

No mere Drop in the Ocean

How geographical biases and financial resources prevent and promote specific societal strategies for approaches to water management

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Précis

This paper is based on the original piece ‘A Drop in the Ocean for Foresight Practitioners’ completed as part of a Master’s program at the Australian Foresight Institute in 2003. Since that time a number of the key concepts have been taken to the wider public though never in the full document provided here. The majority of the original content remains intact with a handful of adjustments and some changes having been made to the formatting of tables.

Introduction

This paper aims to assess aspects of arguably the greatest challenge facing the globe – access to, availability of and uses of fresh water. A topic of this magnitude could easily form a multi volume book. You’ll see here that I provide some broad-brush strokes for consideration with hopefully enough detail for you to formulate the potential impacts of the fresh water challenge that faces us.

Two new concepts are introduced - a currency unit called the ‘Global’ ⁽¹⁾ and a metaphor called the ‘Global Currency Map’ ⁽²⁾. These concepts are aimed at adding depth to our understanding of what water means to different cultures, to peoples of differing societal zones and how these zones and cultures may approach the use of water.

Causal Layered Analysis [CLA] ⁽³⁾ is applied in a general way to assess the ‘Global Currency Map’ and how we may identify the differing approaches of societies around the world. The aim here is to group similar societal ‘strategies’, regardless of the cultural types or geographic position, to show that it is the ‘strategy’ applied or accepted by that society, that has identifiable factors leading to how water is used. The strategies available to any given society are heavily influenced by two factors – the geographical and topological biases that enable or prevent the formation and delivery of water, and the financial resources that enable a society to build and maintain effective water delivery infrastructure.

By identifying components of a societal strategy, we develop our assessment of that strategy from the level of ‘Litany’ (the unquestioned acceptance of how things are) to a conscious level that may provide opportunities to consider the possibility of the need for change and actions for effective water management. We also establish the means to assess whether water management strategies particular to one societal zone may be suitable for use as potential methods for another society to move forward, or as a warning sign for potential pitfalls.

Finally I offer questions that may challenge strategists to enhance their forward views and those of their clients to consider the potential impacts ahead.

Some Global Facts About Water –

By reviewing a few ‘snapshots’ that detail the spread and complexity of the global water challenge, we are able to quickly understand the significance of the problem the world faces. Doing so should provide greater clarity as you work through the paper:

- In the decade from 1991 to 2000, almost 1,720,000,000 people (equivalent to almost a third of the world population) died from drought or flood related causes ⁽⁴⁾

- Incidence of Floods are becoming more frequent almost doubling in the years 1990 to 1999 ⁽⁵⁾ with serious personal and financial impacts
- Climate and crop modelling simulations predict agricultural production losses due to flooding, will cost the USA \$3 Billion per year over the next 30 years ⁽⁶⁾
- A recent worldwide poll on the environment received over 25,000 responses from people living in 175 countries. Of all issues, concerns over water supply was rated the number one issue of importance.
- The main cause of Cholera epidemics is infected water supplies most often linked to poor sanitation ⁽⁸⁾
- Effective management of diarrhoea could save 1.8 million lives a year ⁽⁹⁾
- In just 3 districts of Bangladesh alone, Arsenicosis kills more than 1 million people a year with many more impacted by related diseases ⁽¹⁰⁾
- In the Gaza strip, nearly 1 million Palestinian people use 25% of the available local ground water. The remaining 75% is used by the Israeli settlers - less than 4000 people ⁽¹¹⁾

On the balance of these points it would be easy to assume that none of the above indicators are in any way 'positive outcomes' for the planet. Certainly not for the people affected. However given the demands an increasing population rate means on our finite resources, perhaps the human species has discovered its own method of not outgrowing the planet? The points provided also highlight how impacts in one zone may differ from impacts in another and importantly show that there may be water related events of which people in one zone are unaware, and yet are significant to others.

What the points above all indicate is just how far reaching the issue of fresh water is. All continents and areas of human activity are affected, from agriculture to health, industry to recreation, from tourism to disease and more.

Expanding your perspectives

Fresh water is often thought of as 'drinkable' water. The term most often used is 'potable'. However we may be better served by consideration of fresh water in terms of its 'useability'. Useability gives us an application focus - the 'purpose' for usage.

This reminds us that oceans also play a part and only 'fresh' oceans provide advantages for our future. Fish stocks play a vital role in the supply of food, often commercially in a far cheaper way than other food options. As part of the constant water supply 'loop', ocean evaporation leads to cloud formation and then fresh water falls elsewhere. This cycle aids the temperature regulation of the planet, provides food and redistributes fresh water for crops.

Useability expands our consideration of fresh water to consider such qualities as drinkable, recyclable & sustaining (various life forms). The idea of 'purpose' expands the standard by which we judge water quality and the potential for use inherent in its availability. This also allows us to assess water quality in light of what it may be suitable for – its purpose. So the water used for drinking should be of a higher quality than that used for washing a car (in western worldviews at least), and the water quality for car washing is still a useful quality to consider (though arguably, significantly less important).

Later in this paper you'll see we are discovering that different plant species also have differing demands for water quality. Second and third use crop systems are becoming more commonplace. You'll see in the page showing the slide 'The Whirlpools of 'Global Impacts' just how far reaching the challenge is. This list provided is not exhaustive.

In order to help expand our perspectives, I've designed a new method of 'currency' and a map that helps us to determine the various strategies for water usage around the globe.

Introducing the 'Global' Currency Unit (GCU)

In 2002 in a discussion on triple bottom line reporting and sustainability I indicated that in my opinion there already existed a collective 'global currency', and that we had up till that point, failed to recognise it. I subsequently compiled the framework for what I subsequently referred to as 'The Global'. (12)

- A single 'Global' currency unit is equivalent to 1 litre of water. This would be drinkable grade water where the 'purpose' needs fresh water for usage and 1 litre of salt water where the purpose requires 'salt' water
- Because all supply chains use water at some stage, all trade exchanges are merely examples of shifting 'fresh' water in its various forms and end states.
- All trade exchanges, be it nationally or as part of the wider global market, vary from high cost trades (high water expenditure in production) to lower cost trades (lower water expenditure in production)
- Establishing a world-wide standard of water currency value, provides a means by which trade activities (water expenditure) can be assessed
- Establishing a standard value for water usage also changes the paradigm of personal use - personal activities will now be viewed as a form of 'trade' - the expenditure of fresh water to achieve an end result. This also places a burden onto the individual user because although agriculture and manufacturing are high front-end users of water, they are ultimately supplying individual needs & wants so pressure for improvements in industry usage of water cannot be placed in the realm of industry alone.

The preceding five points combine a multitude of perspectives. I have combined Salt with Fresh, the individual with industry and established a simple benchmark regardless of physical location. Within the realm of foresight, our ability to extend our views beyond the paradigm in which we operate gives rise to a potentially more aware picture of what the future may hold and this is what the 'Global' attempts to do for the subject of water.

These next five points link the 'Global' currency unit to the Global Currency Map (GCM) by establishing the societal strategy for water expenditure in much the same way that we can establish the balance of trade figures for a country. The GCM identifies the various 'playing fields' of where and how 'Globals' are spent.

- The concepts of 'globalisation' and 'open markets' fail to consider the inherent inequities within the trade system. The GCM is based on a broad take of World GDP figures, energy consumption, food production and international rainfall estimates. (13)
- Accepted in any country, 'Globals' are in abundance in some countries and are short supply in others and whilst the current system of trade appears to shift goods & services what it really moves is 'Globals'.
- By mapping the lack/abundance of fresh water access and the degree of trade/consumption within a country, we can identify a particular society's 'Global' expenditure & the potential challenges this expenditure creates.
- The GCM helps to identify likely cultural challenges and tactics that may be transportable into other countries and zones as well as identifying why other tactics may be unsuited.
- Sociological, topological and geographical restrictions & limitations of the planet impact the inequities found within the 'Global' trading system. Future trade exchanges will need to be far more alert to the expenditure of 'Globals' and the impact that that Global expenditure has on the future of our world.

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As you can see, trade in water in its various forms and end states, extends across the world. By assessing how a particular society uses water and applying Causal Layered Analysis (CLA) to that method of use, we gain insights into the limitations of the various ‘models’ of water use and begin to find useful ways forward to address the impacts of water shortages.

CLA is a four-tiered methodology for assessing the depth of information on a topic. These four tiers are - Litany is regarded as an unquestioned acceptance of stated ‘facts’ or perspectives; Social Causes are often seen as the accepted approach to ‘how things are done’ within the society; Worldviews are the perspective that a particular ‘class’ of society shares as common ground, i.e. ‘western’, ‘3rd world’, ‘banking’, ‘environmental’; and Myths & Metaphor are the unconscious drivers of the psyche of how a society sees its self. Another way to understand the layers from Litany to Myth and Metaphor is stating them as ‘what we say’; ‘what we do’; ‘how we think’ and ‘who we are’.

By using CLA we increase our depth of knowledge regarding the particular way water is used and treated in differing zones throughout the world.

The Global Currency Map

High \$



Cultural Tensions

Expensive search for water saving in manufacture & food production.
Accepted as scarce resource in society as self sufficiency in food difficult
Eg: Israel/Palestine, Turkey/Syria

Consumption Driven

High waste in manufacture. Minimal recycling urgency, few ‘environment friendly’ laws. Disruptions to the norm met with disbelief but no societal behavioural changes seen
Eg: United States, Russia

On the Cusp

Semi self sufficient in many industries. Exposed to weather variances and its impact on national economy. Tourism plays large part of trade income
Eg: West Indies, Australia, Italy

Aid Dependant

High mortality rates, starvation and water borne diseases. Reliant on inflows of donated food. Geomorphic riches controlled by external entities or open to decreasing supply
Eg: Southern Africa, Papua Nugini, Narau

Joining The Rat Race

Selling of environmental assets as major source of income. Deforestation, animal smuggling, drug crops & increasing population rates.
Eg: Indonesia, Philippines, China & South Americas

Low \$

Low ← Fresh Water Access → High

Interpreting the Global Currency Map (GCM)

The Global Currency Map attempts to combine a series of factors that provide distinguishable characteristics of a particular 'approach' to water. The currency in this instance is the currency of 'Globals' and you'll recall that a 'Global' is equivalent to one litre of 'fresh' water.

There are two axis lines ranking low to high variables– the vertical axis assesses the dollar value in the population, a broad take on GDP figures, and the horizontal axis assesses fresh water access. It is important at this point to note the use of the word 'access' as many of the countries perceived as drought ravaged, often have sufficient rainfall throughout the year to make the drought more manageable. What are lacking are systems to store water for later use and to direct that water to sites where it is most needed.

The GCM also provides five identifiable societal zones made up of countries that share similar strategies applied to the use of water. Called 'Aid Dependant', 'Joining the Rat Race', 'On the Cusp', 'Cultural Tensions' and 'Consumption Driven', each of the five strategies has consistently definable characteristics that separate it from the others, even if aspects of each zone may utilise the strategies more common to another societal zone.

Litany

The first stage of applying Causal Layered Analysis to the GCM begins by identifying how Litany 'occurs' to each of the five societal zones. The unquestioned 'givens' for each zone has a distinct feel dependant upon the various aspects that make up that society. The quality of infrastructure for effective water storage and use has a major role to play as it may be argued that the level and quality of the water-based infrastructure is a critical determinant in what strategies are available for a society.

Social Causes

How do social causes manifest themselves within each of the five zones? In looking at the 'Joining the Rat-Race' grouping (fig 3), the level of water availability determines what priorities are paid most heed and what choices are available to societies that share a commonality. As the society meets some of its needs, there is a strong likelihood that the society will change its strategy to encompass other uses for water.

For example, the 'On The Cusp' strategy (fig 4) shows a community divided between the perceived 'promised land' identifiable with aspects of the Consumption Driven strategy whilst identifying with the natural resource degradation seen in 'Joining the Rat Race' zone.

Each of the strategies has a social cause and some of the 'priorities' are in fact self-interested 'causes'. As such the water approach within each strategy is stretched between the 'what we stand for' cause (purpose) and 'why this happened' cause (impacts). Decisions over using water for power supply or agriculture, or for sanitation or recreation may generate internal clashes within each societal zone (as people fight for their own desires) or trans-currency clashes between differing social zones.

The World View

At the third tier of causal layered analysis we begin to note the perceptions that each of the five social zones has about what makes their world 'real'. Importantly we learn how their view of reality shapes what they perceive to be a world approach for both their views on others, and the others' views of them.

Aspects of denial and fear are commonplace as the view on water access is ‘chunked up’ to a larger view. Here we have societies beginning to grapple with awareness of changing ‘realities’ as the depth of understanding has shifted from a societal level to an appreciation (perhaps an acceptance) of the true nature of the problem. The drivers for change, innovation, adaptation and preparation are embedded within the particular worldview and how that worldview typically responds. The western worldview turns to science and technology (but not to its own behaviours) to ‘fix’ the problem. The 3rd world may see tribal elders appeal to the gods for assistance or indicate that it is time for the group to move on. The environmental worldview sees ecology as the provider of a way forward while the finance worldview may see opportunities for profiteering.

Myth & Metaphor

At the fourth tier we apply CLA to the GCM to assess how Myth and Metaphor appears to each of the societal zones’ approaches to water. Remember that myth and metaphor are deeply embedded within the social psyche and help us form patterns of behaviours associated to that psyche. Australia’s ‘fair go mate’ and ‘laid back larrikin from the bush’ are examples of the metaphor.

We have easily definable differences to what a water metaphor means to each of the zones. Dams for instance are a potential ‘life raft’ for the Aid Dependent whereas for the Cultural Tension strategies dams mean ‘power’. For the Consumption Driven strategy, dams indicate a ‘civilised society’ for they supply clean water and electricity. Industry methods, health problems and solutions, recreational choices and more are heavily influenced by water access. The examples below indicate each zone’s suggested surface level discussion points, activities, thinking and beliefs that we are likely to see in each of the zones within the GCM.

Global Currency Map: ‘Aid Dependent (low GDP and low fresh water access) Zone’ and the approach to water

Causal Layered Analysis Level	Societal Approach/Thinking
Litany (what we say)	Water provision is seen as the role of women who carry water (often hand pumped) vast distances. Education on disease limited and may be based on superstitious beliefs. Water seen as a ‘sacred’ gift. Tainted water is a message from the gods. Oceans and rivers supply food where access is available.
Social Causes (what we do)	Every drop is to be saved. Water quality & access a major concern. Water borne disease has huge impact on survival rates, medical costs and self-sustainability but tools are limited so we do what we can. Low water access reduces food production and increases reliance on international aid
World View (how we think)	Birth rates remain high to combat water borne disease-driven mortality rates. Western scientific intervention provided or requested as it is seen as the silver bullet. Education of masses slow and open to cross cultural misinterpretation. Food aid will hopefully come ‘in time’ to save us
Myth & Metaphor (who we are)	Water means life. And Death. The ancestors and elders hold the key to water access. Every drop is a precious gift from the spirits. Changing of Seasons bring hope and despair.

Fig 2: CLA & the Global Currency Map – The ‘Aid Dependent Zone’

Global Currency Map: ‘Joining the Rat-Race (low GDP, high fresh water access) Zone’ and the approach to water

Causal Layered Analysis Level	Societal Approach/Thinking
Litany (what we say)	The rainy season comes one day and then on another it stops. Water is a ‘road system’ for boats as part of a person’s daily life and is developing into a major highway for industry. Water will always be in abundant supply as it always has been
Social Causes (what we do)	Dams to supply power and timber for export leads to loss of natural habitats. Water used as method of waste disposal for all levels of industry & society. Fresh water often bottled or required to be boiled. Most water borne diseases avoidable & precautions not always taken
World View (how we think)	Rainforest timbers bring instant rewards. Tourist income not yet sufficient to offset impact of extraction of timber. Water degradation perceived as minimal due to abundance of supply. Flow on effects ignored as the ‘west’ will buy natural assets feeding many more mouths.
Myth & Metaphor (who we are)	Water helps grow trees that supplied medicinal (healing) qualities. The rainforest and rivers are one. A new ‘spirit’ has arrived and the ways of the ancients are being overrun as we bow to the god from the west. The ‘gap’ between rich & poor grows vast as the ruling elite pocket the wealth

Fig 3: CLA & Global Currency Map – The ‘Joining the rat race Zone’

Global Currency Map: ‘On the Cusp (variable GDP, variable fresh water access) Zone’ and the approach to water

Causal Layered Analysis Level	Societal Approach/Thinking
Litany (what we say)	“There’s drought and then there’s flood”. Faces the challenges of each of the others – consumerism, reaping natural assets, the pain of ‘lack’ & seeking methods for effective use. Oceans are to be respected. Each sector of society’s own beliefs go unquestioned
Social Causes (what we do)	Society segregated with understanding the importance of the water challenge. Farming districts remain reliant whilst cities are ignorant of consumption. Connection to tourism needs is strong and anything that threatens industry receives attention. Planning for future needs lacks scope & urgency beyond ‘el Niño’ time scales
World View (how we think)	Society is split as to how or when to tackle problem. Industry denying the problem looks for quick fixes. Pulled by lure of consumption driven ‘benefits’ of ‘globalisation’, parts of society want

	to reach levels of leading consumer societies. Repeating mistakes made by others nations
Myth & Metaphor (who we are)	It's a harsh land battered by 'mother nature'. The world sees our clean oceans but we hide our dieing rivers. Success means a green lawn & a washed car in the driveway. As people of the land we have to put up with the challenges presented to us – she'll be right!

Fig 4: CLA & Global Currency Map – The 'On the Cusp Zone'

Global Currency Map: 'Cultural Tensions (high GDP, low fresh water access) Zone' and the approach to water

Causal Layered Analysis Level	Societal Approach/Thinking
Litany (what we say)	Water viewed as an expensive commodity. Fresh water used in recreation is for the 'rich' and holds high allure. Strong connection to water use & sustenance
Social Causes (what we do)	Society accepts need to conserve water. Industry leads the way as water costs are prohibitive to profit. New dams and de-salination structures are proposed to supply population's drinking and or power needs with minimal consideration for cross border or environmental impacts.
World View (how we think)	We are in a race to establish more water reserves before nearby neighbours and to increase our 'living standards' (consumption). Down stream impacts of dams ignored or are denied in order to preserve self benefit and potential.
Myth & Metaphor (who we are)	Water abundance indicates wealth and control. Dams mean power. Civilisations evolve around mighty rivers and ownership and control of water resources is a right assigned by god(s)

Fig 5: CLA & Global Currency Map – The 'Cultural Tensions Zone'

Global Currency Map: 'Consumption Driven (high GDP, high fresh water access) Zone' and the approach to water

Causal Layered Analysis Level	Societal Approach/Thinking
Litany (what we say)	Water is viewed as a 'given' with a strong link to 'recreation'. Advertising images for hair products, bathroom products and cars involve images of an abundance of water. The 'kitchen tap will always work'
Social Causes (what we do)	Water a 'right' for agriculture & domestic use. Disposal seen as Govt's problem. Natural flood outlets levied to protect homes, causes problems downstream. Redirection of rivers for electricity, oceans used as waste disposal & as an asset to be plundered. More technology will fix all ills.
World View (how we think)	Water access a '3 rd world' problem – may provide business with opportunities. Some sectors are pushing for wiser use of water. Industry

	relies on cheap water but reluctant to spend on infrastructure. Fresh water sources are potential terrorist targets
Myth & Metaphor (who we are)	Sanitation a sign of an advanced society. Success keys are a swimming pool, jacuzzi, a bidet in the bathroom and a freshly washed car dripping in the driveway. Snow, Water & Jet skiing display man's dominance over 'nature' – water is a simple toy for pleasure

Fig 6: CLA & Global Currency Map – The 'Consumption Driven Zone'

What the quick overview of each societal zone shows is that the approaches available to that zone is heavily influenced by that zones' ability to access differing (and often more complex) types of technology and or the ready accessibility to water. Where the washed car in the driveway or long showers are taken for granted by the 'Consumption Driven' society, such choices would be deemed unacceptable or unavailable to the wider public in the 'Joining the Rate Race' zone. When it comes to the issue of water, a comparison between the 'Aid Dependent' zone and the 'Consumption Driven' zone can be summed up as 'Life versus Lifestyle'.

Alarm Bells & Trouble Spots

Now that we understand the existence of different strategies around the globe for how water is consumed and for what purpose, along with the various layers of thinking that drive the different strategies that emerge in each particular zone, we can look more closely at individual signals arising from within those various strategies.

The following list provides six key trends already occurring, or that have potential to demand society focus. The Whirlpools of 'Global' Impacts provides an overview of many of the interconnecting factors that make up the key segments determining the development of a society: 'Sanitation', 'Manufacturing', and 'Food'. These whirlpools are metaphors for the various trends coming together and causing a form of societal turbulence that may dissipate with minimal effect or increase from a small eddy into a significant whirlpool, sucking energy and resources into the depths.

These six trends provide clear warning signs and calls to action not only as independent 'eddies' but also as combinations of areas of turbulence and help form the three major whirlpools listed below.

Trend 1 **Disease** - Gastro Enteritis, Malaria, Ross River Fever & Murray Valley Encephalitis, Diarrhoea/Dysentery, Cholera and others. With increasing periods of shortages in quality water, all zones are likely to see severe impacts on health costs & expenses, death & burden of care, potential epidemics and control.

Trend 2 **Access & Usage** - Civil and Industrial. Supply, Quality and Costs. Preferences for 'high value' trade commodities & activities, Interest group influence on crop growth and political favouritism. Expect to see more consumers making purchasing decisions based on the level of water consumed to create comparable products and to deliver comparable services.

Trend 3 **Threats** – Trans-national and international conflicts. Dams, waste disposal, trade competition, deliberate & incidental poisoning of supplies through terrorist activities etc will emerge as areas requiring deliberate actions and contingency plans.

Trend 4 **Ownership** - Rainfall catchment & run off areas, 'Public Domain versus self-interest'. Who 'owns' water? Considerations of rights of supply and use for farming and industry, pressures to commercialise (privatise) water management.

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Trend 5 **Consumption** - Domestic, Industrial, Agriculture - 'True Cost' accountability of water use. Society being forced to choose between supply to specific areas such as allowing dairy farming for milk production versus industrial steel production versus personal grooming needs.

Trend 6 **Location & Creation** - 'Global Domain' concept - Rainforests currently produce two thirds of the world's rainfall (14), iceberg 'farming & mining', storage facilitation for times of limited supply, environmental variances.

The Whirlpools of 'Global' Impacts

Sanitation



Eg:

Illness & mortality rates
 Health Infrastructure & Costs
 Hygiene/Disposal of waste
 Population In/De cline
 Education
 Loss of skilled workers
 Disease Epidemics
 Marcus Barber 0417815
 October 2002

Manufacturing



Eg:

Production costs
 Business closures/survival
 Employment impacts
 Inventory management risks
 Infrastructure costs
 Decreasing profit margins
 Input Supply shortages
 HSF 631

Food Produce



Eg:

Crop production
 Starvation/supply
 GM Food impacts
 Salination & Soil Erosion
 Stock feeds, food choices
 Cost of Imports, Loss of exports

13

Expanding The Whirlpools of Global Impacts

The 3 key 'whirlpools', Sanitation, Manufacturing & Food each appear to exist as an isolated eddy, fully self-contained. However foresight practitioners understand that such a simple belief ignores that there are potential 'knock on' effects for EVERY factor listed in one eddy that connects it to other factors in the other whirlpools.

We can expand the effect of seemingly isolated factors. For example, 'disposal of waste' is a clear sanitation issue reliant upon water supply. If we ask the question 'What happens if we lack effective sanitation methods?' we can identify that Manufacturing may also be impacted both through a loss of skilled workers due to disease and also by loss of potential customers. We could also say that Sanitation has an impact on food production, both for fresh water supplies to grow crops and also for soil quality. When you begin to assess multiple factors simultaneously, we get exponential challenges to each societal zone.

It would be errant of a reader to believe that any one particular society is better placed than another. Whilst the societies with higher GDP may be in a position to invest more resources to deal with challenges that emerge through the whirlpools of global impacts, vested interests would not 'go gently into the night'. As such we could anticipate large sections of society to face significant penalties as influential sections of society vie for survival.

Tying It All Together -

As someone who has grown up in a western worldview society I bring particular biases, beliefs and understandings to any assessment of a topic. In order to consider more fully the widespread nature of the problem I have used CLA to add depth to my interpretation. The following then becomes a mini critique on the unquestioned way of being, within this western (my) worldview.

What the Global Currency Map indicates is that different societies treat the concept of water differently. This also means that their expectations of water availability are different, that their strategies for conservation are different and that their priorities regarding usage of water are also different. The following points assess how a typical 'western worldview' takes for granted water supply, assumes an unabated continuation of its worldview, and looks at current water usage and for what purpose in both commercial and domestic needs.

Having provided some of the broader worldviews and their crises, I leave it up to the reader to determine if the usage facts stated here are justifiable in view of the overall world need.

Usage Facts (commercial)

A typical paper mill uses up to 350,000 litres of water to make just 1 ton of paper ⁽¹⁵⁾

Typical breweries use 10 litres of water to make just 1 litre of beer ⁽¹⁶⁾

Murray Darling Basin Irrigated Agriculture accounts for 70% of all water used in Australia ⁽¹⁷⁾. Approximately 25% of that consumption is used solely for the production of one crop - cotton

Every year between 50% and 75% of resource inputs to industrial countries are returned as waste flows to the environment ⁽¹⁸⁾

Inside the next 15 years, scenario modelling predicts that water shortages will cause the price of rice to increase by 40%, wheat by 80% and corn by 120% ⁽¹⁹⁾

Commercial Impacts

Decreasing supply will lead to increased costs of manufacture and in some cases, business collapse. Companies with inadequate foresight will struggle.

- Building & Construction - timber, concrete, glass and steel all heavily reliant on fresh water for production, sanitation & cleaning
- Automotive - one of the highest commercial uses of fresh water is in new car manufacture along with petroleum production & tyre manufacture
- Textiles - dyes, paints, fabrics and paper all produced with fresh water inputs
- Mining - used to cool machinery, dampen coal dust, tailings dams, wash raw ores
- Agriculture - growth & quality, soil erosion & salinity, greater seasonal variances
- Fisheries - stocks are impacted by ocean pollution & pesticide 'run-off', water is also needed for cleaning, freezing and cooking

Usage Facts (Domestic)

Non-smart toilets use up to 11 litres of fresh water per flush and the domestic toilet is the largest household consumer of fresh water (20)

Modern Composting toilets produce no odours, use no water, are virtually maintenance free and look just like the 'normal' system (21)

'Concrete doesn't grow, so why water it?' (22)

An average hose consumes 40 litres of water a minute (23)

On the first day of level 1 water restrictions in 2002, Melbourne used almost 1,000,000 litres less water than it did on the previous day (24)

"One of the more common causes of domestic shrubs and plants dieing is root rot caused by over-watering" (25)

Domestic Impacts

Our typical western worldview approach means that even domestic consumption has a high degree of waste based on a taken for granted view of water availability. If we fail to curb our consumption of this resource, the following impacts are likely to eventuate.

- Societal - Welfare agencies, employment agencies and health are all likely to be affected by decreases in water supply as job contraction leads to income loss and financial strain and water related illnesses increase.
- Crop growth (food shortages) for stock & human consumption can be severely impacted by drought or water contamination. Grain and pasture fed livestock likely to be slaughtered with water shortages. Floods wipe out whole plantings. Prices for meat products jump. Staples like bread, pasta, rice, vegetables and fruits also hit.
- Poverty entrapment & wealth reduction are potential outcomes as industries reliant upon access to water collapse, leading to job losses. Some industries could take years to recover. Gambling & crime related flow on effects potentially increase.
- Irrigation techniques force changes in crop rotation leading to changes in supply. Sporting clubs see increase in injury due to hardness of grounds. Damage occurs as houses begin to shift and walls crack due to footings drying out. Insurance premiums increase.

Plans in action

Luckily all is not lost. Action is being taken and many initiatives are underway as the following local, national and international levels activities attest. Many of the ideas have proven their worth. For others, the longer-term impacts have yet to be seen or felt. The judgement as to their overall benefits for implementation is left to the reader. What you may care to consider is whether you are in a position to influence a wider understanding of these techniques and if you feel they are a valuable alternative to standard practises, perhaps implement them in your own sphere of influence.

International Initiatives

- India - UV Water Works, a low maintenance Infection Removal system for water supplies invented by Professor Ashok Gadgil (26)
- United States - IWMI's Water & Climate Atlas provides data to farmers for timing and quantity of irrigation based on evapotranspiration levels of local area (25)

- Egypt - Driwater, a gel tube feeding water directly to roots reducing evaporation and enabling effective tree growth in harsh conditions (27)
- CSIRO's dry root technique - Used in grape crops around the world as a precise tool for root watering that decreases evapotranspiration of vines and decreases water needs by up to 50% (28)
- Turkey - Great Anatolia Project (Ataturk Dam) - The damming of the Euphrates & Tigris Rivers for power and water supply throughout Turkey (29)

National Initiatives

- CSIRO irrigation study into crop irrigation - planting crops able to use 'tainted' water, below those crops planted higher that need the freshest water for best results (30)
- Reclamation study & initiatives for recycling 'grey water' (31)
- Water Trading - Desire to enable irrigators who have not used their allocated entitlement to shift (sell) the remainder of their entitlement to those that need it (32)
- Urban grey water re used for vine crops irrigation (33)
- 'Pipe' the Murray & Tributaries irrigation channels to reduce water lost through evaporation (34)
- The 'Tilt Australia Campaign'. With most of the water flowing to the eastern states, suggestion that we lower the continent from the west, causing rivers to flow inland, making more water available where it is most needed (35)
- Drought Proof Australia. A series of dams, river redirections and flow reversals (36)
- The Wentworth Group's 5 Point plan. A group of environmental scientists so alarmed at the pop futurist approach suggested by Alan Jones, they quickly convened a meeting to discuss ways forward that met Australian conditions. The group's name was derived from them having met at the Wentworth Hotel (37)

Local Initiatives & Suggestions

- Grey water flush toilets using shower, bath and laundry water; minimal flush toilets, no flush toilets (sometimes called trees)
- Suburban rain capture in tanks (2000lt min, 5000 max capacity per household) to store run-off for later use on gardens, to wash cars, windows or flushing toilets etc.
- Shorter showers, limit time, number per day, per week, shower nozzles types.
- Boycott high usage products and manufacturers whose techniques are consumption excessive (certain beverage, commodity, automotive and paper manufacturers).
- Boycott products made from rainforest timbers
- Mulch gardens and plant Australian Native trees that require less water and select lawn grasses most suitable to local environment.
- Maintain a small vegetable garden that can be hand watered so that there is less reliance on irrigation fed agriculture
- Use a broom on your driveway. Legislate against hosing down drives.

Other Ideas

- Iceberg farming & mining - collecting small floating icebergs around the polar caps and the drilling of icebergs to gather water for cartage back to nation states.
- Introduction of the 'Global' as a worldwide currency

- A 0.02% Freshwater Tax collected on all international trades to enable countries producing high levels of fresh water to retain rainforests and glaciers etc
- 20% Tax on imports brought in from countries not signatories to Kyoto Treaty. 5% reduction if company from a non signatory nation producing those goods can show it is using best practise standards in water use & environment impacts
- Ban plantation of high water dependant crops (cotton) and farming methods reliant on old world approaches (rice/flood irrigation)
- Genetically modified foods that can cope with smaller amounts of water
- Eat less meat products as these consume large volumes of water through grain feeding and water consuming during the animal's growth

Questions for Foresight Practitioners

Having provided a few broad-brush strokes as to the variety of areas affected by useable water access, the following questions are aimed at expanding your own understanding of the global challenge.

The words 'You(r)' & 'Your Organisation' & 'Your Client' are interchangeable within each question. Others may also be considered. The idea here is get your client to consider the impacts of a sudden or long-term water shortage. The questions generally fall into 3 areas - Personal impacts, Business Impacts and impacts on society, for eg -

What steps have you undertaken to reduce your water consumption?

How would a terrorist attack on fresh water supplies affect where you live?

What are some of the water use activities your client currently undertakes and what alternatives are available that would decrease the level of consumption?

Water availability is so pervasive and yet so unquestioned. Practitioners of foresight, who overlook the significance of what a lack of supply may mean, leave their analysis at 'Pop Futurism' levels. The following questions should help expand your appreciation of just how wide ranging this 'drop in the ocean' has become.

Questions for Foresight Practitioners

1. When thinking about fresh water useability, does your organisation understand the challenge of decreasing supply?
2. Is your client adapting its processes to deal with a water shortage? Does the organisation sell to a customer base that has a water need? Does your client have suppliers reliant upon water for production?
3. How will you be impacted by water borne health issues? Do you have adequate medical insurance? Does the society in which you live have adequate facilities and training to cope with widespread disease?
4. Are you aware of the 'Global' cost variations among food types? How will increasing food prices impact your client and your client's clients?
5. If fresh water access was to be stopped within 1 month, what would your organisation need to do, to be able to continue operating?
6. What legislative, community or organisational pressures need to be applied to create a shift within your organisation's approach to water consumption?
7. During a 'useable water' drought, and given a choice, which of these 3 areas would you be willing to by pass to maintain supply to the other 2 areas? - Food Supplies, Sanitation, Manufacturing? (See Slide - 'The Whirlpools of 'Global' Impacts')
8. Given your selection, how would stopping supply to that area impact on the wider community? What flow-on effects are likely?

9. On a worldwide scale, how does your organisation's 'Global' expenditure compare to the leaders in their field?
10. What strategies from other sectors on the GCM would benefit you? What assumptions are unquestioned by your client with regard to fresh water access, availability and useability?
11. With depleting fish stocks around the world, is the organisation aware of the down stream impacts of waste produced and are they taking steps to reduce this waste?
12. Who owns the water that falls on your client's factory roof?

Summary

The impact of water is no mere 'drop in the ocean'. What will benefit the world is a greater understanding of the challenge that exists now, and how parts of that challenge may balloon in the future.

Concepts such as the 'Global' currency unit act as a means to educate parts of the world as to the excessiveness of our usage, when others understand the preciousness of the commodity and the urgency required to address the challenge.

The Global Currency Map shows how different sectors of the world treat (approach use of) water differently and how lack of quality supply has a flow on effect to other sectors of a society, in particular starvation, disease and mortality.

Practitioners of foresight may well do a fine job in creating more useful forward views for their clients. However if they fail to include 'water' in their eye to the horizon, they are merely taking for granted supply & quality. As I have shown by listing some of the initiatives already under way, and potential questions to consider, it is quite simply, an assumption without foundation.

A Final word about this paper.

The background image for the accompanying power point presentation has been deliberately chosen for its visual ambiguity.

Earth is often referred to as the 'Blue Planet'. The image here however is of one of Neptune. An atmosphere of methane, hydrogen and helium it is unfit for human habitation – windswept, lonely and for all intents and purposes, lifeless. Unless we begin to act immediately and decisively, our planet will achieve a similarity with Neptune as it too will be unfit for human habitation.

Many of us tend to be more impressed with how things look, rather than how things are. It is the realm of the pop futurist mantra where surface images and simplistic notions are passed off as 'depth and knowledge' by media and parties with limiting self-interest focus. In the 'west' our green lawns, clean cars and deep baths ignore the struggle faced by millions every day. It's time to re think our paradigm.

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