicates up to a 50 % reduction in dam inflow rates (Figure 1). It should be noted that the short time line of the data set available for the SEQ catchment limits the confidence in the interpretation. However the evidence from longer records, such as many of the catchments draining east of the Great Divide, displays a similar percentage reduction (i.e. >50%). Of note is that the larger catchments such as the Fitzroy and Burdekin Rivers which cover many thousands of square kilometres this trend is not as evident from the data available at present. However, the trend over the last fifty years has seen all of the east coast of Australia receive less rainfall.

There are no options to wait and see what will happen; SE Queensland is not expected to have a sudden improvement in long term average rainfall that will maintain the supply in the existing or planned reservoirs. The predictions for the future are that in SEQ rainfall will increase in variability (extreme storm and drought events) with an ongoing decline in the long term average. Some of the extreme rainfall events will provide major inflow into the storages but this is expected to be highly unpredictable and not a reliable source of supply. The projected increases in temperatures are expected to compound the problem with increase rates of evaporation and greater demand for water for irrigation and domestic usage.

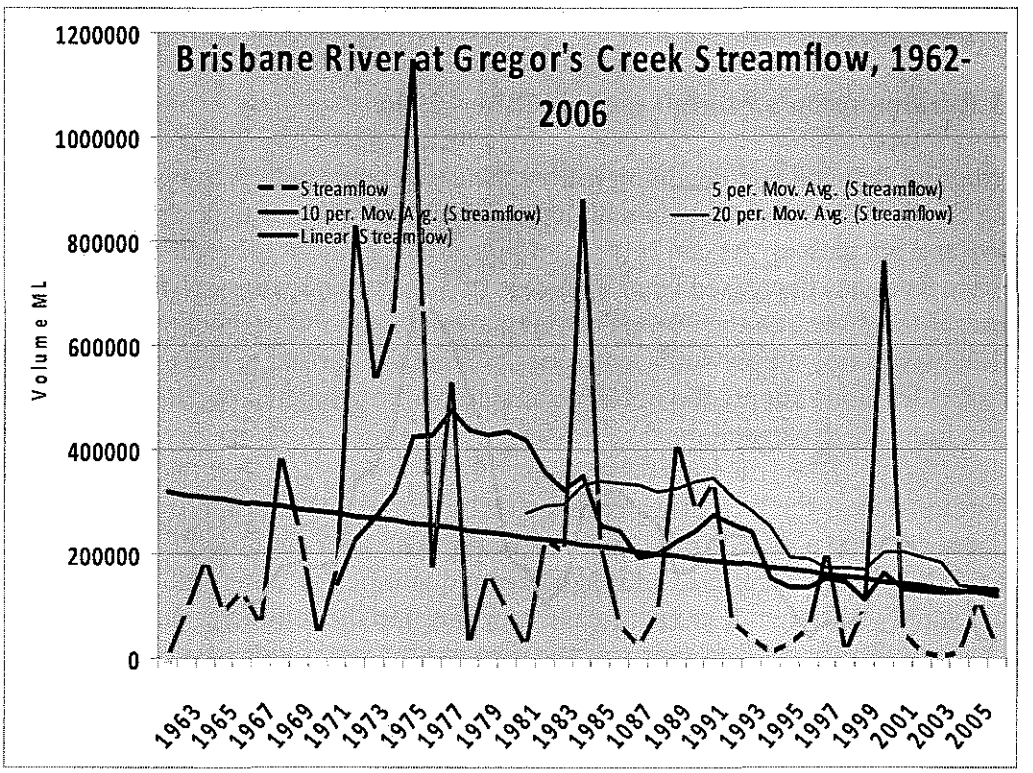

Figure 1 Stream-flow Brisbane River 1963 - 2006

Of note is that while the eastern coast of Australia has received significantly less rain over the last fifty years this trend is not just a recent one. As an example the annual rainfall in Rockhampton has declined from around 1100mm per year to around 700mm (figure 2). While this is one of the more dramatic examples of rainfall decline, similar trends are evident across the entire eastern seaboard of Australia. The effect of this decrease in rainfall has been mostly felt in the high population growth regions such as the Gold Coast, Sunshine Coast and Brisbane. In these regions demand is outstripping supply. There is no evidence that this trend will not continue.

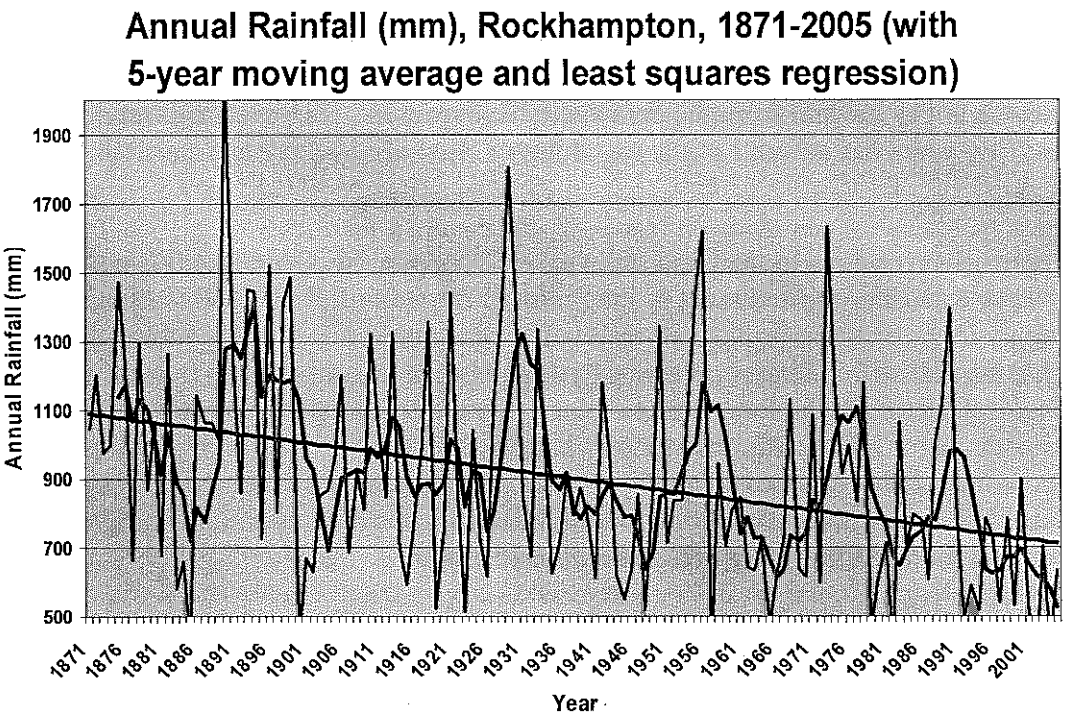

Figure 2 Rockhampton's rainfall records 1871 – 2006

With increasing demand and declining inflow the catchments and river systems supplying South East Queensland can no longer meet the needs of the existing population and businesses. As can be seen in Figure1the amount of water that flows in the Brisbane river has decreased from in excess of 32,000+ megalitres to less than 16,000 megalitres based on the 20 year moving average. On the basis of this trend the stream flow would not supply sufficient water to meet the current needs of the existing users let alone supply the needs generated by the projected population growth and related industry expansion.

In an effort to address the lack of water in the short term the Queensland government has set about creating a water grid to provide water to all users in South East Queensland. While the water grid adds significant quantities of water into the South East water supply (through desalination and recycling) in the long term these inputs will not make a significant difference, as the demand for water increases and the supply continues to be limiting. The cost of supplying water using recycling and desalination is greater than the current costs of supply from rainfall.

The Price of Water

Householders in Australia pay anywhere from 50c to $1.70 for a kilolitre (1000 litres – a tonne) of water. At an average selling price of about $1 per kilolitre, most water suppliers (councils or water authorities) are able to stay in business. However many water authorities don't make enough profit to maintain or replace old infrastructure. At about $1 per kilolitre the traditional mains water supply in towns is far the cheapest product available and represents a very low input cost to most users. As such not all water users pay much attention to how much they use. The price of water in Brisbane is also relatively cheap (Brisbane City Council 2007) and there is no significant difference in the price charged to domestic and commercial users. Domestic users are charged $1.19 for the first 255 kl used and $1.69 for each kilolitre above 310. Commercial users are charged $1.29 for the first 200kl and $1.74 for every kilolitre above 300 (references). In 2004-05 the average domestic users used 324 litres per person per day and in 2006-07 this had reduced to 219 litres. In the same period the average non-domestic user in Brisbane used 5,149 litres per property per day and this decreased to 3,191 litres. So in a 3 year period domestic users have reduced their consumption by 32.5% and in the same period non-domestic users have decreased their daily consumption by around 38% (Australian Water Association 2007).

With the advent of desalinated water and water recycling the price of water will increase. The cost of desalination varies depending on the size and site of a plant and the technology used. A major cost in desalination is the energy used and it is likely that the cost of energy will increase over the next 10-20 years adding to the existing cost of desalination. In small plants producing 200 kL/day Burne (2005) estimates the cost would be $1.25/kL. This estimate is derived from operational and maintenance costs of $90,000 per annum. If the set up costs are included - estimated at $500,000 then the total cost is $2.21/kL over the 20 years operating life of the plant (Burne 2005). Larger plants are more costly to operate and establish. The cost estimate for a 500mL/day plant in Sydney was $2,510,000,000 for a desalination plant and $3,845,000,000 for a recycling plant. Sydney Water (SW13403/06) estimated the operating cost at $165 million a year for desalination and $175 million a year for recycling. The SE Queensland plant has an estimated operating cost of $351 million over 10 years (Stolz, 2007). The proposed cost for the desalination plant was estimated at $1.3 billion and $1.7 billion for the recycling plant. These costs do not include the cost of distribution.

Any increased cost in supply are expected and required under Council On Australain Government (COAG 2004) water reforms to be past on to consumers. Of note however is that the price of water in the short term is not likely to increase substantially with a recent commitment by the Queensland Government to reduce the potential impact of proposed rises to 4% return on investment extended over 10 years as opposed the to projected 7% return in 5 years. Hence while the cost of water to most businesses will be expected to rise moderately it is still most likely to continue to be a relatively minor input when compared to other inputs such as raw materials and labour.

As the price of water increases people and business are expected to be more conscious about how much water they use (and so conserve water). If price reflected the real cost of water then water businesses would be able to invest more in replacement programs; and more environmental protection activities could be funded from profits.

While this is the position of the QWC and required under COAG National Water Reforms, the Queensland Government has committed to cap this to 4% over ten years. This is expected to be the position for the immediate future.

Given the current hydrological and infrastructure limitations to water supply in SEQ, if the region is to have a sustainable supply of water, that allows for ongoing economic growth, then governments will have to invest significantly in water infrastructure particularly desalination. The cost of water supplied through desalination will increase the price of water in the short term. According to Barron (2005) feasibility studies for a large-scale seawater desalination plants, have estimated the cost of production for up to 80,000m3/day at a price of $1.2-1.3 /m3 (current production cost at Tampa Bay in the USA are $0.52/m3, and $0.60/m3 at the Ashkelon plant in the USA). However the existing desalination plants in Western Australia produce potable water at much higher cost, which is partly due to their low production rate. The cost at Ravensthorpe (capacity 180m3/day, BWRO) is about $6.5/m3 ($4.0), Denham (capacity 265m3/dayBWRO) - $5.0/m3 ($3.08), Rottenest Island (capacity 200m3 /day SWRO) - AU$4.0/m3 ($2.46). The Water Corporation of WA suggest that there is a potential for desalination techniques for water supply in Australia, which will become increasingly competitive with the natural water sources within next 20-30 years.

Water Demand and Economic growth.

Australia's total water consumption, per head of population, amounts to about 3000 litres (3 kilolitres) per day. Of that, two thirds is used for irrigation; the next biggest user is households, which take up 11.1%. Industry comes way behind that, taking up just 3.1% of the water for manufacturing and 5.6% for other industries. From the 1980s, most water authorities and local councils began charging wastewater discharge tariffs on industries; usually based on a combination of the volume discharged, and the contamination load. This persuaded factories to use less water; the result is that many Australian businesses are now world leaders in water efficiency. For example, Yatala Brewery in Queensland uses about 2.2 litres of water per litre of beer brewed compared to a typical world figure of more than three litres per litre. Twenty years ago, a brewery would use between five and eight litres per litre (Australian Water Association 2007).

However the current government thinking does not see water pricing as an effective mechanism for controlling water use, so in the short to medium term it is expected that there will only moderate increases in the price of water to either business or domestic consumers. The current policy is that Governments intend to use education and water restrictions to force consumers to become more efficient consumers of water.

Of note is that the primary driver of economic activity in Queensland is household spending (OESR 2007). Household consumption rose 0.7% in June quarter 2007, following growth of 1.8% in the March quarter 2007 (the strongest quarterly growth since June quarter 2004). Household spending is underpinned by investments in housing which was 10.6% higher over the year to June quarter 2007, with both new and used dwelling investment up 8.5%) and alterations and additions activity (up

13.2%) recording strong annual growth. For the SE Queensland economy and business to grow they are dependant upon a growing population as household spending and investment in public infrastructure to meet the needs of a growing population are the 2 key drivers of economic growth (OESR 2007). As can be seen in Table 1, the population in Queensland is growing at a much faster rate than predicted in 2003 and the total population is expected to increase by almost 700,000 by 2026. This population increase will place severe strain on the existing water supply across Queensland.

Table 1: Projected population by statistical division (a), Queensland, 2006, 2016 and 2026 (b) (comparison of 2003 and 2006 projections)

Statistical division	2003 projections			2006 projections		
	2006	2016	2026	2006	2016	2026
	— number —			— number —		
Brisbane	1,816,561	2,077,562	2,292,371	1,844,606	2,196,754	2,533,359
Moreton	855,615	1,089,450	1,312,959	839,316	1,072,868	1,310,539
Wide Bay-Burnett	261,945	309,408	358,111	263,211	305,857	352,565
Darling Downs	220,256	238,872	257,485	225,994	251,277	274,629
South West	26,723	27,044	27,636	26,950	27,082	27,705
Fitzroy	191,659	212,064	234,601	191,959	218,671	248,403
Central West	12,089	12,000	12,215	12,135	11,948	12,233
Mackay	147,660	163,827	180,973	150,978	183,433	207,419
Northern	205,170	231,784	257,590	209,763	242,301	264,834
Far North	245,033	282,264	320,802	242,099	278,463	317,234
North West	33,010	33,506	34,284	34,356	34,753	35,036
Queensland	4,015,722	4,677,780	5,289,027	4,041,368	4,823,408	5,583,956

Source: Queensland Government Population Projections, 2003 edition

The areas of greatest growth in Queensland and indeed Australia are in SE Queensland. Brisbane and the Gold Coast are the two top local government areas (LGA) of population growth with both LGAs increasing their population by more than 13,000 people. Four other LGAs in SEQ are in the top fifteen growth areas and contributed an increase of over 15,000 people to the region in 2006.This combined with increases in overseas tourism (Brisbane and the Gold Coast have 50% of the overseas tourists visiting Queensland) means that there is a growing demand for water. With unemployment at a low of 3.5% the SE Queensland needs a growing population to ensure business have an adequate workforce and to continue to fuel household spending and consumption. In the short to medium term governments will continue to support and indeed encourage immigration to SE Queensland.

Methodology

According to Gregor and Keeney (1994) many important public decisions are viewed as controversial because they require difficult tradeoffs among the objectives and values held by different stakeholders. Such tradeoffs are not easy to achieve, because they require giving up something that is seen as important or valuable. These decisions are complex because of differing views of stakeholders about the critical objectives and their relative importance. As a result of public scrutiny and media attention, decisions that once were discussed behind closed doors now are debated in the public domain and in the media, and decisions that once were made on an ad hoc

basis now must be defended with reference to explicit criteria and a logical approach. An increasingly important area for decision-makers involves choices between business, community, economic and environmental objectives. These decisions are often controversial because of what appears to be sharply conflicting opinions about the economic impacts on businesses and environmental effects on the communities, and increasingly in the case of water scarcity, the social implications of the current options. The adversarial tone of many debates and the emotional nature of the information has confused the decision-makers, alienated the public, and encouraged a lack of trust in both the analysts and the managers participating in the public decision-making process.

Tradeoffs between economic and environmental objectives are present in significant public decisions that, by their inherent nature, are of interest to a diverse set of stakeholders (Wathern 1988). These stakeholders need to be involved in the decision process, because they will be among those affected by the policy directions, and the outcomes of these policies To be most useful, Gregor and Keeney (1994) argue that stakeholders should have substantial early input, helping to specify and guide the entire decision process as well as identifying objectives that should be considered. They (Gregor and Keeney 1994, 1036) have used three interdependent steps to structure a decision with stakeholders. These are
(1) setting the decision context,
(2) specifying the objectives to be achieved, and
(3) identifying alternatives to achieve these objectives.

Using Gregor and Keeney's (1994) three steps we set about engaging with stakeholders in the decision making process. The decision context in this study was set by an industry body making the decision on behalf of its members. Following Gregor and Keeney's (1994) work it is important to ensure that the decision context is broad enough so that most stakeholders can agree on the context. Once there is a satisfactory level of agreement on the context the researchers need to work with stakeholders, in this case the industry body, to specify the objectives to be achieved. These objectives then need to be modified if needed and agreed to by the decision makers and in this case, this was achieved at the start of a workshop. At the start of the workshop all stakeholders were able to add their own objectives and no priority was given to any one objective enabling all stakeholders to agree on the fundamental objectives.

Next, the stakeholders identify alternatives using a set of scenarios as resource and stimulus material. Participants were given three scenarios and discussed the implications and likelihood of each scenario. The critical outcome of discussing the scenarios was a shared understanding of the water scarcity problem and what that meant for commercial and industrial water users in SEQ. In order to identify alternatives to achieving their agreed objectives participants engaged in a risk assessment and evaluation of how to manage the uncertainty of climate change. The framework used for this assessment was the AS/NZS 4360 risk management framework. This is a an internationally recognised approach to managing risk and exposure to future possible events based on likelihood and probability. Participants were allocated into 5 groups of 5-6 people and asked to achieve the following:

1. Define the risk
2. Prioritise the Risks
3. Select the response and adaptation measures, and
4. Develop an action plan

Results

Knowledge, information and communication

The workshop participants firstly considered and debated their own level of knowledge, the information they had to hand and the adequacy of the communication from Government. In areas that they felt that the adequacy of their knowledge and their general awareness was insufficient for business decision making [this sentence needs rewording]. They felt that on many issues their knowledge was incomplete, inadequate with a high degree of uncertainty provided by Government. In addition they were confronted with very short timeframes to respond to Government change in policies and strategies and this impacted heavily on their business. The participants also very clearly felt that government did not completely understand the implications for business of implementing the relevant measures and had made very little effort to engage business effectively in the debate. From a business perspective decision-making was made on the run and business was left to respond in unrealistic time frames as there were many external factors which influenced operations and these had not been considered.

Plans and Strategies

Plans and Strategies to manage climate change impacts were also considered. Business felt that when given the right information and lead time and an effective policy and institutional setting along with realistic and effective engagement, there were a range of potential solutions that business could take to manage with or militate against the exposure and risk. Such ideas for development and consideration included:

- The adoption of new technology and process modification
- Changes to the product mix
- Relocation where accommodation of the needed changes proved difficult or resulted in a loss of competitiveness in the market place
- Alternative water supply strategies for the short term and medium term such as trucking of water, installation of water tanks, upgrade of facilities to achieve greater water use efficiencies and water reuse
- Switching from manufacturing to retailing
- In changing the product mix consideration which could include the purchase of inputs or products from other locations
- Business could consider closing certain water-intensive operations and focus on other areas of the business where production systems permitted such strategies

Improving Design and Practice

Improving design and practice in their business was also considered and suggested strategies for the future included co-generation at the local level, improving energy efficiency and water efficiency, reviewing operations, seeking cost efficiencies and the recycling of waste water. All these strategies had implications that in most

instances were beyond the total control of the business and required some partnership approach with Government.

Diversifying, spreading the risk, mitigation

Diversifying and spreading the risk, mitigation was dependent on a partnerships approach with Government that included sufficient lead time to respond in an informed way. Planning certainty was a critical issue confronting all business and seen as the single biggest impediment and blockage to change that confronted business. Industry felt that there was an urgent need for Government to address this to enable them to get on with the business of doing business. Planning certainty was needed to help mitigate the risk.

Other risk management strategies included moving production offshore if necessary (which had a risk of reverse engineering), outsourcing, relocation, adjust production processes/product mix and having contingency strategies in place to obtain materials from overseas if necessary

Structural and policy and adjustment issues

There were a number of core structural and policy issues that had not been adequately considered by Government from a business perspective. These included the impact of water shortages and increased pricing on small business including loss of competitiveness in the market place and the loss of market share to competitors due to short term disruption or loss of supply. Questions were also raised as to how much certainty could be bought by investing in infrastructure and what was the real cost of this capital investment and the amortisation of this infrastructure through time. Who will eventually pay the true cost including the environmental cost? The questions were asked about business segmentation and how the needs of the businesses differed and how should these be accommodated. For example, for some businesses security of water supply is a critical issue (namely guaranteed water supply) on other fronts it seems that the debate about future cuts given the small quantity that industry uses is a political issue of residential verus business supply. Other consideration includes the capacity of small business to adjust to the expected or desired changes as opposed to the capacity of the larger business to adjust particularly where infrastructural investment is required.

The questions was also raised as to the need to assess the fit of the business relative to the capacity of the supply to meet the market (public and industry) demand in terms of volume and reliability of the catchment or supply source yield in the short medium and long term and the potential considerations in terms of structural adjustment. In other words what is the realistic demand and supply relationship for the region? If business were required to relocate due to loss of competitiveness, reliability of supply or sheer demand relief what policy and structural arrangement should be considered.

Risks and exposures identified by business

There were a range of identified risks that were regarded as having an almost certain probability of occurrence. With a limited supply and expected and projected climate change impacts, cost of water could be expected to rise. Many felt that this could be as high as six fold increase based on the CSIRO projections. Few were able to see how the infrastructure investment costs could be met, particularly given the water reform agenda and the intent to realise full cost recovery. With an aging

infrastructure problem that the SEQ is experiencing this was seen as an highly probable expectation. The effect of this on business operations is seen as a substantial impact on production costs and market place competitiveness. Concurrent with the expected rise in cost of water was an expectation that all business would have some form of statutory or regulatory obligation to achieve best practice. Inherent within this requirement will be a significant cost in changing practices and or production systems for some industries. Recycling and water reuse was regarded as almost a certain requirement into the future. The cost associated with such a move was seen as a significant likely cost for most businesses. Cost of adopting and complying with the WEMP were regarded as moderate and of high probability. In most respects the most probable changes were all expected to have a moderate impact on business and would result in some loss of competitiveness in the market place from products sourced from areas without the same restrictions.

It was seen as likely that with ongoing water restrictions and increased costs that it was likely that the cost of the supply of energy could be expected to rise. Any losses due to energy failure or water supply interruptions were likely to impact on some industries in terms of production costs and loss of market share. Such increased costs and supply uncertainties were likley to result in some stranded assets or losses of product quality through time. These were expected to have a moderate impact on businesses in SEQ.

Given supply restrictions and climate change forcasts it was expected that there could realistically be a possibility of loss of supply to some sectors. This was regarded as catastrophic. Impacts could include loss of contracts through to business failure and or declining profitability or loss of product quality and market share.

Key findings

Potential impacts on core functions

The participants of the workshop were asked to sumarise what they regarded as the key impacts that needed to be considered by the business sector, Government and the Community. Consideration was given to Economic, Community and Lifestyle, Environmental impacts, Financial and Legal Liability, Essential Infrastructure and Safety.

Economic development perspectives

From an economic perspective issues were summarised as increased input costs, risk of staggered supply, competitive disadvantage or costs passed on and sunk assets (stranded) makes relocation problematic. Strategies to offset these impacts included increased outsourcing/off-shoring and the need for realistic timeframes for adjustment. Many recognised that operating costs would increase but that many had limited ability to pass costs on to consumers as there was easy substitution from interstate and overseas suppliers.

There were also a number of recognised opportunites to come out of the changes but for these to be realised a strong partnership approach was required with Government. Opportunities included improvements to industrial ecology and the possibility of partnership agreements for waste water. This requires a well considered policy

response from government on a number of these issues. At a general level the question of whether water pricing was in fact a suitable mechanism to control water usage and achieve the best outcomes for the long term was raised

Community wellbeing viability and lifestyle considerations
For many the prospect of having to move to other regions was real and for many given the breadth of the challenges in water supply on the eastern seaboard of Australia the question was posed as to where do we move to? Questions that need to be answered included the risk of staff loss, logistical issues, public perception and the ability to attract and retain staff and achieve synergy through clustering. It is clear that the major impact of the loss of any business to a region was the consequent reduction in employment prospects and the subsequent decrease in the liveability of the affected community. Clearly the issue of livability within a community had to consider the cost and access to water and the competition for water. The challenges represented major concerns for lifestyle, livability and the aesthetics of the region.

Environment
Enviromental concerns included the recognised need to maintain stream and aquatic ecosytems and the competition for water that this would bring. In addition some of the positives included the improvement in industrial ecology and reduced environmental footprint for some industry sectors.

Financial and legal liability
Financial and legal liability considerations needed to be factored into the debate. Included within these areas were the contractual issues, legal and health issues associated with the use of recycled water issue and the direct management of risk and uncertainty for contracts and compliance.

Essential Infrastructure
Essential infrastructure concerns include the lack of clear policy statements and strategies to address concerns over the reliability of supply and the recognised need of what was the definition of minimum flow for a sewer system as well as the real cost of realising improved water use efficiencies and the cost benefit anlaysis infrastructure needs to realistically achieve this.

Safety
The only direct safety need identified was the risk of using recycled water and the consumer acceptance of this. A wide range of health and occupational safety issues related to the wider debate of climate change were also recognised but will not be dealt with here.

Conclusions
Businesses in South East Queensland recognise the need to effectively manage water resources. Dramatic reductions in the available supply of water have lead to the introduction of water restrictions which have had significant impacts on some businesses. Most business in SE Queensland have responded to the water restrictions in a positive way and have reduced their water consumption and put in place plans and actions to reduce water usage. However there is still a lack of awareness amongst businesses of the potential long term impact of ongoing water shortages. Given the

increasing demand for water in SE Queensland driven by population growth it is almost certain that industry will have to learn to live with a reduced availability of cheap water. While it is acknowledged that the State government has put in place an infrastructure plan for water recycling plants and desalination plants to augment existing supplies, it is unlikely that the current planned supply will meet the demand created by a growing population and increased economic development.

If businesses are to survive and thrive in SE Queensland and compete effectively with businesses located in regions with an adequate supply of water they need certainty. Businesses, particularly large water users need certainty in the supply of water and some guarantees that they will have ongoing access to trade waste disposal. Given sufficient time business can react to change and adapt their processes to a reduced water supply environment. However large facilities such as process manufacturers need time to alter their processes and introduce water efficient technologies. Business cannot respond overnight or in the short term to reductions or stoppages in water supply. While there are short term strategies such as, water re-use, desalination and transporting water by truck that can allow businesses to continue to operate these are not sustainable in the long term. Long term water shortages and uncertainty of supply will force some business to actively consider, purchasing inputs and products rather than manufacturing, closing water intensive parts of operations and in extreme cases relocating their operations interstate or offshore. These reductions in capacity will have significant impacts on the economic growth of SE Queensland and in some cases will expose the Queensland economy to risk as essential suppliers relocate their facilities offshore.

Some SE Queensland business that cannot respond or meet the requirements for reduced water use will go out of business. SE Queensland is not isolated from the rest of Australia. Many businesses are competing with operations in northern NSW who have certainty of supply and are better able to compete as they are not forced to meet the additional costs of water efficient systems and technologies. State and Local governments need to recognise the demands they are placing on Queensland businesses and the impact these demands will have on the competitiveness of many businesses. While in the short term the State government has limited the level of costs of additional water infrastructure that are past on to businesses, these additional costs will have an impact. Major water users and those with significant levels of liquid trade waste will in many cases have to absorb any additional costs as they will be unable to pass these costs on as they will lose customers. By absorbing additional costs this will put strains on the businesses concerned and will impact on their competitiveness. Additional costs include the costs of compliance with WEMP and the costs of attaining a best practice position.

While the additional water infrastructure delivers some relief the use of recycled water will have an impact on businesses in sectors such as food and beverage and may have an impact on businesses supplying to the hospital and the medical sector. Regardless of the quality of recycled water in Queensland there is a perception amongst consumers that recycled water is not the same quality as water from existing reservoirs. Also current regulations will limit the use of recycled water in some food products. If food and beverage manufacturers in SE Queensland are required to use recycled water to achieve world best practice this will affect their market share and the sustainability of their businesses. Many businesses supply products that are easily

substituted by products manufactured in other States and overseas if these businesses have a weak competitive position then they will be at risk if added compliance costs cannot be passed onto consumers. Some large water users have invested heavily in assets and to upgrade or in some cases replace these assets will be extremely difficult. The nature of these assets means that they are not easily relocatable to regions with a reliable water supply, if this is the case these firms need time to recover the cost of their assets and to find additional capital to invest in water efficient technologies.

There are three critical issues for businesses in the current water supply environment in SE Queensland. The first issue and the most critical is certainty and reliability of supply. For businesses to survive and invest in growth in SE Queensland they need to be assured that water will be supplied when then need it in the quantities they need and at the quality that meets consumers expectations. The second issue is time, businesses need time to adjust to changes in supply that will impact on the day to day running of a business operation. Given sufficient time most business are able to adapt to changes in the supply of resources, with sufficient time they will improve processes, upgrade systems and purchase new water efficient technologies. In time they will become world best practice users of water but the time needed for this will vary from sector to sector and business to business. Some businesses in SE Queensland are all ready on the path to best practice and they should not be penalised for being proactive. Other businesses have not started down the path to improve their water use efficiency often because they are not sufficiently aware of the gravity of the situation and simply waiting for the drought to break and damns to fill. Business need to be made aware of the long term problem and assisted to find water efficient solutions. This leads to the final critical issue, which is cost. Businesses have to invest in water efficient solutions and compliance with government regulations, if this is part of doing business and managers can factor this into their budgets then they will survive. If costs escalate or rise rapidly many businesses will fail or will move to regions that can supply water at lower costs, or they will shutdown the water inefficient parts of their business and source the products elsewhere.

So it is important for business and the economic prosperity of Queensland that government and the QWC genuinely engage with industry to ensure the risks and impacts of water shortages are understood and minimised. Communication needs to occur in both directions, government needs to talk and listen to industry and industry needs to talk and listen to government. A framework needs to be put in place that enables industry to plan for a future where water is no longer a cheap readily available resource that can be squandered, but a future where there is a level of certainty of supply for business and an economically realistic cost that allows SE Queensland water smart businesses to remain competitive.

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