

# Community Perceptions of Risk, Trust and Fairness in Relation to the Indirect Potable Use of Purified Recycled Water in South East Queensland: A Scoping Report

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The Urban Water Security Research Alliance (UWSRA) is a \$50 million partnership over five years between the Queensland Government, CSIRO's Water for a Healthy Country Flagship, Griffith University and The University of Queensland. The Alliance has been formed to address South-East Queensland's emerging urban water issues with a focus on water security and recycling. The program will bring new research capacity to South-East Queensland tailored to tackling existing and anticipated future issues to inform the implementation of the Water Strategy.

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## FOREWORD

Water is fundamental to our quality of life, to economic growth and to the environment. With its booming economy and growing population, Australia's South-East Queensland (SEQ) region faces increasing pressure on its water resources. These pressures are compounded by the impact of climate variability and accelerating climate change.

The Urban Water Security Research Alliance, through targeted, multidisciplinary research initiatives, has been formed to address the region's emerging urban water issues.

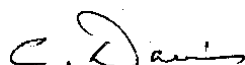
As the largest regionally focused urban water research program in Australia, the Alliance is focused on water security and recycling, but will align research where appropriate with other water research programs such as those of other SEQ water agencies, CSIRO's Water for a Healthy Country National Research Flagship, Water Quality Research Australia, eWater CRC and the Water Services Association of Australia (WSAA).

The Alliance is a partnership between the Queensland Government, CSIRO's Water for a Healthy Country National Research Flagship, The University of Queensland and Griffith University. It brings new research capacity to SEQ, tailored to tackling existing and anticipated future risks, assumptions and uncertainties facing water supply strategy. It is a \$50 million partnership over five years.

Alliance research is examining fundamental issues necessary to deliver the region's water needs, including:

- ensuring the reliability and safety of recycled water systems.
- advising on infrastructure and technology for the recycling of wastewater and stormwater.
- building scientific knowledge into the management of health and safety risks in the water supply system.
- increasing community confidence in the future of water supply.

This report is part of a series summarising the output from the Urban Water Security Research Alliance. All reports and additional information about the Alliance can be found at <http://www.urbanwateralliance.org.au/>.



**Chris Davis**

Chair, Urban Water Security Research Alliance

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## EXECUTIVE SUMMARY

This reports the latest stage of research in the *Systematic Social Analysis Project* in the Urban Water Security Research Alliance. The research concentrates on the introduction of the Purified Recycled Water (PRW) scheme in South East Queensland (SEQ), due to be operational by the end of 2008. It has as its first objective:

*to identify and provide a baseline measurement of the psychological drivers of the community's intended behaviour in relation to drinking water that includes PRW added to Wivenhoe Dam to provide for the informed design of community engagement and education, and the monitoring of any shifts in community attitudes, values and intended behaviours over time and with increased experience.*

The project's baseline measurement and modelling in late 2007 (Nancarrow et al. 2007) identified the key drivers of people's intended behaviour in relation to drinking PRW added to the drinking water supply. The aim of this stage of the project is to gain a detailed understanding of the community's perceptions in relation to the key behavioural predictive variables with the intention of providing a basis for ongoing research in the key areas of risk and fairness. This is to ensure that the implementation of PRW is informed by sound social-scientific knowledge of the SEQ community and is responsive to its needs. It was also intended to identify any priority issues for the Queensland Water Commission's (QWC) communication and community engagement program.

While the majority of the report outlines the key issues raised by the community at a series of workshops, it also attempts to use the scientific literature to:

- investigate why people may be thinking in the ways they are;
- provide explanations for the links and overlaps that seem to be emerging between the key variables; and
- provide direction for the ongoing research.

A total of nine community workshops were held throughout SEQ in early December 2007. Attendees were recruited by telephoning random community members and previous behavioural survey respondents. The attendees appeared to roughly reflect the proportionate views of support for or concern about PRW in the wider SEQ community. The workshop discussions provided a richness in detail and understanding of community members' issues and concerns associated with PRW. This was particularly so on issues of risk and fairness, which is more clearly defining and guiding the next stages of research. Greater insight into the role of emotion was also gained.

With the purpose of the workshops being to explore the *range of issues* associated with the key predictive variables of the behavioural model, the report outlines people's thoughts, perceptions and concerns and no attempt has been made to verify the factual nature or otherwise of what was said and there has been no analysis of frequency of comments. The content does not reflect the authors' views, but it is important to record the issues and sentiments as they were portrayed.

While most participants supported the PRW scheme, this support was generally cautious, and reflected feelings of the inevitability of PRW in the face of the water crisis. As identified in the behavioural survey, system risk and its influence on health risk is a major concern for the community. It is essential to develop an informed basis from which the community and technical experts can communicate and discuss these risk issues, and cultivate a trusted dialogue and relationship into the early stages of the implementation of the scheme.

Feedback from participants indicated that many felt that there was little detailed information readily available to them on the PRW scheme. Many participants expressed satisfaction with the expert information on the scheme that was provided at the workshops. It was generally observed that participants appeared more confident with the scheme after the water quality expert explained the seven barrier treatment process that will be implemented to treat the recycled water.

Also identified in the behavioural survey was the interrelationship of the key variables: trust, risk, fairness and emotion. The data and analysis here confirms this, and also shows how emotion is a pervasive influence, which may become more dominant as the scheme implementation draws closer.

People expressed a need for more readily available information on the PRW scheme. Although a lot of information has already been provided by the QWC, it was evident that many participants were unaware of this. People requested information on the details of the scheme, such as: its seven barrier treatment process and how it will overcome health risks; how the Water Grid and the infrastructure will operate; what happens when the dams are full; what will the costs be and who will pay, etc.

From discussions, it was apparent that people wanted information in their communities which was more personalised, hands on, and “living”, so they had a good understanding of what was going to happen and how, and they’d have the opportunity to ask questions. Methods included: interactive and moving displays in shopping centres such that people can see and touch; an easily accessible information line; and a You Tube video of the Singapore information centre. It was emphasised that different levels of detail and technicality were required to meet the needs of all in the community.

# 1. INTRODUCTION

A wide range of challenges are evident for water management in south east Queensland (SEQ), and with this in mind, the Urban Water Security Research Alliance was formed. This provides the basis for the collaboration and integration of effort between scientists in Queensland Government Departments, CSIRO, The University of Queensland and Griffith University. Working in concert with the Queensland Government, the science can be tailored to meet the needs of Queensland’s long term future.

A key area of the science in the Alliance is the *Systematic Social Analysis Project*, as a part of the *Informed Decision Making Program*. Its primary objective is:

*to develop a partnership between the government, scientists and the community that builds mutual trust, acknowledges a “whole of community” challenge and responsibility, and provides a basis for ongoing sustainable management and use of water resources in SEQ.*

Given the Queensland Government’s intention to institute a Purified Recycled Water (PRW) scheme by the end of 2008, the Systematic Social Analysis project proposed as its first objective:

*to identify and provide a baseline measurement of the psychological drivers of the community’s intended behaviour in relation to drinking water that includes PRW added to Wivenhoe Dam 1 to provide for the informed design of community engagement and education, and the monitoring of any shifts in community attitudes, values and intended behaviours over time and with increased experience.*

The project’s baseline measurement and modelling in late 2007 (Nancarrow et al. 2007) identified the key drivers of people’s intended behaviour in relation to drinking PRW (see Figure 1).

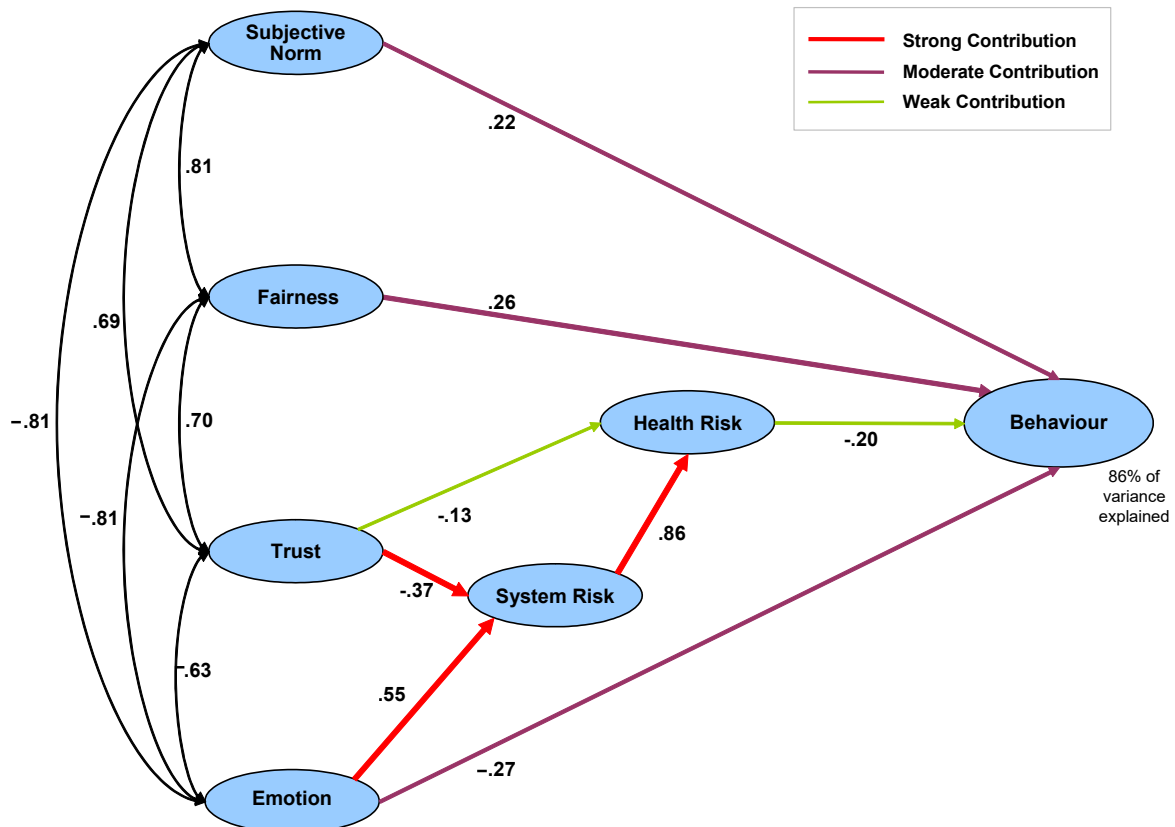


Figure 1 Simplified structural equation model of the SEQ community’s intention to drink PRW

<sup>1</sup> For ease of reading and writing, hereafter *drinking water that includes PRW added to Wivenhoe Dam*, will be referred to as *drinking PRW*. This is also consistent with the community talking in terms of *drinking PRW*.

The aim of this next stage of the project is to gain a detailed understanding of the community's perceptions of the key behavioural predictive variables. The intention of this scoping work was to provide a basis for ongoing research in the risk and fairness areas to ensure the informed attention to, and management of, community issues and concerns. It was also intended to identify any priority issues for the Queensland Water Commission's (QWC) communication and community engagement programs.

While the majority of the report outlines the key issues raised by the community at a series of workshops, it also attempts to use the scientific literature to:

- investigate why people may be thinking in the ways they are;
- provide explanations for the links and overlaps that seem to be emerging between the key variables; and
- provide direction for the ongoing research.

## 2. METHODOLOGY

Nine community workshops were organised throughout SEQ in the first two weeks of December 2007. These were held at different times of the day and night, and on weekdays and weekend days, to provide the opportunity for a wide range of people and age groups to attend. Workshops were held at the following locations and times.

### *Brisbane (2)*

Kedron	morning
Kenmore	evening

*Ipswich* evening

### *Logan*

Springwood	late afternoon
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### *Gold Coast*

Nerang	afternoon (Saturday)
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### *Lockyer Valley (2)*

Fernvale	morning and evening
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### *Sunshine Coast*

Caloundra	evening
Caboolture	evening

The workshops were structured to elicit discussion both in plenary sessions and in small groups. A *water quality and treatment expert*<sup>2</sup> was available at all workshops to provide an overview of the water grid and the seven barrier treatment process planned for PRW, as well as to answer any questions throughout the workshops.

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<sup>2</sup> Professor Tony Priestley: Senior Principal Research Scientist - CSIRO Land and Water, and Deputy CEO - CRC for Water Quality and Treatment.

Each workshop was approximately two hours in duration, with the majority of time for participant discussion, and consisted of:

- A *welcome and introduction* which outlined the purpose of the workshop.
- A *plenary discussion* to elicit an overview of perceived positive, negative, and neutral issues associated with PRW. It also allowed for a brief discussion on alternative futures and sources with advice that this was being dealt with in the ongoing Alliance research. The purpose of doing this was to try to focus the workshop discussions on PRW and not favoured alternatives. Participants were encouraged to write down any points they would like passed on to the other research areas.
- A brief *information overview* of the grid and PRW treatment and questions.
- Facilitated *small group discussions* to understand participants' perceptions of systems, health and environmental risks (e.g. safe and unsafe systems; certainty; trust and governance issues).
- A short break and refreshments.
- Facilitated *small group discussions* to understand participants' perceptions of fairness of the PRW scheme (e.g. distributive and procedural justice; universal and contextual fairness criteria).
- A *plenary session* to summarise key messages and questions.

At each workshop, the research team consisted of:

- A main facilitator who oversaw the whole workshop and facilitated the plenary sessions.
- An information provider who lead the information session, answered questions and moved between the small groups.
- Two to three small group facilitators and scribes as well as digital recorders.
- A member of the Project Reference Group (except for the Kenmore and Gold Coast workshops).

## 2.1. Recruitment

Trained interviewers were requested to recruit approximately 32 random community members from localities surrounding the venues. They were provided with telephone lists and called people to invite them to participate. They were asked to try to obtain equal numbers of males and females. In the cases of Brisbane, Ipswich and Logan, they were also provided with contact details of respondents to the behavioural survey who resided near the venues and who had indicated a willingness for ongoing participation. All who agreed to participate were sent letters of confirmation with maps showing the location of the venue.

Past research by ARCWIS has indicated that approximately 50% of community members who agree to participate actually attend on the day. This number can vary to as high as 75% attendance, and as low as 15%, depending on circumstances on the day.

## 2.2. Attendance

In all, of the 293 community members who agreed to attend, 99 actually attended their respective workshops. This included 51 females and 48 males from a variety of age groups. This was an overall attendance rate of 34%, but it varied between locations. The attendance rate for survey respondents who agreed to attend was 50%. It is highly likely that the time of year, close to school break-up and Christmas, was a factor in the less than expected attendance in some of the locations.

However, although no formal numbers were taken, the discussions indicated that, *overall*, those who attended the workshops roughly reflected the societal proportions of supporters (about 75%) and detractors of the PRW scheme. However, some workshops were more positive than others, and some were more negative. The discussions clearly reflected the issues and outcomes of the behavioural survey. Therefore, we are confident that the sample of participants covered the range of issues, perceptions and concerns that are prevalent in the SEQ community at this time.

The following table provides an outline of the attendance at each workshop.

	Kedron	Kenmore	Ipswich	Logan	Gold Coast	Lockyer Valley 1	Lockyer Valley 2	Sunshine Coast	Caboolture
<b>Agreed</b>	33	32	32	31	34	35	32	33	31
<b>Attended</b>	14	10	16	5	12	14	8	7	13
<b>Apologies</b>	4	0	0	0	2	0	0	1	0

### 3. RESULTS

The purpose of the workshops was to explore the *range of issues* associated with the key predictive variables of the behavioural model to gain a better understanding of the meaning behind people’s survey responses. As such, what follows is a report of people’s thoughts, perceptions and concerns and no attempt has been made to verify the factual nature or otherwise of what was said and there has been no analysis of frequency of comments.

The content does not reflect the authors’ views, but it is important to record the issues and sentiments as they were portrayed to us. The report structures the discussions in amalgamated themes and frequently uses quotes to illustrate the points being made. Some input is provided by the authors where references are made to scientific literature to try to better understand the motivations for some comments and points of view, or to provide direction for ongoing research in those areas. This is principally background research for the social analysis project to better design and structure the future components.

#### 3.1. General Acceptance of the PRW Scheme

Generally participants accepted the concept of using a PRW scheme to provide an adequate, safe water supply, if somewhat cautiously. They believed it was the government’s responsibility to maintain water security using dams, desalination plants and recycled water if necessary. Participants preferred water from traditional supply systems rather than from the PRW scheme, yet they conceded PRW provided a common sense and logical approach. Australia was described as a dry continent in crisis, and decisions to maintain water security were driven by necessity, in light of the imminent threat of running out of water. General support for the scheme in the focus groups reflected viewpoints from the baseline measure (Nancarrow et al. 2007) of 583 South East Queensland residents where the majority of survey respondents (74%), expressed support for the PRW scheme, while 14% were unsure and 12% were expressly against the scheme. Focus group participants were similarly aligned, the majority expressing support for the scheme. It was, however, common for PRW support to be ‘conditional’, for example,

*“...the scheme needs an independent government appointed body, the government can’t be monitoring themselves, they have got to have checks and a balance in place, there needs to be an overarching authority.”*

Participants voiced the need for the government to act to ensure water security, to minimise risk to the public and to keep them informed of the choices in infrastructure, costs and the process of implementation. Those who may have objected to the scheme but felt they had no choice in the matter, suggested the government and politicians had to introduce the scheme. Suggested benefits from the PRW scheme included reduced water restrictions for household and gardens, economic growth, employment and increased housing options.

Some participants felt the PRW scheme would provide high quality water and confidence was expressed in the seven barrier system for delivery of water that would be safe for consumption. People reassured each other by voicing their convictions that the scheme had been tested overseas “...they do OK in other countries, i.e. Singapore, Arab Emirates, and Europe.” Acceptance of the PRW scheme was reinforced by concerns about the quality and effects of pollution on present water collection systems. A strong argument in favour of the scheme was suggested by a participant,

*“rainwater purity is disputable - this includes what’s coming down in the rain, what’s on the roof, drinking from tanks, what’s in the atmosphere, we don’t know the quality of the water we are drinking now.”*

In addition another participant suggested that there has been *“a lot of building in hinterland in last 30 years, with seepage of septic systems into the creeks, it’s impossible to get clean water.”*

In general, participants thought that the public was growing accustomed to the idea of drinking recycled water. However, some residents had no intention of drinking the water after the introduction of the scheme and preferred water from rainwater tanks and/or bottled water options. *“Most people don’t want to use it, they would rather use their rainwater tanks,”* claimed a participant. Some participants were ambivalent about the scheme, had no real concerns about drinking water and had options of using other sources of water (i.e. bores or rainwater tanks) to supplement their own water requirements. A minority of participants expressed complete opposition to the scheme, citing strongly-held concerns, many of which are detailed throughout this report.

Most participants had limited knowledge of the infrastructure, processes, and cost and implementation details of the PRW scheme. The workshop incorporated information from a CSIRO water quality and treatment expert who was familiar with the scheme and had been consulted on issues of its planning and implementation. An information session was held during the workshop and the expert was available to answer questions raised by participants throughout the session. Information imparted by the water quality expert raised awareness for participants and often eased their concerns. Participants expressed reassurance and valued the dissemination of trusted scientific knowledge. At the completion of the workshop participants vocalised their appreciation of an opportunity to learn and understand more about the PRW scheme. Many reported leaving the meeting more convinced of the appropriateness of the scheme, with many fears and concerns allayed. Agreed consensus was often reached within the smaller groups as to the benefits of implementation, as long as regulations were in place and overseen by another body, preferably CSIRO or an independent panel of experts.

## **3.2. Trust**

There was a common perception by participants that the current water crisis was largely due to inaction, neglect and lack of foresight by the Queensland Government. Concerns were directed at the complexity of the PRW scheme, suggesting possibilities for systems failure and a consequent threat to public health. There was a lack of trust that the public would be informed if safety standards were breached. Generally participants did not trust that the system would consistently perform to acceptable standards, 100% of the time. *“No level of uncertainty is acceptable,”* claimed a participant.

Participants expressed doubts and confusion as to the sources of dependable information they were prepared to trust, as expressed by one participant.

*“There has to be somebody in the expert role and a group of people to pick the experts that we are going to believe. Because there are different expert opinions, which one to believe? We must trust someone to pick trustworthy sources of information. Either way we have to trust someone.”*

Often expressed was the need for (i) transparency, (ii) accountability, (iii) responsibility and (iv) independence of the system.

### **3.2.1. Governance**

Even though many participants espoused faith and trust in government decisions and the government’s ability to deliver a safe water system, a lack of trust in state governance was still observed. Participants were concerned about the apparent ineffectual enforcement of regulations, the lack of infrastructure, and lack of timely government planning. The sewage treatment works were often regarded as having doubtful practices in the past, with a subsequent lack of community trust in future practices and compliance with regulations. Some reported instances in the past where there had been breaches and overflows of sewage effluent in local waterways, with subsequent departmental denials. As one participant explained,

*“I don’t have an issue with the recycling system and most people here all realise that it just has to happen, but I don’t trust the government to follow through on the treatment because in the past they just open up and let it all go through [insufficiently treated sewage]. This is what is in everybody’s mind.”*

As well as this, claims by participants of suspicions, doubts, misinformation and conspiracies were also made. Queensland Health was considered to have a poor track record of compliance. The ability of regulatory bodies to enforce and monitor compliance was also doubted. The government was accused of (i) wasting public money, (ii) inaction, (iii) untimely implementation of alternative water systems, (iv) incompetence, (v) fragmented control of water systems, (vi) inability to regulate and control water quality compliance, (vii) issuing false information, and of being (viii) unable to respond to health issues (e.g. asbestos). There was some confusion over how changes would be made to government regulations for water management, as water that was once considered to be contaminated, would now be in use for drinking.

### **3.2.2. Science and Technology**

Participants expressed a high level of trust in science and technology. There was a confidence that a research alliance was over-seeing the project and appropriate quality control would be in place. The government was seen as *“using the best science”* in an attempt to ensure water security. Participants expressed confidence that the technology had successfully been used in other parts of the world, though it was mentioned on several occasions that feedback from Australians living with these schemes would be desirable.

Some participants had doubts about who to trust, but their trust in scientists prevailed.

*“Lots of scientists argue amongst themselves, with differing opinions on the use of recycled water, divided opinions - who can you trust and how can you decide on whom to trust to make decisions? I need to trust scientists, because I don’t know.”*

Even though some felt impelled to trust science, they wanted to be guaranteed that the water would be safe for human consumption. Participants expressed confusion and claimed that science was often inconsistent or conflicting and it was difficult to know which scientists to believe. Mention was made that science can be fallible, one participant observed; *“scientists have been wrong before e.g. cane toads, thalidomide....it always turns out that scientists discover something bad about everything.”* Another participant queried *“...how can they prove that these things [contaminants] are removed?”* There were suggestions that there were too many experts who *“think they know everything.”*

A few participants were adamant that they neither trusted scientists, nor technology. Uncertainty and fears were expressed that it would be ten years before the impacts of the scheme might become apparent, and may affect peoples’ health *“...there are diseases we are only just discovering.”*

There was some confusion and uncertainty about PRW schemes used in other countries, due in part to conflicting information presented by the media. One participant suggested,

*“...PRW schemes are happening overseas but people don’t know if it is for drinking. It would be good to have someone from overseas to explain how they are doing it.”*

### **3.3. Link between Trust and Risk**

It was clear from many discussions that matters of trust and matters of risk were intertwined. Specifically, the trust that people instilled in government agencies seemed to have a bearing on subsequent perceptions of risks associated with the PRW scheme. This is supported by previous studies and theoretical literature which suggests that trust is strongly predictive of people's risk perceptions (Leviston, Nancarrow, Tucker and Porter, 2006; Poortinga and Pidgeon, 2003; Slovic, 1993).

#### **3.3.1. Political Will**

Participants lacked trust in the changeable nature of political processes and the impact this could have on the safety and ongoing operation of the PRW scheme. Many participants suggested the scheme was at risk as the government was suspected of being capable of (i) devolving future responsibility for

water security and supply to the private sector, (ii) sale of infrastructure, (iii) undue deference to international business operations, (iv) cuts to operating budgets, (v) use of the scheme for revenue raising and (vi) inability to guarantee a safe and adequate water supply for residents. One participant expressed concerns of the changing nature of politics and the implications for the success of the scheme.

*“...we don't have any issue with the science; it's the maintenance of the system. We are concerned about this as a political issue. .... Rules change depending on what party is voted in.”*

Political instability could undermine a long term commitment to the scheme, as one participant expressed concern; *“...what is going to happen if Labour doesn't win the next election? Will the next government be committed to continuing and maintaining the South East Queensland grid? As a result, possible water quality breaches and systems failures were feared.*

There were suggestions that a highly politicised campaign was currently being conducted to convince residents of the merits of the scheme and a general lack of trust in political information and a sense of risk was expressed.

*“...what the 'pollies' tell you when they go overseas and see these PRW schemes is confusing and wrong, because schemes like this don't exist in other places.”*

*“...if the cost blows out or decisions are bad, there is a danger of political spin.”*

Reassurances that science would prevail over politics were required.

### **3.3.2. Monitoring Capacity and Staffing**

Distrust of private, international and public bodies involved in the PRW scheme, were moderated by suggestions of the need for experts and an independent body, or an over-arching control authority, to monitor the implementation and management of the scheme. This was seen to be necessary to minimise risk and safeguard the scheme.

*“...the scheme needs to be run by a proper regulatory body with clear transparency. You have to trust who the government appoints to oversee the scheme, but we demand assurances through monitoring and record keeping.”*

Some participants were sceptical that an international company was to be in charge. The main concern was the need to monitor activities as there was a lack of trust that the company would hold concerns for the health and safety of the residents, rather they would be purely driven by profit motives. One participant suggested the need for, *“...certified testing, and checks and balances in place, this reduces the risk of being tainted by financial gain.”* Nor, in some cases, did participants trust the government's choice in private company, as mentioned, *“...this company must have put in the cheapest quote, we must employ expertise, but we don't trust the government to choose the best company for the job.”* However, others perceived there to be insufficient expertise available in Australia, and so it was conceded that employment of an international company may be necessary. Some were also reassured that, in order to maintain its reputation, the company would need to manage things well.

However, the company engaged to deliver the scheme was not trusted to self-monitor. To avoid risks of contamination, participants were adamant that there be checks or an audit put in place. Doubts and fears that the company would be trustworthy enough to meet the contract details were expressed, as illustrated in the following;

*“Even if there is external scrutiny, will regulators actually penalise [Veolia]? If the breach is not fixed, what will happen? Will they continue as normal? What's the next step?”*

One participant mentioned that rigorous reporting and security was now occurring in water monitoring. However, concerns about perceived risks of adherence to regulation and of monitoring the new system continued to be raised by participants. The concerns that were voiced were largely about potential systems failure due to human error.

Staffing issues also arose as concerns. Participants expressed that permanent, long term staff contracts were needed so that there were reliable trained staff who could understand the system and respond immediately to system failure. Doubts were consistently expressed that sufficient expertise currently existed in Queensland or Australia, or that sufficient numbers of people were being trained for the future to ensure the competent, safe and ongoing management and implementation of the scheme.

*“Where are all the water technicians going to come from to manage these plants?”*

*“These skilled people aren’t on site, they aren’t in Queensland.”*

*“Are they encouraging people to study?”*

### **3.3.3. Long Term Water Security and Planning**

Implementation of the PRW scheme was seen to reduce the risk and uncertainties associated with long term water security.

*“PRW is a step towards confidence we are not going to run out, under the current system. We had a lot of water one moment.... Then we had none. It’s the uncertainty.”*

However, concerns were expressed that the scheme would become obsolete, or the technology outdated, and hence insufficient to supply the burgeoning population. The scheme was seen by many as a *bandaid* solution when the real problem was unfettered population growth. The government was accused of a lack of foresight and planning, and an inability to respond to the growing populations’ needs for water and infrastructure. Some participants felt that alternatives hadn’t been sufficiently explored and raised a range of possible alternative water sources and demand management options.

*“There’s more than one solution to the problem. There must be other technology. There should be initiatives for people to move out of South East Queensland. Services should be more regionalised.”*

The PRW scheme was considered by some to be a better alternative than total reliance on desalination in light of the power costs involved. Participants also suggested that they had less confidence in dams. *“don’t build dams - not a good idea as they are not catching water. The weather patterns are shifting. Ecosystems changes are changing water catchments.”* The PRW scheme was also seen by some as providing *“an environmentally positive approach”*.

## **3.4. Risk**

Risk of failure of systems and risk to health were the primary worries and concerns of participants. Some participants were consoled by the thought that the government and experts implementing the scheme would also have to drink the water and wouldn’t put themselves at risk, thereby increasing the overall safety of the scheme. Assessments of risk by participants evolved from the unknown and uncertainties inherent in the PRW scheme, as expressed in the following quote.

*“I accept the current quality of water e.g., dead cows etc., and can deal with that. But uncertainties become too much with the PRW scheme. Likewise, dead seagulls in the water tank. The water is more acceptable than the unknowns in dam water.”*

### **3.4.1. Systems Risk**

System failure was perceived to be the greatest risk. Even with seven stages of water purification, participants were not confident the water would be absolutely pure or safe to drink. Participants wanted reassurance that quality control would be regulated and sufficient to ensure a failsafe system. The consequences of human error were perceived as contributing a considerable risk.

*“Systems are as strong as the weakest link – can’t discount the human factor. Nobody is perfect - no matter what they do, it can’t be failsafe.”*

To add weight to this argument, mention was made of other systems that had failed through human error, in particular the Chernobyl nuclear accident. To minimise the risk of system failure participants suggested there was a need to attract dedicated, trained, technical staff into the industry who knew what they were doing and who took their employment seriously.

*“We need to be assured that if the system fails that remedial action can be taken immediately. If you get a flat tyre on your car and stop immediately it’s alright. If you continue on, it’s wrecked. If you have a failure in the system and continue on it only gets worse.”*

Some participants were concerned about technical details of the infrastructure and wanted access to technical information to address these particular concerns. Issues raised included, (i) positioning of pipes and treatment plants, (ii) storage of bio-waste, (iii) impurities re-entering the system, (iv) capacity of the dam if flooding occurred, (v) details of maintenance procedures, (vi) safety and reliability of the barrier system, (vii) adequacy of water supply, and (viii) technical skill required to safely maintain the system.

To minimise risk of failure, residents expected the system safety attributes would include the capability of isolating and shutting down of specific areas when problems were detected.

#### **3.4.1.1 Relative Risk**

The seven stage barrier treatment process was generally regarded as maintaining a high standard of control, minimising the overall relative risk of failure.

*“Naturally there will be a breakdown in the system at some stage, but for more than one of the treatment stages to breakdown at once is pretty unlikely. With all the different stages involved plus the last natural process in the dam, the risk is pretty minimal.”*

The physical distances involved in the movement of recycled water from the treatment plants and the dam reassured participants that there was a reasonable amount of time to rectify anything that might go wrong in the advent of a systems breakdown. For some participants, the risks perceived to be associated with the PRW scheme when compared with other risks in the environment were deemed not worth worrying about. For example, *“I’m not concerned about PRW because we are eating food from China and we don’t know what they are using to grow it.”*

Of particular concern though were the unknowns and uncertainties associated with cumulative risks. The unknown implications of the cumulative impact of the possibility of an increased concentration and combination of chemicals from a variety of sources in a system of continuously recycled water was raised a number of times.

#### **3.4.2. Health Risk**

An adequate supply of clean water was regarded as essential to good health. Perceived concerns of the risk to personal health were amplified by a lack of knowledge, and it was said that concerns could not necessarily be assuaged by reassurances or unanimous guarantees that the water would be safe to drink. Participants expressed a variety of health issues they perceived that might arise from using recycled water.

*“It’s not just drinking it that concerns me but what it’ll do if it comes in contact with skin, will it exacerbate skin conditions, could we be allergic to the contaminants? I’ve got no concern about what the water will do internally; I’m worried about the external impacts on my skin....there is not enough research on the effects that it can have on us.”*

Some sectors of society were thought to be more reactive to issues of cleanliness, with young men and women anticipated as presenting the greatest revulsion to perceived water reuse risks. Suggestions were made that water should only be used for industry and not for drinking water, to alleviate some of the perceived risks that might affect the health of the individual. However, alternative sources of drinking water were also considered risky, such as bottled water, as it may be unscrupulously sourced from the general water supply with less attending regulation.

Concerns were directed at the imperative need to remove solid waste and chemicals from sewerage, focusing on the contaminants in the wastes from hospitals and industrial plants. Wastes from hospitals were considered a threat to health if not removed by the seven barrier system e.g., *“We are worried about hospital waste, pathogens, radio nucleotides, chemotherapy residues, chemicals from hospital patients. How will the system deal with these things?”* Residual hormones and endocrine disrupters were also mentioned. Participants wanted reassurances these substances would be removed from the water supply.

Release of industrial wastewater into the system had the potential to introduce pollutants, particularly in instances of non-compliance with regulations. Fears were expressed of the presence of heavy metals as well as the effect of additional chemicals used in the purification process. In addition, concerns were expressed that other sources of pollution from increased emissions in treatment process might affect respiratory health and reduce air quality.

#### **3.4.2.1 Relative Risk**

At times, health risks were mentioned in relation to the relevance of other elements of risk. For example, “...*pumping water is far less dangerous than smoking*” acknowledges that people indulge in risk taking behaviours in other aspects of their lives, the dangers of which would be a more significant health risk. In addition, risk was rationalised in statements to the effect that contamination or concentration of elements could be more prevalent in other areas of their lives, e.g., “...*chicken and beef are full of hormones now, and so risk in water is minimal.*” Sources of pollution from other water sources such as groundwater were also considered to possibly present a risk to health, i.e. “...*What effect is the rubbish in land fill having on groundwater?*”

However, it was thought that some residents might be more susceptible to perceived pollutants in the recycled water if the seven barrier process proved to be inadequate to purify the water. Contaminants in the water supply might then exacerbate existing health conditions. Uncertainty appeared to drive fears of additional sources of infection which may impact on an individual’s health. In addition, indirect health impacts could occur from diseases common amongst mosquitoes that bred in alternative water supplies such as rain tanks, in an attempt to avoid using recycle water. Future fears of the unknown long-term consequences were expressed, as was concern over the possible impacts on the next generation.

#### **3.4.3. Environmental Risk**

Environmental concerns were largely related to social-altruistic (affects people) and egoistic (affects me) values (Stern 2000). Less emphasis was placed on biospheric (affects nature) values, as one participant stated confidently, “*Nature will take care of itself*”. The aesthetic value of beautiful gardens was highly regarded and contributed to the acceptance of the PRW scheme.

A concern was the possibility of unsightly pipes detracting from the environmental aesthetics, additional infrastructure affecting people’s everyday lives. Concerns were expressed regarding the physical impact that the grid infrastructure may have on the environment – e.g. “...*wildlife corridors, and can you walk over or under the pipes?*”

Environmental impact statements were suggested as a means to investigate the true impact of the PRW system. Confidence in the system was emphatically expressed by one participant, “...*If treatment is done correctly most of us agree that there aren’t going to be any environmental problems.*”

Some concerns were expressed about putting PRW in the dams if contamination results and the implications for the ongoing water supply. Similarly there were concerns about the effects of PRW on the ecosystem.

*“I’m concerned about putting PRW in the ecosystem... all the chemicals they put in to take all the other stuff out... what it is going to do to the rivers.”*

The effect on the ecosystem, with less run off into the sea, and pumping water out of natural systems, also added to environmental concerns.

There were comments that measures to address algal blooms would include the use of additional chemicals, adding to fears of chemical contamination that might be hazardous. Also the added risk of algal blooms was seen as having impacts on recreational and agricultural water uses, particularly for people around Lake Wivenhoe.

Building additional dams to form part of the Water Grid might require that viable farming land be lost to production. Concerns were raised about the impact of cyclonic rains and the influx of PRW into potentially full dams.

The energy required for the PRW scheme was also discussed. Concerns as to the environmental cost in terms of the “*size of the eco-footprint*” were voiced. “*Pumping water out of the ocean and desalination costs more energy - will it be worse for the environment?*” asked a participant. There were concerns that the energy used to maintain the scheme could add to carbon emissions and exacerbate the reduction of rainfall in the area. In addition, there were energy implications in producing bottles for bottled water as an alternative source of drinking water. “*It may drive people to use more bottle water, and therefore use more energy,*” suggested a participant.

### **3.5. Emotions**

There is empirical evidence that the way people process information (their cognitions) can influence and be influenced by emotions (Constans and Mathews 1993; Isen 1993; Johnson and Tversky 1983; Keltner et al. 1993; Lazarus 1991). As such, there is support for a two way connection between assessments and emotion. It is possible therefore, that emotional states (as manipulated by media and special interest groups) can have a direct influence on people’s judgements about the PRW scheme’s levels of risk, fairness and acceptability. Emotions have been shown to play a key role in the way people rate environmental risks, demonstrating a relationship with perceived acceptance, riskiness and destructiveness or potential damage (McDaniels et al. 1995), thus indicating that people might rely on emotional appraisals as a primary cue when assessing potential risks and benefits (Loewenstein et al. 2001). Therefore, as the implementation of the PRW scheme draws closer, and the reality of drinking recycled wastewater becomes more tangible, it is possible that appraisals of the scheme will become more emotionally based (Gilovich, Griffin and Kahneman 2002).

#### **3.5.1. The Link to Sewage**

As the system delivers drinking water from recycled wastewater, there was a general expression of revulsion by some. They expressed a general unease stemming from the concept of re-using “*toilet water*” and the stigma of “*drinking your own sewage*”. Interestingly, a number of participants referred to the “yuck factor”, but this was often used by supporters of scheme apparently to diminish the credibility of those who opposed it. In this sense, it was inferred by participants that PRW was generally perceived by the SEQ community as still being sewage.

*“The treatment is on every body’s mind - the yuck-factor that they speak of.”*

It was suggested that the language used when discussing the PRW scheme with the SEQ community could influence their perceptions. The usage of the word *recycled* might convey to people a sense that the water is second-hand. Some suggested that PRW should be called ‘new water’ in order to overcome the wider community’s mental barrier of drinking water for a second time around.

There was limited recognition in the workshops that all of the water on the planet is essentially recycled, having passed through many biological systems in the earth’s history.

*“It doesn’t taste better the second time around.”*

*“When pollies talk about the scheme its recycled water; and when the media talk about the scheme its recycled sewage.”*

Some workshop participants maintained that recycling and drinking wastewater was a violation of the natural order. Manufactured or treated water was perceived by some to be unnatural and therefore unclean, despite recognition of contaminants in natural environments. Stormwater was seen by some as ‘*coming from heaven*’ and therefore more natural and pure. Interestingly, Wivenhoe Dam was perceived by many as a natural environment. Despite assertions that water quality in Wivenhoe Dam is poor and acknowledgement that PRW is potentially cleaner, many participants were pleased that the water would be ‘*naturally treated*’ by being piped to the dam. These attitudes reflect the behavioural survey findings that only 29% of respondents would support a direct potable reuse scheme, piped straight from the treatment plant to their home. Those respondents gave as their main reasons: *additional treatment in the dam/second treatment/naturally treated; prefer it to be mixed/diluted; prefer water to go into the dam first; and just don’t want to drink it/against the idea*. This appears to violate logic and demonstrates the discrepancy between cognitive and emotional judgements about the scheme.

Some interesting myths had also developed about PRW being unnatural. As one participant stated,

*“PRW is so purified that it’s dead. It has to go through solar lights to bring it back to life.”*

The history of water infrastructure and institutions can influence peoples’ perceptions of the water supply and contamination. Allon and Sofoulis (2006) explore how *water culture* can influence people’s perceptions and behaviours. A key part of modern nation building in Australia has been the large scale development of water infrastructure, involving monumental engineering feats to bring water to a dry and vast country. This is captured in the concept of *Big Water*. Allon (1994) suggests that such feats have contributed to the development of a heroic and metaphorical ‘Australian way of life’, as well as the false perception that water supplies are endless and immediately accessed. One participant made a comment that was uncharacteristic of workshop discussions.

*“The water system isn’t instant you know. It’s not a matter of turning on the tap and the water comes straight from the treatment plant”* [spoken as if not a widely accepted view].

The hidden nature of water infrastructure (i.e. underground and not in plain view) contributes to a sense that the water supply system is immediate: you turn the tap on and the water comes straight from the source. This is significant if sewage or toilets are considered the source of PRW. The presence of two sets of pipes within the home, one for delivering clean water, one for removing waste, reinforces the perceived necessity of keeping sewage separate from drinking water. This presents a challenge, when people are informed that wastewater is to be recycled and consumed. Many workshop participants were concerned about the scheme infrastructure and whether there would be separate pipes for waste and drinking water. There was obvious confusion about the operation of the Water Grid and the reversibility of flows and the number of pipes. For instance it was suggested that PRW would be further contaminated if it was to be moved across the state in the same pipes/ infrastructure as sewage.

### **3.5.2. Self vs Others**

As in the behavioural survey, there was evidence of workshop participants distancing themselves and their views regarding the PRW scheme from that of other people in SEQ. Overall, participants accepted the scheme, but generally felt that the broader community would not be as accepting as they were. A distinction was made between personal attitudes regarding the scheme and perceived attitudes of others. Essentially ‘*I think the scheme is fine, but you’ll have a hard time convincing others*’. This mirrors the baseline behavioural survey’s findings that: the majority of respondents intended to drink recycled water from the scheme (73.9%) and that they thought their families would also be happy to do so (63.4%); but less than half felt that other people in SEQ would share this attitude (39.2%).

*“The disbelievers will have you believe you’re drinking sewage!”*

*“Most people haven’t got enough information and don’t like it.”*

The distinction made by participants between self and others’ attitudes was also demonstrated in discussions about the fairness of redistributing ‘water assets’ around the state via the Water Grid. Participants indicated that other people (i.e. not themselves personally) were defensive about their water being distributed to Brisbane, particularly if it resulted in water restrictions. This may have been related however to participants not wanting to appear to others as if they would be supportive of withholding water from those in need.

Self and others distinctions may in fact be related to social aspects of group participation in the face-to-face focus groups. It could be that participants only felt comfortable articulating socially desirable or scientifically sound (i.e. rational/logical) sentiments in the presence of professionals from a well recognised research organisation. Workshop participants presented themselves as rational and capable of making assessments of the scheme that were driven by logic rather than emotion. Emotional responses to the scheme and to drinking recycled water (such as anxiety, fear, disgust and resentment) were not generally admitted by participants, but may have been projected onto others instead.

The emphasis on cognitive appraisals of the scheme over emotional appraisals could also be related to people’s limited capacity to forecast how they are likely to respond emotionally to an event. In other words there is a discrepancy between peoples’ predictions about how they will feel in the future

(*affective forecasting*) and their actual emotional response (Wilson and Gilbert 2003). Research has demonstrated that affective forecasting is related to Emotional Intelligence (Dunn et al. 2007), which can be described as the ability to identify and manage the emotions of one's self and others. People with higher Emotional Intelligence can make more realistic assessments of their post-event feelings. This may be related to their abilities to recognise that emotion depends more on how an event is interpreted, dealt with, and shared with others than on the actual nature of the event itself.

Discrepancies between affective forecasts and emotional experiences may in part explain the differences observed between planned and actual behaviour. This has implications for the PRW scheme in SEQ. Those people who indicated that they intend to drink recycled water may be confronted with an unanticipated emotional response to the enactment of that behaviour which could change their views on the acceptability of the scheme.

Numerous studies have demonstrated peoples' tendency to be unrealistically optimistic about potential risks and benefits to themselves compared with others - an *optimistic bias*. For instance, people tend to believe that their own risks are less than the risks of their peers (Hoorens 1993; Schwarzer 1994; Weinstein 1980). As such, workshop participants may have been underestimating the potential risk of their having an adverse emotional reaction to drinking recycled water. This could explain the observed differences between perceptions of one's own attitudes and those of others.

### **3.6. Fairness**

Understanding the SEQ community's appraisal of the fairness of the implementation/ management of the PRW scheme may assist efforts to maximise the acceptance of the scheme. Issues of "what's fair" can have the potential to heighten community conflict. People often use fairness as an evaluative criteria to help them make a decision when they are uncertain. The perceived fairness of the PRW scheme in SEQ has been shown to be a key predictor of community intention to drink PRW in the baseline behavioural survey conducted in 2007, demonstrating a significant and direct relationship (Nancarrow et al. 2007).

Workshop participants in this scoping phase of the social research were asked a range of questions about the overall fairness of the PRW scheme in relation to: potential differential impacts to a variety of water users; water affordability and choices; and decision-making processes. That is, aspects of procedural justice (the fairness of the decision-making process) as well as distributive justice (the fairness of the distribution of resources and burdens, including risks and costs) were discussed.

#### **3.6.1. Process**

Reactions to decisions made by a third-party are influenced by the fairness of the decision-making process itself, independent of the desirability or fairness of the outcomes of that process — the procedural justice effect (Thibaut and Walker, 1975). In other words the perceptions of *how fairly decisions are made* are highly correlated with people's reactions to the outcomes from the decisions. The influence of procedural justice has received widespread and strong empirical support (see Folger and Cropanzano, 1998; Lind and Tyler, 1988; Tyler and Blader, 2000 for reviews). Theoretical models (Lind and Tyler, 1988; see also Tyler, 1989, 1994) suggest that fair procedures are important because they indicate to community members that they are valued by the authority, and are more likely to lead to more acceptable outcomes.

Overall, workshop participants placed less emphasis on procedural justice issues than on distributive justice issues. It was considered by many that it was not always appropriate for community members to have input into important decisions regarding water security. Decisions regarding the scheme were seen as primarily the responsibility of government and/or scientists. As such there was general support for not having a referendum/plebiscite on the PRW scheme.

Reasons cited by workshop participants for their support of community exclusion from decision making processes regarding the scheme included: (i) the problems associated with the Toowoomba ballot; (ii) costs associated with conducting a referendum on the matter; (iii) lack of timely governmental action or responsibility regarding water security and planning in SEQ; (iv) lack of community capacity and technical expertise in water management; and (v) the magnitude of the water shortage and level of restrictions.

*“They had a vote in Toowoomba and they didn’t like the answer, it messed up the system. We can’t afford another mess up.”*

*“I’m glad the decision for the referendum was withdrawn. The government has to make the hard decisions.”*

Overall workshop participants accepted that the PRW scheme was necessary, indeed vital, and that ultimately they did not have a choice about whether the scheme would go ahead (recognition that the decision was already made). Water security was a primary consideration for most and community input or fairness of process was secondary. General acceptance of the scheme’s necessity and inevitability was related to the: severity of the water shortage and the level of restrictions in SEQ; and the perceived lack of government action/responsibility/planning associated with water security.

However, many participants felt that the lack of timely governmental action to secure water supplies was unfair to SEQ residents. As such any action (including a referendum) that was likely to prolong water shortages was perceived as less fair than ensuring a ‘fair process’ in which SEQ residents have voice in decision making processes.

*“It’s not about fairness; we have to do it - we’re in dire straits.”*

Procedural justice issues were raised, though, in relation to the perceived lack of information provision about the scheme. Despite acknowledgement that decisions regarding the scheme are primarily the responsibility of government and/or scientists, participants highlighted issues associated with the lack knowledge and awareness in the community about PRW. Many participants expressed gratitude for the information provided in the workshops about the treatment process, and stated that they would now be prepared to drink PRW whereas before they would not.

*“The process of the treatment should have been told better, earlier. We needed more face to face contact but we received no consultation and no information was given.”*

Procedural justice issues were also raised in relation to council amalgamation and included concerns about the lack of local representation through council members and subsequent lack of ‘voice’ in PRW decision-making in the future. This was seen as particularly salient in the Sunshine Coast workshops and may have reflected the recent media coverage of council amalgamations. The perceived lack of local input in PRW decision-making through council members was viewed by some as potentially affecting the fairness of the scheme.

*“Why would the scheme be unfair if the members of council are representing us? The concern is if they won’t be representing us because the councils are amalgamated.”*

The relative lack of attention paid by workshop participants to procedural justice or *fairness of process* may not be surprising in light of the finding that distributive justice issues are the most relevant information used by people when assessing fairness (Van den Bos et al. 1998). People often rely on procedural fairness principles when information about distributive matters provides a weak reference point or is not available.

### **3.6.2. Distribution**

The distribution of resources and burdens (such as risk and costs) is a key consideration when making fairness appraisals. Fairness issues associated with the scheme largely centred on concerns regarding the distribution of increased water costs and rates associated with development and operation of the scheme infrastructure, water resources and allocations, and health risks to vulnerable and disadvantaged groups.

The fairness of the scheme was generally viewed as being dependent on the distribution of costs to ratepayers. There was a general belief that the public would bear the costs associated with the development of scheme infrastructure and the ongoing running and maintenance through increased rates and water prices. Many participants felt that they were unable to assess the fairness of the scheme until they knew exactly *how much* the public would pay. Concerns were expressed that the price of water will continue to rise like petrol prices.

There was recognition that increased water costs would also impact on manufacturing, primary production/agriculture and energy generation. It was thought that these costs would eventually be passed on to the consumer. Flow-on or indirect costs of the scheme to the public were anticipated as contributing to higher cost of living (water, electricity and food prices). There were perceived equity/discrimination issues if the costs of living become too high for certain vulnerable groups such as pensioners and low socio-economic groups. However this perceived inequity was somewhat mitigated by the relative unfairness to all SEQ residents of not having a secure water supply.

*“Ultimately the cost will go around to everybody. The price of electricity will go up and we will all pay more.”*

*“Vulnerable groups will be affected by policy, but not having a water supply is unfair.”*

*“If it’s really expensive it’s not fair, people with no money will be discriminated...the rich couldn’t care less with their spas etc.”*

The direct and indirect economic impacts of the scheme were generally considered fair to most businesses in the state, which were viewed as being adaptable to increased input costs. A clear distinction was made in terms of business enterprise, between manufacturing (mostly framed in terms of beer) and agricultural production. Essentially business was perceived as being able to ‘look after itself’ and increased input costs were unavoidable. Farming was largely viewed as an activity separate to other business enterprises. There was considerable concern in the Lockyer Valley workshops about the potential economic impacts of the scheme on agricultural producers and production. However, these sympathies associated with increased input costs were not extended to manufacturing.

*“The cost to business can’t be avoided. They have to change their product or go out of business, and it’s just a fact of business. It’s a bit unfair that they are being penalised by increased input costs, but they’re all going overseas anyway.”*

*“Manufacturing is different to farming. The manufacturing can adapt [to increased input costs], and you can’t compare the two.”*

The best way to manage the cost of the scheme was a key discussion point in the workshops, including debate about whether costs should be distributed: nationally; across Queensland; across the SEQ community as a whole; or only to users of the scheme. Participants in the Lockyer Valley workshops identified that many people from rural areas do not have access to town water supplies and must rely on alternate supplies such as bores and tanks. In light of this, there were suggestions that it was unfair to expect those people not accessing PRW from the scheme to pay for the infrastructure and operation through rates.

There were varying opinions on whether a ‘user pays’ system was most appropriate with recognition that:

- many people in the city do not have an option to sink bores or install tanks and subsequently they have no choice but to use the system;
- there is an abundance of water in northern parts of the state and the scheme may not provide benefits to those areas, yet they might be contributing to infrastructure costs; and
- people can’t control where it rains and are not responsible for the lack of water so shouldn’t be penalised through increased water costs when others in the state are not. However they do have individual choice about where they live and can move to areas where water is more abundant (and costs are less).

Many felt that it was not fair for costs of the scheme to be distributed across the state to areas where water resources are adequate reflecting broader issues associated with perceived: Brisbane-centric attitudes; support/resources directed to SEQ at the expense of the rest of the state; and ‘Us-and-them’ attitudes.

*“They used to say that Queensland stopped where the electric train stopped, it’s all about Brisbane.”*

*“The rest of the state already supports SEQ, with mining etc, so we are already paying for SEQ anyway.”*

There was a perception that some people in the northern areas of SEQ, Sunshine Coast, were defensive about their ‘water assets’ being distributed to Brisbane via the water grid (particularly if it resulted in water restrictions). However, this sentiment was largely expressed as being held by people other than the workshop participants themselves. This may be related to participants articulating only socially desirable sentiments (i.e. not wanting to appear to others as if they would be supportive of withholding water from those in need). There was recognition that access to water was a basic human right that impacted upon conceptualisations of water as a ‘resource’ and subsequent concerns about distributive justice or sharing.

*“Brisbane will divert our water [in Caloundra] and then we will need to have water restrictions. I accept that, because they are people and it’s not their fault where the water falls.”*

*“Water is essential; everyone needs water, food and housing, basic necessities.”*

Equity principle theory argues that perceived fairness of the allocation of burdens and resources is relative to each party’s contribution to the production of risks and conservation of resources (Albrecht, 1995; Messick, 1993). This is difficult to apply to water because the *resource is the input* necessary to create positive outcomes (such as crops and survival) rather than the output (Syme et al. 2000). The nature of water as a vital input may influence the apparent acceptability of sharing water resources across the state by moving water around the grid.

Issues of ‘proportionality’, or deservedness, were also raised in relation to the scheme. Some rural participants indicated that people in the metropolitan area lacked a water conservation ethic and were therefore less deserving of water, and more deserving of increased water costs. Perceived fairness issues were also associated with continuing population growth placing strain on state resources. New residents to the state were seen by some to benefit from the development of state infrastructure (including the PRW scheme) without having contributed financially through rates and taxes. Essentially, new and/or urban residents were seen by some participants as contributing to burdens (lack of water availability), without adequately contributing to conservation efforts and the development of infrastructure.

*“New Queensland residents haven’t contributed to the infrastructure through rates etc, but they’ll reap the benefits.”*

The PRW scheme was seen by some participants as facilitating continuing population growth by catering for increased water demand and subsequently exacerbating existing impacts. Continuing population growth in SEQ was perceived by some to be unjust and at the expense of existing residents. Many considered it unfair that the State Government was permitting so much development in the face of water shortages. The scheme was also seen by some to contribute to climate impacts through increased energy usage and carbon emissions, raising concerns about intergenerational equity. Some viewed the scheme as unfair because it was treating the symptoms of climate change (reduced rain fall) whilst exacerbating the root cause problem (carbon emissions).

*“Queensland government is irresponsible with the amount of development they are allowing, they are cutting down so many trees which create water.”*

Many fairness concerns raised in the workshops reflected broader underlying equity issues associated with the relative distribution of resources in rural and metropolitan areas. A ‘*rural urban divide*’ was evident in the workshop fairness discussions, with evidence of resentment in rural areas directed towards the urban population.

*“In the city they can switch on the tap and not worry about it. Doesn’t water come from a bottle, Perrier?”*

Distributive justice issues were most evident in rural landholders in the Lockyer Valley workshops and included concerns regarding potential impacts of the scheme on farmers’ water allocations, the quality of PRW water and potential for increased algal blooms, and water affordability affecting agricultural production and viability. Farmers were particularly concerned that direct and indirect costs of the scheme would compound the significant financial barriers they already experienced. Potential

increase in water prices could compromise the viability of many farming enterprises, and as such the PRW scheme was considered unfair.

*“The water recycling takes water from existing users, the farmers have to take an allocation cut.”*

*“The algae in Wivenhoe could smother the whole dam and algae affects irrigation.”*

*“I don’t think farmers will be producing product, we can’t afford the water.”*

Fairness appraisals of the scheme were somewhat dependent on risk perceptions. Where people perceived that there was no or low risk associated with PRW, fairness was also not a major factor in their appraisals of the scheme. The link between perceived risk and fairness of the PRW scheme is demonstrated by the farmer’s appraisals of the scheme. Farmers indicated that the scheme was not fair as it could negatively affect retail of produce grown using PRW because of public perceptions regarding the contamination and health risks. Concerns about potential health impacts associated with the scheme were linked to risk perceptions (i.e. if the scheme is perceived high risk then health impacts are perceived as more probable).

*“If you accept that there is no risk [from PRW] then it’s not a matter of fairness.”*

Potential health risks from PRW were viewed as affecting the fairness of the scheme to vulnerable social groups and manufacturers. This link between risk and fairness was demonstrated by concerns about economically vulnerable groups’ capacities to afford alternative drinking water options such as bottled water, tanks and bores. Potentially differential health impacts to vulnerable groups were considered possible. For example, people with limited economic resources may have no choice about drinking PRW as they cannot afford other options and may suffer cumulative health impacts. Alternately those with medical/physical vulnerabilities may be more susceptible to health impacts. Businesses using PRW in manufacturing could also be unfairly impacted by the *perception* of potential health impacts alone (i.e. reduced sales of product regardless of any demonstrated health impacts).

The PRW scheme in SEQ represents the first example of PRW for potable use in Australia. Some participants felt that the scheme was unfair as SEQ residents were guinea pigs in an Australian first or test case.

### **3.6.3. Summary and Implications**

Fairness issues associated with the PRW scheme were not a primary concern for most workshop participants, mirroring findings of the behavioural survey in which only 11% of participants rated the scheme as unfair. However, fairness has been found to be a major predictor of community decisions in relation to a wide range of urban and rural water management and policy issues (i.e. both acceptability and compliance) (e.g. Porter et al. 2005; Syme, Nancarrow and McCredlin 1999; Nancarrow, Kaercher and Po 2002), and it did emerge as a predictor of behavioural intention in the baseline survey. Therefore, it would be unwise to prematurely dismiss the likely influence of fairness on ongoing acceptability decisions of PRW.

The severity of the water shortage and restrictions in SEQ contributed to workshop participants’ perception that the PRW scheme is necessary/vital and that justice considerations are secondary. Furthermore, fairness appraisals of the scheme were somewhat dependent on risk perceptions. Where people perceived that there was no or low risk associated with PRW, fairness was also not a major factor in their appraisal of the scheme. This supports research findings that fairness is more important to people when mortality has been made more salient (Van den Bos and Miedema, 2000).

Social justice research indicates that people pay more attention to fairness when they are uncertain, as explained by fairness heuristic theory (Van den Bos 2001; Van den Bos, Lind and Wilke, 2001; Van den Bos, Wilke and Lind 1998). For example, fairness appraisals are often used by people as an analytical tool to help them make a decision when they are uncertain. The perceived lack of viable drinking water alternatives in SEQ (or lack of choice regarding the scheme), and the low risk perceptions associated with the scheme can be conceptualised as representing a high degree of certainty that the scheme is acceptable. As such, the lack of emphasis upon fairness in SEQ residents’ appraisal of the PRW scheme may not be surprising.

The nature of the fairness appraisals evident in the scoping workshops may also be explained by other factors. Attitudes that are frequently thought about and easily recalled are more likely to influence behaviour (Fazio 1990, 1995; Fazio and Williams 1986). As implementation of the scheme draws closer public discussion about the scheme is likely to escalate. The scheme may be thought about more frequently and attitudes associated with appraisals of the scheme may become better developed and more likely to influence behaviour.

The relative ease with which an individual is able to appraise an issue is related to their level of prior knowledge and direct experience of the issue (Wood 1982; Wood and Kallgren 1988). Attitude crystallisation influences how information is processed by an individual (Mason et al. 1988; Tesser et al. 1995). Currently, SEQ residents' have no direct experience of the PRW scheme and limited prior knowledge, therefore their attitudes may not be crystallised. As such, their ability to critically appraise the scheme's fairness is limited. SEQ residents' critical capacity to assess the scheme's fairness will more likely improve as a result of having direct experience of PRW and scheme impacts (economic and social).

Fairness is difficult to conceptualise and measure (e.g. Folger 1996; Kals 1996; Syme et al. 2000; Syme and Nancarrow, 2001) and the behavioural survey findings suggested that people weren't discriminating to any great degree between water users. Workshop participants did however identify a range of potential differential impacts (largely economic) from the PRW scheme on water users including: agricultural producers and rural water users; lower socio-economic and vulnerable groups, and businesses.

The workshop participants' responses to fairness questions demonstrated that overall equity conceptualisations were not well developed. It may be that fairness issues become more salient to SEQ residents and businesses closer to completion, or upon implementation of the scheme. Fairness was found to be strongly interrelated with trust and emotion in the behavioural model tested in the baseline survey. Greater belief that the scheme is fair was found to be associated with less negative emotions towards the recycled water scheme and greater levels of trust in the authorities.

As the implementation of the PRW scheme draws closer and the reality of drinking recycled wastewater becomes more tangible, it is possible that appraisals of the scheme will become more emotionally based. This would be consistent with past, international experiences. Furthermore, if community perceptions regarding potential health impacts of PRW are manipulated by special interest groups, or uncertainty develops (perhaps with greater availability of fresh water supplies), then fairness issues could become more important to the SEQ community. Given the importance of fairness in people's water decisions, it will therefore be important to monitor these factors as the time for implementation draws nearer, to avoid any last minute surprises.

### 3.7. Information

As noted on a number of occasions in this report, people felt that information was not readily available to them, and many expressed enjoyment with the opportunity to participate in the workshops as they felt they were leaving with a greater understanding of the PRW scheme. It was apparent that our *water quality and treatment* expert engendered trust in the participants and allowed for easy questioning about and discussion of the issues. Certainly having the seven barrier treatment explained to them by an apparently trusted source generally left participants feeling more confident about the safety of the scheme than they were when they arrived.

*"I've learnt a lot tonight, prior to coming here there was no way I'd drink it."*

Participants felt that there was not a lot of conversation about PRW in the general community, which may be related to their lack of information and knowledge about the scheme.

*"Communication to the public doesn't seem to be enough .... only [information] from the politicians."*

*"All we get are maps - where we are up to and where we are going to."*

*"There are too many unanswered questions. We need a bit more assurance."*

In fact, it became evident throughout the workshops that the lack of information was a critical issue with constant suggestions being offered for topics of information that covered a wide range of issues, particularly in relation to the systems' operation and infrastructure. Such suggestions<sup>3</sup> included:

- the seven barrier treatment process;
- who is doing what;
- how the grid will operate, especially the piping and pumping in different directions;
- will there be alternative uses for PRW when the dams are full;
- what happens to diseases and viruses going into the water; and
- more about recycled water from international schemes.

*“People would like to know more about recycled water schemes that exist overseas, including first hand experiences of the people, or Australians, who have lived there.”*

One could infer that people wanted more information so that they could feel some level of personal control in the water crisis.

*“People want choice. There isn't enough information there to help them with this process.”*

*“Widespread information so people can feel empowered.”*

This was particularly the case for the agricultural producers who required greater certainty about the direct and indirect cost implications for their businesses. Greater certainty about the implications of cost was also required by rate payers. As previously noted, social justice research indicates that people pay more attention to “fairness” when they are uncertain. Information on cost implications of the scheme may reduce uncertainty.

From discussions, it was apparent that people wanted information in their communities which was more personalised, hands on, and ‘living’, so they had a good understanding of what was going to happen and how, and they’d have the opportunity to ask questions. Suggested methods included: interactive and moving displays in shopping centres such that people can see and touch; an easily accessible information line; and a You Tube video of the Singapore information centre. It was emphasised that different levels of detail and technicality were required to meet the needs of all in the community.

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<sup>3</sup> While it is recognised that much of this information is available on the QWC website, it appears that this is not readily known or that a Government web site is not a preferred means for gaining information.

## **4. CONCLUSIONS**

### **4.1. Social Analysis**

The information gained at these community workshops supported the findings from the baseline behavioural measure and provided a greater depth of understanding about them. The participants roughly reflected the societal proportions of supporters and detractors of the PRW scheme, as well as those who were unsure. However, as noted above, support was generally cautious and reflected feelings of inevitability in the face of the water crisis. The participants provided a lot of detailed information as well as receiving information, and feedback indicated that they found the overall experience enjoyable, and it generally increased their confidence in what was happening.

As identified in the behavioural survey, system risk and its influence on health risk is a major point of concern for the community. It is essential to develop an informed basis from which the community and technical experts can communicate and discuss these risk issues, and cultivate a trusted dialogue and relationship into the early stages of the implementation of the scheme.

Also identified in the behavioural survey was the interrelationship of the key variables: trust, risk, fairness and emotion. The data and analysis here confirms this, and also shows how emotion is a pervasive influence, which may become more dominant as the scheme implementation draws closer. While the detrimental influence of emotion on indirect potable reuse schemes has been well documented in the past, the exact nature of its influence has not been well understood. This work is beginning to provide a theoretical basis to identify and measure these influences in the application of this scheme. It will be crucial to continue to investigate the precise details and nature of the influences and relationships between the variables, and to identify key indicators to monitor and manage them over the coming months in the lead up to the scheme implementation.

It is also evident from the findings to date that the proposed method for the research on fairness requires redesigning to better reflect the economic dimensions. Additionally, there is a need to adopt a more longitudinal investigation as the influence of fairness perceptions are likely to become more important as the reality of the PRW scheme draws near.

### **4.2. Information and Communication**

People expressed a need for more readily available information on the PRW scheme. Although a lot has already been done by the QWC, it was evident that many participants were unaware of this. People requested information on the details of the scheme, such as: its seven barrier treatment process and how it will overcome health risks; how the Water Grid and the infrastructure will operate; what happens when the dams are full; what will the costs be and who will pay etc. Preferences were for information to be personalised, at different technical levels, interactive, and easily accessible to the community. Advantage should be taken of sources of information that are trusted by the community as mechanisms for communicating the information.

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