

# Shaping More Sustainable Communities

## A Case Study in Urban Water Management

Developing sustainable environmental and sound business agendas

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# Water Headlines

## One week in November 2009

TODAY IN YOUR NEW-LOOK PAPER

**AiTs**  
Entertainment

PLUS: THE BEST OF FILM THEATRE MUSIC

NEWS  
First reviews of The Lovely Bones A4

**THE DOMINION**

Thursday, November 26, 2009

www.dominionpost.co.nz

### Our river of shame

Manawatu 'among worst in the West'

Jon Morgan and Kelly Burns

THE Manawatu River is one of the most polluted in the Western world, according to new research. The Manawatu tops a new pollution measurement of 400 rivers and streams across North America, Europe, Australia and New Zealand, research by the Cawthron Institute has found.

**BY THE NUMBERS**

- 25 resource consents to discharge into the Manawatu River have been granted.
- 75,600 cubic metres can be discharged daily.
- Palmerston North, Horowhenua and Tararua councils have consents to discharge treated sewage and wastewater.
- Horizons Regional Council has taken four

"No matter what way you look at it, the Manawatu River needs cleaning up". Palmerston North Mayor Jono Naylor was concerned with the findings. "No-one likes the idea of having a polluted river running through their city. The council had invested \$16 million upgrading the wastewater system, so the quality of sewage discharged had improved

### Too many people, not enough water

dompost.co.nz

MONDAY, NOVEMBER 30, 2009

**Katie Chapman**  
SPECIALS WELLINGTON

A LONELY hot summer could stave off Wellington's dry as unexpected population growth strains the region's water supply. Greater Wellington regional council's long-term plan says the council must be able to supply at least 100 million litres of water a day to meet target

Marketing analysis manager Andrew Samuel said the standard was worked out from projected population growth and water usage against climate records, but in recent years, Wellington's population growth had consistently exceeded projected levels. Growth modelling done by the council in 2009 indicated the population of the region's four peaks would reach 37,000

came from rivers and an aquifer, supplies would be severely stretched if there was a lack of rain, Mr Samuel said. "It really starts to put extra pressure on the system. That would mean cracking down on water use. For most of the year the region used about 150 million litres of water a day, but that leapt to 200 million litres during peak days in summer. The easiest way to avoid restraints was to start conserving water now, he said. "It's the only way to avoid restraints in five years."

**GET CONSERVING** — only water gardeners in the morning and

- Time and target watering — only water gardeners in the morning and evenings, and aim the water at the roots.
- Be a sensible flusher — where appropriate, use the half-flush option. Your toilet does not have to be full. A litre bottle with sand and soap in the cistern to reduce the amount of water used is very effective.
- Nozzle your hose — this stops unnecessary spraying even if you tap on. A hose uses 150 litres every five minutes.
- Quicker clean — showers and clothes washing are the biggest water users. Take shorter showers, and wash only full loads of clothes.
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**Public notices**

**WATER USE EXPLAINED**

There's been some confusion over the past few months about the water consumption figures for Wellington City and we apologise for this. Some have taken from Council documents (which have since been corrected) and some are in publications over which we have no control, such as the "Quality of Life" document. So here do we measure water consumption?

Water consumption is reported in various ways. First, there is the "gross supply" figure, which is the total amount of water the city buys from the Greater Wellington Regional Council, divided by the population. The number associated with this is currently about 140 litres per person per day (lppd). Another way of measuring is the amount of water that is used for commercial purposes. The water used for these uses is metered, if we take the

**WELLINGTON 2040 CLOSES SOON**

Don't forget to have your say on what you think about Wellington's central city, and how you would like it to be in 30 years' time. We extended the consultation by the Wellington City Council to give you plenty of time to have a think and get your ideas in. The new time has just over a week to go so what you think the options for the central city are. The invitation for feedback closes at 5pm on Monday 16 November. Have your say online or send your feedback form to us via [www.wellington.govt.nz](http://www.wellington.govt.nz)

dompost.co.nz

November 26-11-09

### Kiwis still have water that's not fit to drink

Ruth Hill  
HEALTH

**DRINKING** water in many rural schools and hospitals is failing minimum safety standards, with some recording high levels of faecal contamination and heavy metals. The Health Ministry's annual review of drinking water quality — carried out by the Institute of Environmental Science and Research — shows nearly one in six New Zealanders (712,000 people) was supplied with drinking water in 2007-08 that was substandard or untreated. Of the 500 schools with their own water supplies, 88 per cent of those tested had unsafe levels of bacteria and none was treated to a high enough level to protect children from tummy bugs caused by giardia and cryptosporidium infections. Nearly 40 per cent were not tested.

**WATER, WATER...**

- Best water supply: Hutt Valley — 100 per cent poo-free.
- Worst water: Gisborne — just 3 per cent of residents get water proven to be free of faecal contaminants.
- 83 per cent of Kiwis' drinking water has safe bacteria levels.
- 76 per cent of the population — mainly in big cities — have water that meets the "gold standard" of protocol compliance (i.e. cryptosporidium or giardia).
- Only 17 per cent of tested schools with their own supplies met minimum safety standards.
- 150 water zones — including 80 run by councils — met bacteriological compliance in 2007-08.
- 76

**ROAD**

The Willie Kihoro Wednesday 11-11-09

Lambton Quay

Don't on the 11th

Willie Kihoro

Don't on the 11th

Victoria Street

Don't on the 11th

A classy drink

No

Nathan Bunn EDUCATION

FORGET THE

PHILIP

# Introduction



**43 cents** in each NZ dollar of urban rates goes to water, stormwater, and wastewater management (KCDC, 2006). Evident pattern of decline in water resources

**Research Objective** – find out the critical constraints to achieving healthier systems that are affordable

**How** – scrutinise the specific challenges facing Kapiti, a community pursuing sustainable urban water management objectives

# Motivation?

Nearly a decade ago the PCE (2000/1) predicted that reaching consensus on environmental, social and economic goals would become one of the greatest challenges facing New Zealand communities. Can we meet the challenge? How?



# Methodology

- Pilot Study
- **The Theory of Constraints (TOC) & Stakeholder typology** to identify 'typical' and 'atypical' stakeholders and systematically examine their perspectives
- **Causal Loop Diagrams (CLDs)** to explore and circumvent potential negative outcomes or 'fixes that fail' (Senge, 1994)





# What to Change?

## How?

1. What is the destination?
2. What to change?
3. What to change to?
4. How to make the change happen?

...with TOC Thinking  
Processes (Dettmer, 2007).

# A model for thinking

| State of Change         | Applicable Logic Tree                              |
|-------------------------|--|
| What is the standard?   | <b>Intermediate Objectives Map</b>                 |
| What to Change?         | <b>Current Reality Tree</b>                        |
| What to Change to?      | <b>Evaporating Cloud (EC), Future Reality Tree</b> |
| How to Cause the Change | <b>Prerequisite Tree, Transition Tree</b>          |

Dettmer (2007)



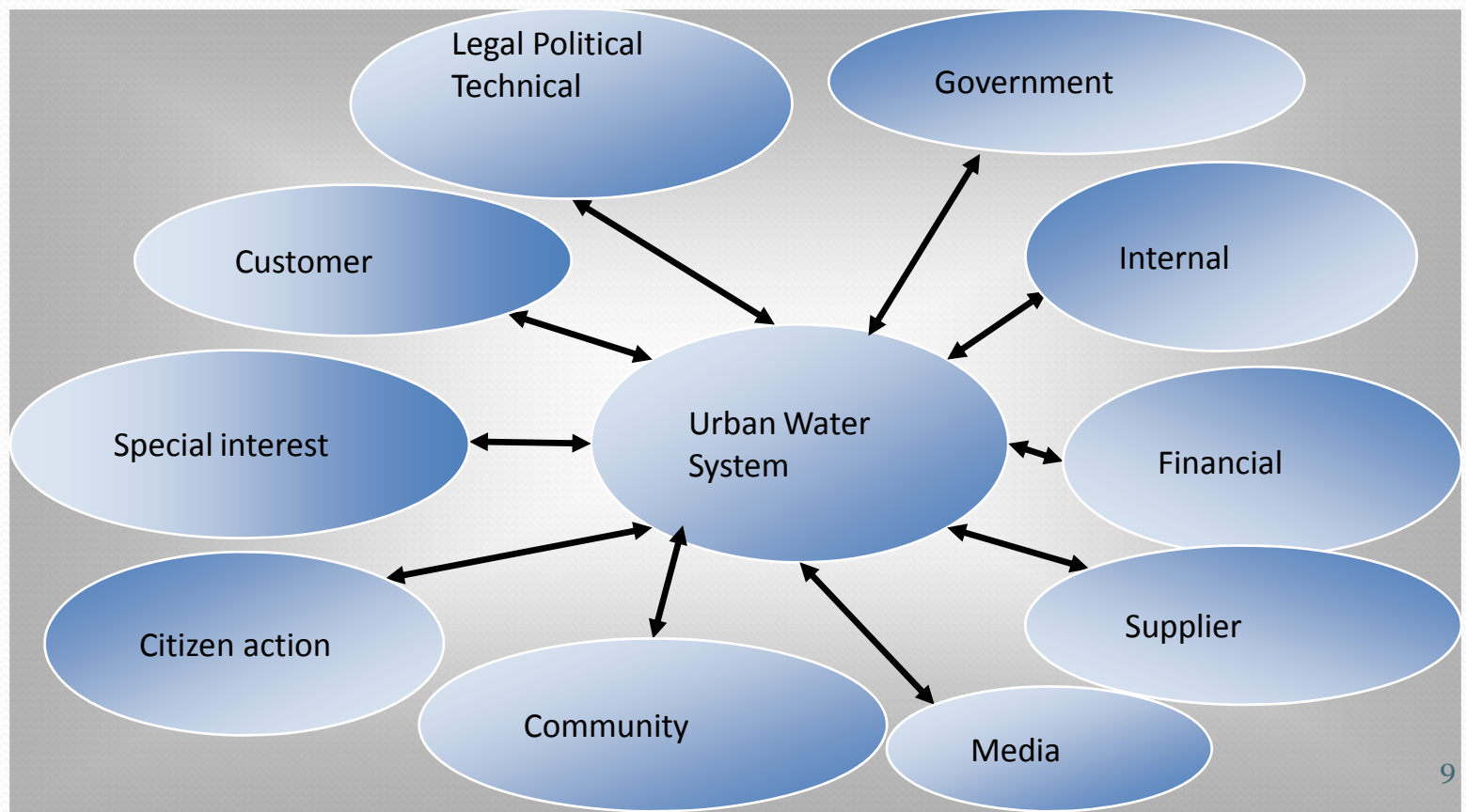
# Approach to Data

- Reviewed consultant engineers' and PCE reports, community surveys/studies, attended public workshops
- Interviews individually and in small groups
- Workshop with Councillors
  - helped identify and break a clear conflict using the TOC Conflict Clouds
  - resolved 'fixes that fail' with Causal Loop Diagrams



# The Stakeholder map

following Elias, Cavana and Jackson (2002). Note the two directional arrows, illustrating the nature of the relationship between the stakeholder and system issue. Study participants are represented in each of the ten categories.



# Voices

***[...] there's plenty of rain in the hills so we need to answer, where exactly is the problem? – Participant***

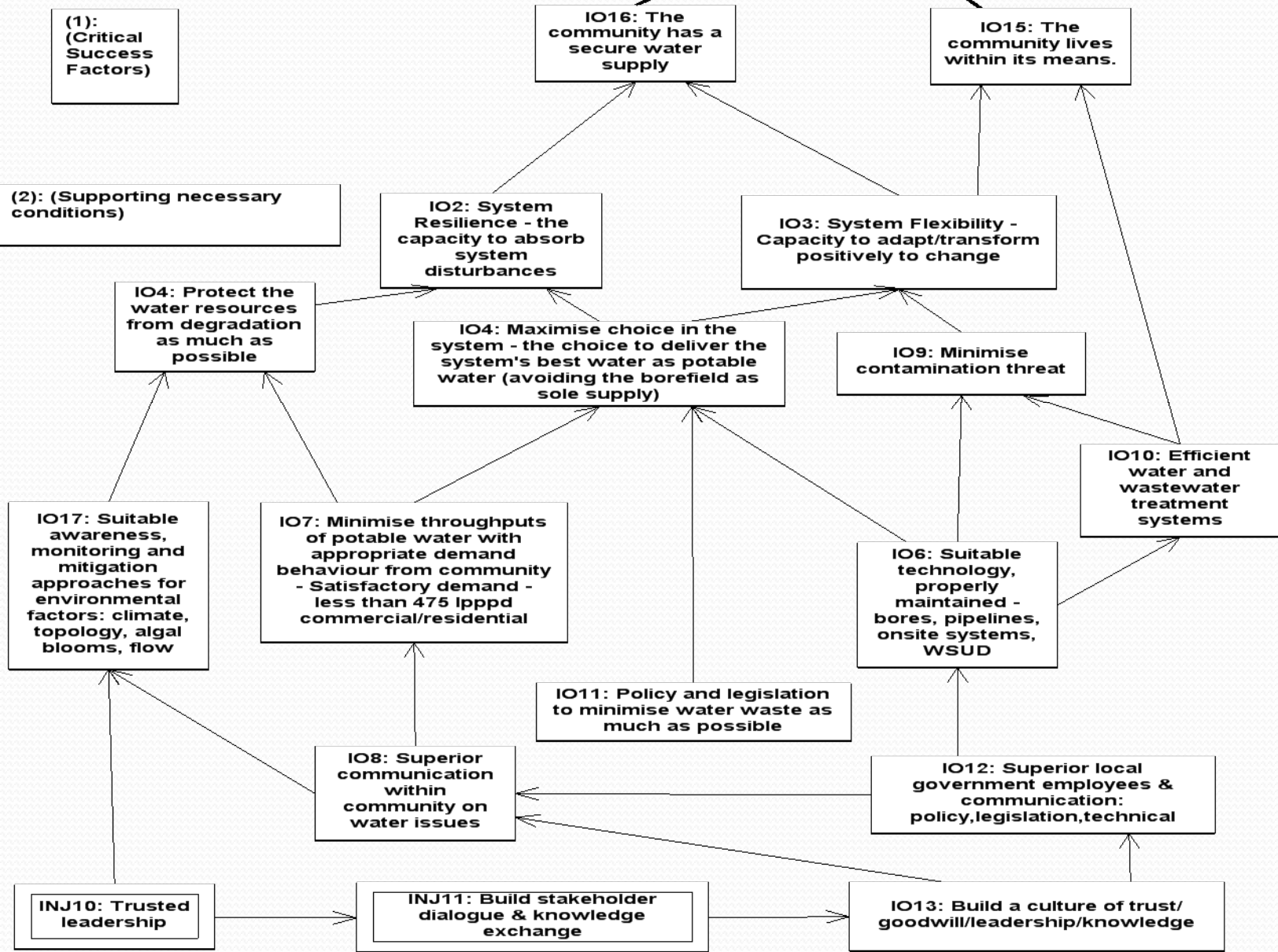
***The search for a magic bullet goes on (when) really we need a coherent package of options[...] we need good advice and good science to support it – Participant***

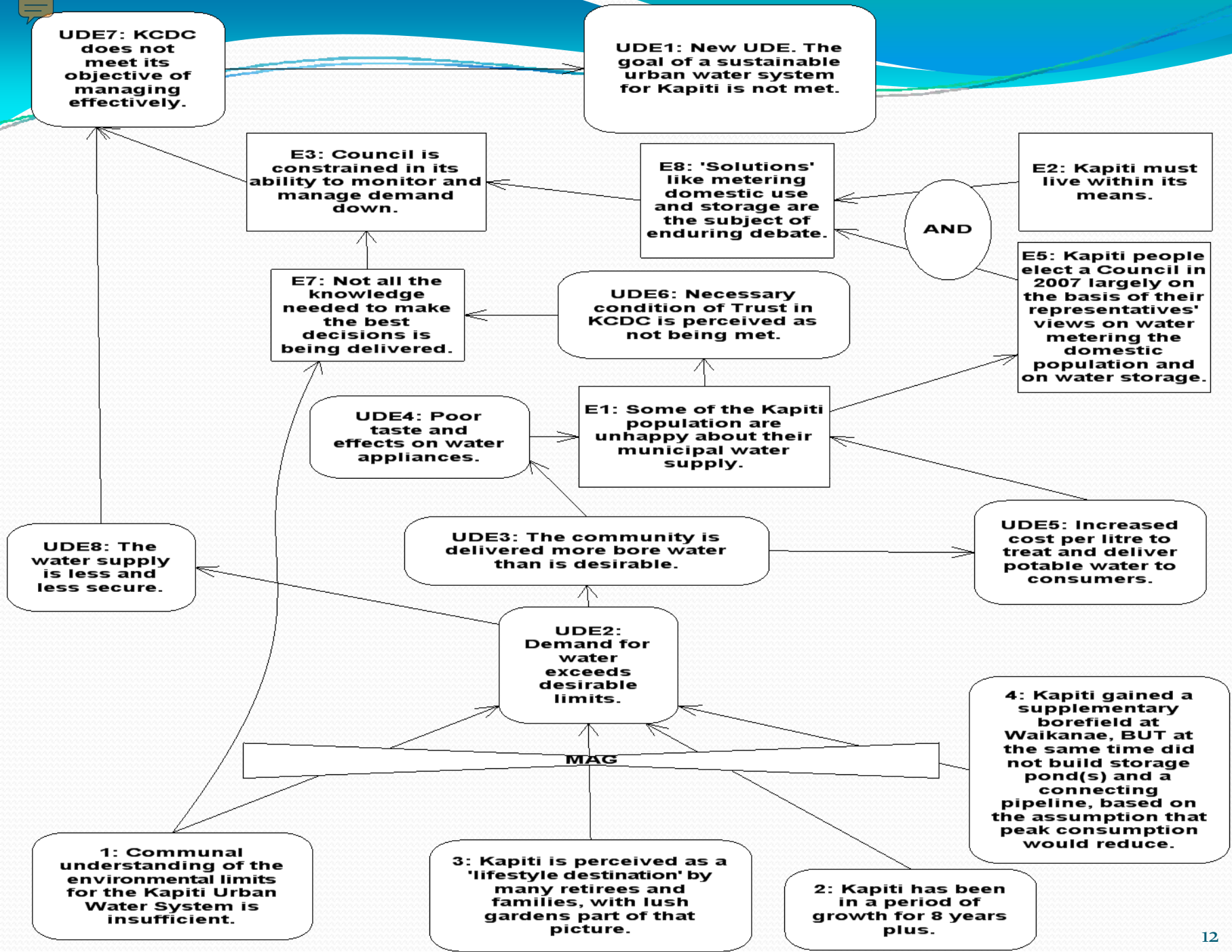
***We're going to run out of water if we don't do something soon – that's why we have to be focused on simplicity – we need a simple plan and the right people – it's quality of communication that's missing – Participant***

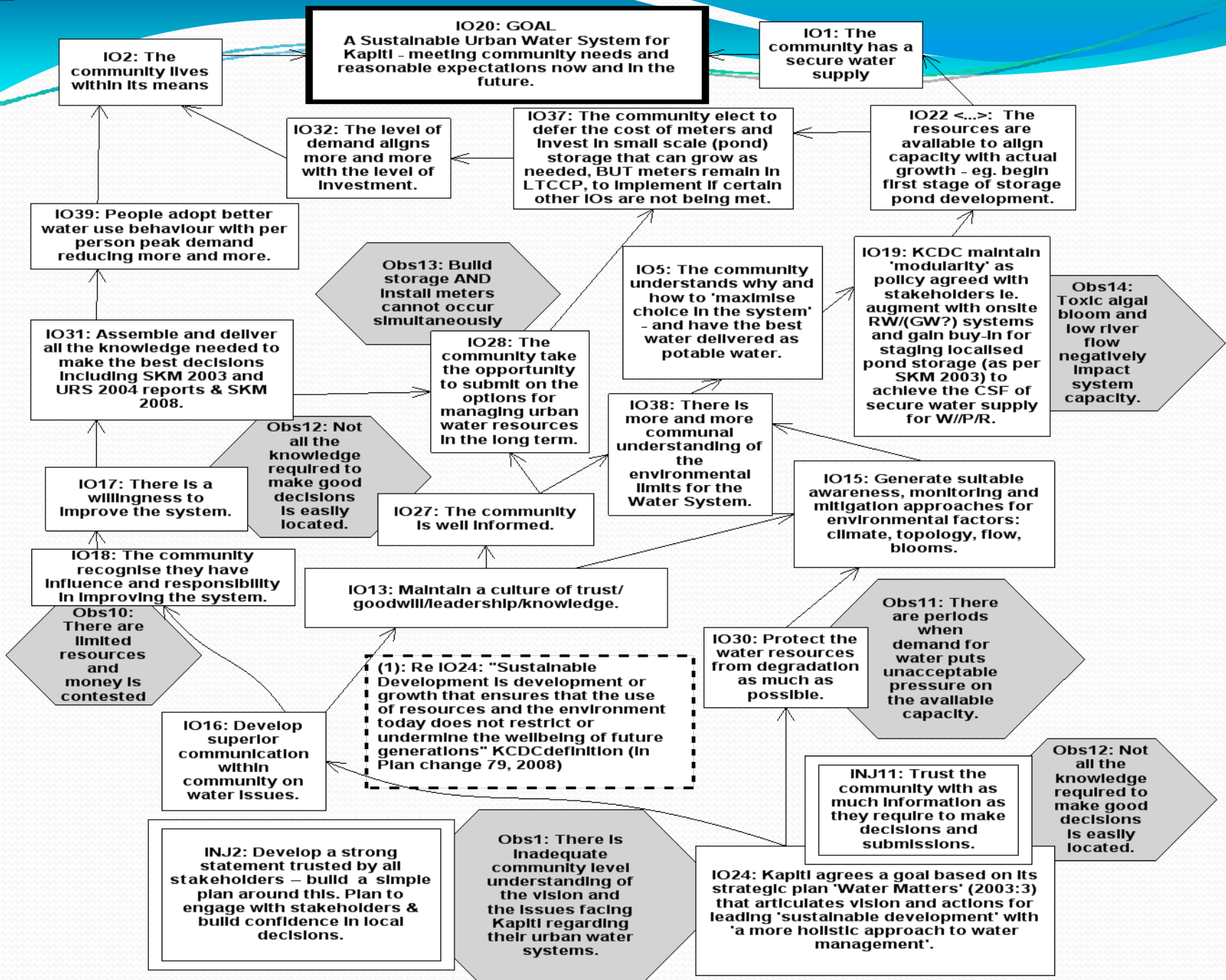
**IO1: GOAL**  
 A Sustainable Urban Water System for Kapiti - meeting community needs and reasonable expectations now and in the future.

**(1):  
 (Critical  
 Success  
 Factors)**

**(2): (Supporting necessary  
 conditions)**



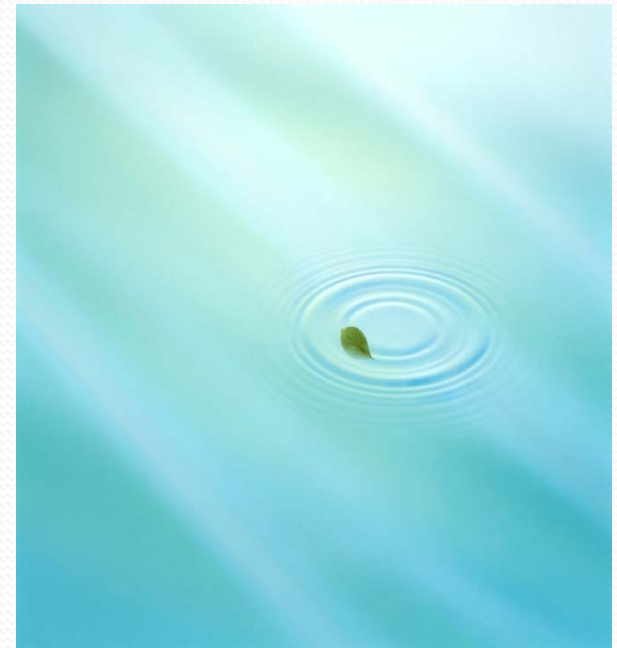




# Findings

The methodologies worked synergistically to **evoke a rich picture** of the **critical issues** and **solutions** – with stakeholders encouraged to **‘think out loud’**.

The **Stakeholder typology** provided a tactical element not routinely evident in systems studies - **valuing experiential & historical perspectives** of those who might otherwise be treated as outside the system, their views **marginalised**.







# So is it worth the effort?

- Full TOC diagrams do take a great deal of time and expertise
- However, the combined TOC/CLD and Stakeholder Typology framework was of **value** in seeking and testing a number of **solutions** to the long standing problem of water insecurity on the Kapiti Coast.
- A type of ongoing conversation with all taking part
- Subsequently, KCDC has adopted a Water Communications Strategy and are also establishing how to best engage with stakeholders – necessary conditions for more sustainable urban water systems (according to the IO maps and CLDs prepared with Councillors and other participants).
- TOC -Aid to thinking, even if not used rigorously?

# Two more November headlines



# Milestones

- Participants were interviewed between July and September 2008
- The thesis with conclusions was made available to all participants in July and August 2009 and feedback welcomed
- The researcher **reviewed KCDC's Water Communications Strategy** and **workshopped IO maps/Conflict Clouds** with KCDC's Water Project Manager in September 2009
- KCDC announced in November 2009 their 'new and systematic approach' to dealing with Kapiti's water supply issues...Watch this space!

# Informing the research

Barriers to Advancing Sustainable Urban Water Management: a typology. *Rainwater & urban design 2007* conference paper presented by Rebekah Brown and M Farrelly

*Kapiti Coast Choosing Futures Community Plan Part 1 2006*

Parliamentary Commissioner for the Environment Reports: *Aging Pipes and Murky Waters, Urban water system issues for the 21<sup>st</sup> Century* (2000) and *Whose Water is it?* (2001)

Kapiti Coast District Council Water Strategy: *Water Matters* (2003)

# Thank you

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