Thesis for Doctorate of Professional Studies

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The Race between Education and Catastrophe

Creating Climate-Sensitive-Cities®

An action researcher's approach to
conquering complex climate challenges in cities
through personal leadership
and the development of responsive institutions

Good Governance Accelerates Learning for Better Urban Climate Practices

Certification of Thesis

I certify that the ideas, experimental work, results, analyses, software, and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award.

Signature of candidate Date

ENDORSEMENT

Signature of Primary Supervisor Date
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Abstract

‘History is a race between education and catastrophe’ (Gurría, 2013). This is the essence of the climate-change dilemma in human settlements today. How can cities act effectively to live with climate change?

After a century, the world is bracing for a perfect storm with burgeoning populations drifting to the cities, resulting in anthropogenic greenhouse gases multiplying exponentially. Rapid urban development breaks down natural systems that sequester greenhouse gases, making cities unhealthy, unbalanced, and undesirable (Blakely & Carbonell, 2012). It is reported that ‘more people are killed from poor urban design and climate-change than terrorism’ (Birkeland, 2008), which is an immense ethical problem.

My focus is on creating resilient Climate-Sensitive-Cities®. This approach to tackling the urgency of climate change in cities is five-fold:

1. It audits vulnerability and coping capacity.
2. It addresses audit gaps by investing in accelerated learning for professions and communities to build capacity for resilience.
3. It appreciates that every individual can make a unique contribution to interdisciplinary capacity-building for addressing climate education through their own organisations and regions.
4. It realises that accelerated learning for the long-term investment in individuals within organisations includes collaborative coaching and partnering.
5. It recognises that optimism for a preferred future can be achieved in a world full of perverse incentives.

Although there are many perspectives and prescribed actions from each discipline, my approach is founded on meta-scanning, with principle-based options that emerge from broad lessons from international and local successes. The crucial part of my work is to convert research into desirable

actions in a way that demonstrates learning for better climate governance. The results of my endeavours include influence of policy and practices in fourteen countries and through professional bodies across disciplines. My contribution to transformational guidelines for international climate action transparency is recognised widely.

This thesis comprises an exploration of philosophies, revisiting values, seeking answers to four research questions, a new lens with three perspectives, and project design to ensure higher fidelity with my statement of intent. My Doctorate establishes a framework that enables individuals to lead the way in climate-change practices. I intend to be a living example of such frameworks.

The thesis concludes with new definitions for Climate-Sensitive-Cities® and Accelerated Learning. It also overlays triple loop policy development with the Climate Policy in Practice Cycle® as a means for funding and evaluating action. Finally, a manual for Master Classes delivered across fourteen countries works with a transformational change trajectory that articulates the journey from passive bystanding, to advocacy, to tipping points, to coping with success.

Independent evaluations accelerate the uptake of these skills in governments, communities, professions, and most importantly, individuals. We need to learn, question old thinking, and relearn in order to adapt and live with the many facets of climate-change. Based on this rationale, I have structured my Doctorate to advance a deeper understanding of the technical, intellectual, and interpersonal skills required of an effective Sustainability Commissioner.

Alvin Toffler stated ‘the illiterate of the 21st Century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn’ (ISLS, 2013). **This is how we win the race of education over catastrophe.**

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List of Acronyms

AAS	Australian Accounting Standards (AAS31: naturally generated assets)
ABS	Australian Bureau of Statistics
ACF	Australian Conservation Foundation
ACNU	Australian Council for New Urbanism
ADHD	Attention Deficit Hyperactivity Disorder
ADR	Alternative Dispute Resolution
AGDF	Australian Green Development Forum
AGIC	Australian Green Infrastructure Council
ACOSS	Australian Council for Social Services
AIA	Australian Institute of Architects
AHURI	Australian Housing and Urban Research Institute
AILA	Australian Institute of Landscape Architects
ANU	Australian National University
ANZ	Australia and New Zealand
ANZSEE	Australia and New Zealand Society for Ecological Economists
APSG	Australian Parliamentary Studies Group
ARIES	Australian Research Institute for Environment and Sustainability
ASBEC	Australian Sustainable Built Environment Council
ASPO	Australian Study of Peak Oil
B4C	Bulimba Creek Catchment Coordinating Committee
BCC	Brisbane City Council
BEMP	Built Environment Meets Parliament
BM	Biomimicry
BZE	Beyond Zero Emissions
C40	40 Cities Combating Climate Change
CAP	Commonwealth Association of Planners
CASLE	Commonwealth Association of Surveyors and Land Evaluators
CCC	Climate Change in Cities
CCGHS	Commonwealth Consultative Group for Human Settlements
CEO	Chief Executive Officer
CESD	Commissioner for the Environment and Sustainable Development
CH	Commonwealth Habitat
CHEC	Commonwealth Human Ecology Council
CHOGM	Commonwealth Heads of Government Meeting
CLGF	Commonwealth Local Government Forum

CMC	Crime and Misconduct Commission (now Crime and Corruption Commission)
CO2	Carbon Dioxide (equivalent measure of greenhouse gas)
COAG	Council of Australian Governments
COMSEQ	Council of Mayors for South East Queensland
COP	UN Conference of the Parties (COP23 UNFCCC)
CPD	Continuing Professional Development
CPF	Commonwealth Peoples Forum
CPPC	Climate Policy in Practice Cycle ©
CSC	Climate Sensitive Cities ®
CW	Commonwealth (of Nations)
DGH	German Society for Human Ecology
DPST	Doctorate of Professional Studies
DT	Design Thinking
EbD	Enquiry By Design
EIANZ	Environment Institute for Australia and New Zealand
EPG	Eminent Persons Group (Advisors to CHOGM)
FOSEQ	Friends of South East Queensland
GCCC	Gold Coast City Council
GCN	Global Cities Network
GDP	Gross Domestic Product
GHG	Greenhouse Gas
HPF	Habitat Professionals Forum
HRD	Human Resource Development
ICAT	International Climate Action Transparency
ICE	International Court for the Environment (in The Hague with criminal court)
ICLEI	International Council for Local Environmental Initiatives (now Local Governments for Sustainability)
ICNU	International Council for New Urbanism
INTOSAI	International Organisation for Supreme Audit Institutions
IPCC	International Panel on Climate Change
ISLS	International Society for Learning Sciences
ISO	International Standards Organisation
NASA	National Aeronautics and Space Administration
NGO	Non-Governmental Organisation
NRG4SD	Network of Regional Governance for Sustainable Development
RLRPA	Regional Landscape and Rural Production Area
PALAR	Participatory Action Learning and Action Research
PEC	Planning and Environment Court

PIA	Planning Institute of Australia
PP	Priority Projects (Internationally Significant Biological Research)
PPM	Parts per million (pollution measure)
QCC	Queensland Conservation Council
QELA	Queensland Environmental Law Association
RC	Regenerative Cities
RIMES	Regional Integrated Multi-Hazard Early Warming System
RLOSAC	Regional Landscapes and Open Space Advisory Committee
ROSS	Regional Open Space System (Queensland)
RS	Research Summary
RTA	Residential Tenancy Authority
RTI	Right To Information (also relates to the RTI Act)
S4S	Sisters for Sustainability
SC	Sustainability Commissioner
SD	Sustainable Development
SDG	Sustainable Development Goal
SDSD	Society for Doctorates for Sustainable Development (Columbia Uni, NY)
SEQ	South-East Queensland
SEQROC	South-East Queensland Region of Councils (SEQ council of mayors)
SHE	Society for Human Ecology (based in USA)
SPOLA	Sustainable Planning and Other Legislation Amendment
SPF	South Pacific Forum
SPREP	South Pacific Region Environment Program
SSPP	Single State Planning Policy
UCG	Urban Climate Governance ®
UDAL	Urban Design Alliance
UDIA	Urban Development Institute of Australia
UHD	Universal Housing Design
UNAA	United Nations Association of Australia
UNCLOS	United Nations Law of the Sea
UNCHR	United Nations Commissioner for Human Rights
UNCSD	United Nations Commission for Sustainable Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific, and Cultural Organisation

UNFCCC	United Nations Framework for the Convention for Climate Change
UNHCR	United Nations High Commission for Refugees
UNISDR	United Nations International Strategy for Disaster Reduction
UNEP	United Nations Environment Program
UNGA	United Nations General Assembly
UNH	United Nation Habitat (Sustainable Cities)
UNODC	United Nations Office on Drugs and Crime
WAGGGS	World Association for Girl Guides and Girl Scouts
WBL	Work-Based Learning
WFUNA	World Federation of United Nations Associations
WILPF	Women's International League for Peace and Freedom

Glossary of Terms

Accelerated Learning is the rapid acquisition of knowledge and skills by building on existing experiences, deploying senses, and appreciating different perspectives to achieve a richer understanding. It (AL) is a process of strengthening capability in order to convert a novice to an expert, from a state of passive bystanding to facilitating transformational action. Attention is drawn to personal responsibility to act in order to create desirable change.

Adaptation is the evolutionary process whereby an organism becomes better able to live in its habitat or habitats. In the case of humans, it describes the capability to transform in order to live in changing environments.

Anthropogenic: Caused or produced by humans

Biomimicry: to replicate or behave like nature. The art of sustainable innovation. Nature runs on sunlight. Nature uses only the energy it needs. Nature fits form to function. Nature recycles everything. Nature rewards cooperation. Nature banks on diversity. Nature demands local expertise. Nature curbs excesses from within. Nature taps the power of limits.

Carbonisation: the act of carbon overtaking the molecular structure of other matter (air, sea, water, land) which may convert from a neutral or alkaline base to an acidic base.

A **Climate-Sensitive-City®** is an urban system of shared governance that embraces the complexity of the impacts of extreme events and the ubiquitous slow burn of climate variability on its people, its economy, and its natural systems on which healthy life depends. A Climate-Sensitive-City® works by being both proactive and responsive, through designing and retrofitting to live with nature, enhancing coping capability, and strengthening resilience for adaptive ethical urban futures.

Collaborative Creative Community: a term amalgamating several lots of understandings about empowered communities who proactively forge agreed programs together for implementing preferred futures on the ground locally.

Climate Policy in Practice Cycle©: This policy cycle advances traditional public policy to be directly applicable to climate policy and practices. Ideally all parts of the eight phases are implemented simultaneously (by COAG or local communities) in order to optimise outcomes.

Design thinking: a set of methodologies to advance iterative improvements. There are now five generations for design thinking starting from 1926 models for productivity in factories to 2016's international cross-industry pattern thinking for human-centred, high impact, customised solutions for complex challenges. Design thinking is a component of the UN decade of sustainability education as it applies to Australian Primary Schools, cultural industries, and urban development professions.

Eastern Regional Organisation for Planning and Human Settlements: This interdisciplinary professional body covers about one-third of the globe from Russia to New Zealand to Hawaii to Iran. It is most active in Asia Pacific.

Ethics: Moral principles that govern a person's behaviour or the conducting of an activity. A set of moral principles, especially ones relating to or affirming a specified group, field, or form of conduct.

Fiduciary duty: a legal obligation of one party to act in the best interest of others (Wikipedia Scholar). Of an individual: in whom another has placed the utmost trust and confidence to manage and protect property or money. In a relationship: where one person has an obligation to act for another's benefit.

Greenhouse gases include carbon oxides, nitrogen oxides (NOX), sulphur oxides (SOX) and volatile organic compounds (VOC), often measured in carbon dioxide equivalents (where methane has 26 times the global warming potential of carbon dioxide).

Habitat Professionals Forum: created by UN Habitat in 2009. Now, part of the General Assembly of Partners in the United Nations, shaping future cities under the New Urban Agenda to 2035.

Interdisciplinary Innovation arises from diverse points of view, professional practices, codes of ethics, and cultures. Properly facilitated, it recognises each participant's identity, and then builds upon cutting edge knowledge and practice from diverse disciplines in a safe space, in order to find innovative resolutions to complex problems or urgent dilemmas.

LogFrame: a logical framework developed for Program Evaluators and Project Managers deployed by World Bank as preferred methodology, and adopted by Aid agencies internationally in the 1990's.

Microenterprise: small business at individual and neighbourhood level that supports community-based priority projects and social enterprise.

Microfinance: small systems for supporting local investment in projects (i.e. Pacific Climate Women receive microfinance from 18 source systems to facilitate climate projects in local communities).

Mitigation: the act of (1) Making (something bad) less severe, serious, or painful, (2) Lessening the gravity.

Multiple Objective Decision Support Systems help professionals to prioritise actions through weighting variables and decision criteria to more accurately reflect both subjective and objective information.

Moral compass: a contemporary graphical representation of a country's performance towards environmental, social, and economic policies (2014 definition); An inner sense which distinguishes what is right from what is wrong, functioning as a guide (like the needle of a compass) for morally appropriate behaviour (1865 definition); A person or belief system serving as a guide for morally appropriate behaviour (1974 definition); The full range of virtues, vices, or actions which may affect others and which are available as choices (like the directions on the face of a compass) to a person, to a group, or to people in general (1822 definition).

Net Positive Development: beyond sustainable development to a way for human habitation to progress on all social, economic, and environmental

measures, all being a positive impact where instead of negative or zero consequences, the built environment actually provides for more positive results than the situation before development. For example: (1) cohesive communities, (2) kinetic architecture that exports more energy than it uses, (3) regenerative cities where urban forests are encouraged along with edible gardens, rooftop beehives, biomimicry cooling systems, salt heat balls, closed-loop waste systems, triple-use energy, and water, (4) water-sensitive urban design, (5) new generation mobility.

Positive deviance: a set of behaviours where one community with a positive attitude can achieve far superior outcomes than another community with the same resources. A proactive position defined by Sara Parkin as an alternative to pessimistic approaches to future studies. This became a movement through Europe, UK and Canada, that empowered professionals to take the path less travelled.

Regenerative design describes processes that restore, renew, or revitalise their own sources of energy and materials, creating sustainable systems that integrate the needs of society with the integrity of nature. The basis is derived from systems ecology with a closed loop input–output model, or a model in which the output is greater than or equal to the input with all outputs viable and all inputs accounted for. Regenerative design is the biomimicry of ecosystems that provide for all human systems to function as a closed, viable ecological economic system for all industry. It parallels ecosystems in that organic and synthetic material is not just metabolised, but is metamorphosed into new viable materials. Ecosystems and regenerative-design systems are holistic frameworks that seek to create systems that are absolutely waste-free. The model is meant to be applied to many different aspects of human habitation such as urban environments, buildings, economics, industry, and social systems.

Resilient: the capacity to return to normal after stress.

Sequester: to hide, or in our case to absorb carbon easily within the natural functions (i.e. forest sequester pollution, ocean absorbs greenhouse gas).

Slow burn: incremental impact that has a cumulative effect, like boiling frogs

Social cohesion: the extent to which social systems bond (i.e. how people help each other in times of stress)

Sovereign wealth: Attributed to Adam Smith from *The Wealth of Nations* in 1766, it now generally means Gross National Product Number to economists. Other professionals relate the term to the real wealth of resources: natural (including sub-terrestrial and marine), social, cultural, and built (including business facilitation) resources of a country and its peoples. Globalisation has caused a blurring of sovereign boundaries, so the definition might be changing.

Urbanisation: the act of human population drifting from rural areas to cities; intensive living inside human settlements. Rapid urbanisation means high growth rates of populations in towns and cities.

Xeriscapes: landscape design for water sensitive gardening and soft-scape management that incorporates land orientation attributes and natural element systems that capitalise on self-sufficiency to survive and thrive. Regenerative cities rely on such techniques.

Chapter 1: Overview

1.1 Introduction

1.2 Rationale

1.3 Importance

1.4 Scope

1.5 Framework

1.6 Synthesis

1.1: Introduction

'Climate change…and poor urban design kills more people than terrorism' (Birkeland, 2008). This statement considers some of the converging 'wicked problems' that are having irreversible impacts on the world (Churchman, 1967). With more than half the world's population now living in cities, and more than half of those living in the highest risk zones, the existential threat created by the convergence of climate change and urban development is worthy of detailed investigation (UN Habitat, 2011a; UNU, 2011). In cities, climate change adversely impacts economic engine rooms, people's capacity to cope with extreme change, and the resilience of Nature that underpins healthy life (UNESCO, Brito, & Smith, 2012). My study explores an approach to tackling climate change and rapid urban development through accelerating learning by professionals and communities, enabling them to find and implement the innovative solutions that underpin sustainable futures.

In this chapter I make six statements that anchor my discussion, provide a rationale, and underpin the framework of this doctoral study. In order to guide you through the maze of wicked problems and on to an elegant path forward, I systematically navigate from my perspective (learning plan) and through others' views (joint projects) towards options that can be considered for better-informed decisions about future action.

In this chapter I introduce myself as a climate change educator and professional practitioner. I provide a rationale for this doctoral study by using six statements to focus on the sustainable development for cities and regions by creating more responsive governance where institutions find solutions for complex climate change challenges. I then set out the importance of this study and its limits and summarise how the whole system is organised.

I am the owner of Envirobusiness, a sustainability consultancy registered in Australia and operating internationally since 2000. My private sector venture resulted from a redundancy after 25 years working for the Queensland

State Government. While employed by the government, I was fortunate to gain unusually diverse and wide-ranging experience in roles that expanded my ability to be innovative and adaptable. My roles included rural water administration, auditor general experience, organisational review, portfolio evaluation management, directorship in resource and development portfolios, and Cabinet policy review for COAG agreements and Australia–New Zealand Economic Zone Standards and United Nations Treaties. My government employment placed me in good stead afterwards to begin a consultancy business with high levels of knowledge, skills, and passion. The transformation also allowed me more freedom to be a change agent for those adversely impacted in the community.

While working for the government, my roles were broad but shallow; I could not be a corporate board member, an international franchisor, a green developer, a visible community advocate, a university lecturer, a registered owner of intellectual property, a court-appointed expert witness, a social entrepreneur, or an ethical futurist. However, over the past seventeen years of operating my business, I have been all these things and more, whether by serendipity or design.

With freedom from governmental protocol, I was able to delve into the unmentionables, the ugly, the wondrous, the potential, the important, and the urgent. Consequently, I gained insight into which battles are worth fighting and which wars need to be won. I was able to appreciate the complexity of wicked problems, and the need for multi-sourced wisdom to guide coordinated action for their solution. Although all my work provides a foundation, the projects that explore common ground among diverse experts are the most useful. CHOGM Climate workshops, United Nations Habitat projects with Commonwealth Human Ecology Council, National Greenhouse Strategy, maritime coastal development strategy and urban design roles, and South East Queensland regional advocacy resonate the loudest for me.

I am currently establishing a number of United Nations Associations in the Pacific Region advising on options for alternative futures. Using my artillery of skills, knowledge, and attributes accumulated through government, private, and third sector work, I have chosen to refine my doctoral studies to focus on those wicked problems that most urgently need to be tackled. As an introductory starting point, this chapter maps the parameters of my study. But firstly, I wish to explain why I am doing this Doctorate.

1.2: Rationale – Why this Doctorate?

In this thesis, I argue that current and future generations of humans must develop the capacity to live in harmony with diverse people, sharing finite environmental resources. The most complex 'wicked problem' (Churchman, 1967) is unsustainable development, whereas the greater common good is to leave a legacy that considers the rights and needs of all. Instead, modern societies plan their development on the basis of continuous, unfettered growth, and then manage this growth unjustly and unsustainably. (UN, 2012).

In ancient cultures, the societies who survived best were those who recognised 'limits to growth' (Meadows, Randers, & Behrens, 1972), and instilled in their children the benefits of wise resource management (Dunlop, 2010; Carlson, 1962; CSIRO, 2008). The 'growth fetish' (Hamilton, 2003), exemplified by today's developed world and rapidly infecting developing countries, is not viable in the long-term.

The following six statements are a cascade of logic providing a rationale for this study.

Statement 1: My Doctorate focuses on sustainable development.

As a result of unfettered growth, our current systems are skewed towards the Anthropocene, and unless integrated alternatives become mainstream, society will be locked into a downward spiral. My approach seeks balanced, just, and long-term intergenerational management of resources, with precautions taken to prevent unnecessary environmental harm.

Statement 2: My Doctorate focuses on sustainable development in cities and their surrounds.

The urban shift, where more than half the global population lives in towns and cities (in Australia, the figure is 92%), focuses my research on sustainable development (UN Habitat, 2011a). Cities require support systems from their

immediate surroundings as development impacts become a major challenge (Newman & Jennings, 2008; Al-Shawaf & Guenther, 2012). Therefore, the most effective interventions will occur in city regions.

For 30 years, research has indicated that climate change is a major risk to life as we know it. Climate change has impacts on everything: natural resources, human living conditions, the cost of city infrastructure, and the physical, emotional, and social health of people who are losing their homes, culture, and countries forever. There is an urgent need for future planning with climate vulnerability in mind, to retrofit our cities, and to think ethically about our responses. To do this, society needs to acquire knowledge and skills that promote mitigation and adaptation, it needs to learn these more quickly than usual, and, most importantly, needs to change the contributing problematic economic systems.

In 2011, the culmination of decades of policy-in-practice was documented and debated internationally by CHOGM, the UN, and the European Union. 'Climate change' policy became a spearhead for sustainable development decision-making (Eminent Persons Group, 2011b; The Council of Australian Governments (COAG), 2009).

Statement 3: My Doctorate focuses on sustainable development for cities with more responsive governance.

Being more responsive requires considerable thought and cooperation across many disciplines. Leadership is needed from global policy to regional presence to local advocacy and on-the-ground community coordination. In order to move quickly towards good green governance (Davis, 2002), society needs accelerated learning and institutional frameworks that provide impetus for action. In 2012, the United Nations celebrated twenty years of The Earth Summit implementation, and 'Rio+20' proposes major changes with its Green Economy and Institutional Reforms for sustainable development

governance systems (UN, 2012).

Statement 4: My doctoral studies focus on sustainable development for cities in relation to responsive institutions.

Institutions can include:

- Governments at international, national, regional, provincial, and municipal levels
- Westminster style judicial (Planning & Environment Court) systems, legislative systems, and executive systems
- Independent Reviewers from INTOSAI (International Organisation for Supreme Audit Institutions) including Sustainability Commissioners, Environmental Ombudsmen, Parliamentary Commissioners for Environment and Sustainable Development, PCE, Integrity Commissioners, Judges for Planning and Environment Courts and Land Tribunals, [the introduction of] International Court for the Environment, and all ombudsmen generally. (Hereafter, the role is called Sustainability Commissioner.)
- Civil society: churches; military peace keepers, Red Cross, professional bodies, university policy groups and cooperative research bodies, industry bodies (banks & insurance companies), and women's groups
- Community movements as institutional mechanisms for reform (including virtual networks).
- Institutions only become 'responsive' because people within the organisation have the capacity to rapidly acquire new knowledge and share lessons learned across many stakeholders. As their skills are constantly honed, those people become increasingly adaptable and are able to embrace greater interdisciplinary understanding. Responsive institutions require a framework to accelerate learning

across disciplines, to deliver projects with best available practices, and to evaluate and promote an appropriate mix of techniques for innovative forward planning. Creating the responsive institution is a theme worth pursuing in my doctoral studies (Scott, 2004).

Statement 5: My Doctorate focuses on sustainable cities and surrounds, creating responsive institutions in society.

I argue that triple loop learning is effective for community leaders and professionals from many disciplines to accelerate their capability for implementing innovative suites of solutions for complex climate change challenges in cities.

It is also pertinent to ask how institutional responsiveness can be maintained after this initial learning and innovation. The answer lies in several approaches. Micro-approaches refer to people within the institutions having the capacity to continually learn and innovate (Schülke & Bauer, 1981). Macro-approaches relate to results that plot a pathway for improvement through reporting the impact of decisions on long-term social justice, environmental integrity, and economic security (Grin, Rotmans, Schot, Geels, & Loorbach, 2010). Institutional responsiveness is reflected through accountability for stewardship of capitals. In SMART® Sustainability Management and Reporting Techniques, stewardship is measured through performance outcomes of four capitals – built, natural, social, and cultural (Meadows et al., 1972; Davis, 2002). Independent reviewers, such as sustainability commissioners, are tasked with the role of meta-analysis and reporting on outcomes through changes in capitals which can be the result of a range of institutions' performances. Several years ago, UN Habitat commissioned an investigation of the role of independent evaluators of sustainable city governance (Global Urban Observatory, 2004). Evaluator roles included determining effectiveness of sustainable development governance systems and recommending improvement.

In 2002, I audited the roles of independent reviewers across sixteen jurisdictions relating to legislative mandate, scope, effectiveness, skills profile, efficiency, and funding. I revisited that in 2005, 2008, and 2012. In late 2012, an Australian Sustainability Council was established, however, it was abolished in 2013. I continue to advocate for independent Sustainability Commissioners heading interdisciplinary teams throughout Australia, especially in Queensland. There is a need for superior skills in these roles. These independent reviewers can engender positive change in all institutions involved with sustainable development. In New Zealand, Canada, and Australia, the professionalism of the Sustainability Commissioners influenced all those institutions under review. All parties learned, practised and embedded better systems as a result of inquiry, public petition, review, program evaluation, performance audit, or systems-based audit (Hawke, 1997).

Statement 6: My doctoral studies move beyond the theory of creating responsive institutions to determining how to maintain vigil.

I argue for the strengthening of the roles of independent sustainability reviewers because they are the most effective for accelerating learning for city and regional governance systems. Independent sustainability reviewers are also able to remain vigilant, to ensure the three 'E's of triple loop learning – Efficiency, Effectiveness, and Ethics – remain forefront in governance. Throughout my career, I worked in challenging areas where I recommended some radical reforms, which were then usually introduced. Sustainability reform may question fundamental assumptions or seek other rich perceptions of the same problem. This requires:

- Active listening to a myriad of different people across multiple institutions, disciplines, and cultures who are involved with these issues

- Capturing the ‘essence’ of their arguments is a special skill
- Packaging their collective wisdom to gain collective agreement requires careful synthesis
- Ensuring they each feel ownership of their united words takes talented tactfulness
- Developing their collective recommendations for the future can provide a quantum leap of ideas or techniques
- Nurturing the necessary energy to be bold enough to implement change, and then maintaining that energy, takes determination
- Reflecting and re-evaluating takes courage.

All this has contributed to my rich base of experience, particularly since 1988. These experiences ideally position me to be a successful Sustainability Commissioner before 2025.

1.3: Importance

In essence, my Doctorate is to establish a framework that enables individuals to lead the way in climate change practices. I intend to be a living example of such frameworks in the role of a Sustainability Commissioner. I have structured my Doctorate to advance a deeper understanding of the technical, intellectual, and interpersonal skills required to be an effective in such a role. However, leadership is required from all sectors, and is being summoned to turn the tides (Potsdam Institute for Climate Impact Research and Climate Analytics et al., 2012; McKibben, W, 2013). Everywhere, from policy to practice to precipice, it is vital that this leadership is supported by well-informed, active players working collaboratively to provide longer-lasting solutions.

The impact of the converging wicked problems can be enumerated by the death tolls given in world news reports. It is important to note, however, that impact can range from discomfort to existential threats (Eminent Persons Group, 2011b), and includes economic crashes, societal breakdowns, and environmental collapse. The need for urgent action is now better understood as the rate of climate change has been at the extreme end of conservative predictions (Dunlop, 2010; Climate Commission, 2013; Flannery, Hueston, & Beale, 2013), but responses by institutions charged with fiduciary duty of care are slow and impotent.

1.4: Scope

The scope of this thesis is to establish a framework for technical, intellectual, and interpersonal skills to win the race. It investigates decision-making for resilient cities, and the cyclical policy approaches that address vulnerabilities for people and ecosystems. It considers climate justice alongside ethical responsibility.

The foundation for this research emerged from my study built upon my experience as evidenced in the Doctorate portfolio and study undertaken in the Netherlands entitled, 'Sustainable Cities and Surrounds: Creating Responsive Institutions' (Davis, 2008). To explore these areas and understand how they can be used to make a contribution, I undertook seventeen projects.

These projects demonstrate the linkages between the spheres of climate change, sustainable cities, and accelerated learning. Each project assesses the level of learning for specific cohorts against the desired outcomes for the projects. The consequences are understood by reviewing all the lessons over the period. The contributions are reflected in content knowledge banks, critical learning techniques, and my own insights gained during this study.

This resulted in my writing a text book, *Climate Sensitive Cities* (ISBN: 978-0-9752266-3-6), and masterclass training manuals for foreign urban professionals. In order to become a Sustainability Commissioner, I interviewed my previous work colleagues and contacted recently appointed independent reviewers throughout the Commonwealth – Canada, UK, New Zealand, and the Australian states – so I could synthesise a position description. This position description (in the next chapter) outlines the superior skills, knowledge and personal attributes required to effectively conquer the challenges of such a role.

1.5: Framework

To demonstrate knowledge and skill development, I present a framework that encompasses rationale, scope, specifically designed projects, reflection, assessment, and evaluating the extent to which the original objectives were achieved through this process. Table 1 aligns logic and structure.

Logic		Structure
Philosophy and rationale	Why	Chapter One
Action research		Chapter One and Two
Research issues: wicked problems		Chapter Two
Three Spheres of Enquiry	What	Chapter Three
Method – Project Design	How	Chapter Four
Research summaries		Chapter Five
Seventeen projects		Chapter Six
Conclusions: artefacts and outputs	So What	Chapter Seven
Definitions, new philosophy		Appendices

Table 1: Logic and Structure.

I have organised this thesis to reflect my learning journey through the doctoral course: (1) Why is this Doctorate important? (2) Why am I the best person to do this? (3) What are the spheres of enquiry? (4) How do I approach this enquiry? (5) How does my background research underpin this enquiry? (6) How have I demonstrated my learning? (7) How has my learning and methodology advanced research, action, and evaluation?

1.6: Synthesis

In summary, I have introduced the rationale, scope, importance, and framework of this thesis, *The Race between Education and Catastrophe: Creating Climate-Sensitive-Cities*®.

It is my firm belief that two of the most urgent needs of the modern world are understanding and compassion. Understanding of climate change is based on scientific evidence, is enhanced by informed interdisciplinary debate, and produces innovative solutions for complex local and global problems within an ethical framework for governance that ensures a safer future for all. Such understanding requires accelerated learning and increased responsiveness by people of diverse perspectives and disciplines. Compassion is required to recognise and prioritise ethics within a sea of scientific evidence and technical practices, to acknowledge that these decisions impact people and the planet. Ethical decision-making and practice are the keys to good governance, and their frameworks need to be principled, transparent, and culturally acceptable. In order to find long-term, resilient solutions, my study seeks to link the right reasons for actions with the suite of right actions for defined situations. This is the essence of my Doctorate.

Chapter 2: My Learning Journey

2.1 Introduction

2.2 My Portfolio

2.3 Learning Plan

2.4 Learning Objective

2.5 Learning Contract

2.6 Learning Plan at Glance

2.7 Applying Learning to a Higher Purpose

2.8 Synthesis

2.1: Introduction

At the commencement of my Doctorate my interpretation of the learning journey that was ahead of me was very different to what has eventuated. At the commencement of the program I envisaged my doctoral studies would be like 'writing a book' – I would share my accumulated knowledge and skills with those interested in the area of human response to climate change. It was, on reflection, a somewhat static and outmoded concept of knowledge and information transfer. The analogy I would now use to describe my studies would be more akin to a street actor, without a finalised script, playing multiple roles in a 'live performance' with the objective of engaging their audience in creating the final performance.

As a practitioner-researcher, I have come to recognise that my work with communities and international organisations requires a model of knowledge that is continually engaging and interactive. The problems encountered require a complex blend of knowledge, action, and learning (Cherry, 2002b) to negotiate potential solutions. I can best respond to the issues of climate change in two ways: by developing and transferring knowledge, as well as demonstrating the required effort through my own professional development. It is akin to Engestrom's theory of Expansive Learning where 'the learners construct a new object and concept for their collective activity, and implement this new object and concept in practice. This shift…suggests participation, expansion, and translation as relevant…metaphors for theorising work-based learning' (Engestrom, 2011, p. 87).

This chapter plots my progress through the early phases of my program and provides a foundation for Chapters Four and Six. It articulates my approach to research and work-based projects where I blend Expansive Learning (and its notions of participation, expansion, and translation) with Action Research (comprising knowledge, action, and learning), thereby

contributing unique knowledge to the academic sphere of Urban Climate Governance. I intend to make a material difference in efforts to respond to climate change by:

- Incorporating a variety of learning models (Ansell, 2011; Hatfield-Dodds, 2013; Galtung, 1981)
- Exercising participatory techniques across accelerated learning trajectory
- Reviewing products of these exercises
- Documenting new ways to tackle these wicked problem of urban climate governance.

2.2: My Portfolio

My doctoral learning journey started, to my bemusement, with reflective practice. Through this process, I developed a personal portfolio (Davis, 2012) that documented my knowledge, personal attributes, and skills and established my credibility in the field. As an action-oriented person, I have always tended to focus on evaluating systems, but not myself. I am not accustomed to formally reflecting on my own skills and professional development, so preparing a learning portfolio compelled me to recognise and understand what I had 'done', what I 'knew', and how I had come to know it. This gave me an early insight into the importance of practitioner-researchers responding effectively to the problems of contemporary life, and for such practitioners to reflect upon their understandings and actions. Below are some pertinent extracts paraphrased from my portfolio (Davis, 2012):

1. The reflective approach for this portfolio incorporates Bloom's Taxonomy as a base that illustrates remembering, understanding, applying, analysing, evaluating, and creating (Aainsqatsi, 2011). I apply this taxonomy throughout the narrative to gauge my progress.
2. I wish to highlight some of my 'Eureka' moments with you because they shaped my attitude towards handling what life deals out and inducing the best from others:
    a Near-death realisation (I must have been saved to achieve something useful)
    b Tina Corn – abundance attitude (No reason why I cannot have it all/do it all)
    c Priority allocation (Choosing the highest purpose/outcomes)
    d Nurturing kindred spirits (Realising greater synergies, trust, and leapfrog innovation).

3 I have a unique 'cluster' of skills, extensive networks, and a wealth of experience that I would like to apply to a higher purpose. I can't rely on serendipity

4.This study is an opportunity to explore interdisciplinary analyses of climate change and mature, effective, and sustainable development governance. Completing this Doctorate will allow me to develop new models and techniques to tackle complex issues. I aspire to bring a fresh understanding to ethical action through my studies. Making quality time for this is an indulgence.

In the introduction, I mentioned my aspiration to become a Sustainability Commissioner before the age of 70. Ideally, this role would advocate for a Charter of Environmental Rights similar to those in Ontario, Norway, Bolivia, and Ecuador. However, I need to gain solid credibility in ways other than a local political appointment. Efforts towards this could include completing this Doctorate, which contributes greatly to credibility by:

- Showcasing my international work and its tangible outcomes, which establishes reliability and standing
- Promoting successful local projects over the past decade, considered revolutionary elsewhere, which raises my professional profile within Australian and internationally
- Working for an independent reviewer, which provides familiarity with governance systems and contemporary knowledge/processes.

Australians are recognised elsewhere, but some remain employed overseas and therefore are unable to contribute locally. I would like to advance our cause here before we lose our natural and cultural heritage. How can we 'save the world' if we can't even save your own backyard? (May, 2006)

I wish to advance the continuing professional development of independent reviewers such as Commissioners, Ombudsmen, Auditors-General, Tribunal

Chairs, and Judges for Land and Environment Courts. They do not make laws, but can influence its mature and appropriate application through review of practice in the spirit of the law. The first meeting of these independent reviewers happened in 2006, but these opportunities are rare. I hope that the United Nations Assembly Preparatory Committee will provide an opportunity for sharing systems, techniques, and methods for improvement. There is a need for continuing professional development for Independent Reviewers, and I can envisage a role for me in this.

In the next decade, I also wish to publish:

- A series of green design books, written collaboratively with indigenous women, landscape managers, and para-professionals – their knowledge is lost if we do not capture it in some special way
- Storytelling websites for regenerative and sustainable communities across the world
- Reports with good-practice stories for easier international benchmarking for sustainable regions
- The outcomes from the SEQ Youth Futures (roundtable sessions for young people to debate emerging issues)
- Outcomes from the SEQ Ancient Futures (roundtable sessions for older and indigenous people to debate emerging issues) transplanted elsewhere
- A documentary about Crusty Characters in SEQ – what should we save in SEQ?
- The outcomes from 'White Hands: Black Heart' (SEQ) – women elders share their traditions, bush-tucker, medicines, cultures, language, and stories with younger white women so heritage is not lost forever.

This wish list allows me to implement international policy at a local level by demonstrating ancient wisdom and innovation for regenerative cities as multiple models for urban climate governance.

2.3: Learning Plan

Taking a baseline from my portfolio, it was apparent that my study program required a formal learning plan. I preferred to call it a 'contract' because, for me, it was important to recognise my commitment and obligation (financial, intellectual, emotional, and physical) as though they had the force of a legal contract.

This was serious business, which involved articulating the necessary skills, knowledge, and attributes of a successful Independent Reviewer/ Sustainability Commissioner and designing how to gain those attributes. For me the formal learning plan involved project management plans, dates, and processes, but as work opportunities emerged out of sequence, several projects were progressed simultaneously. Real life is never as neat as the original Gantt chart appears. Plans are there for guidance and a completeness check. For me, my plans built a solid base to concentrate efforts and ensure that I was on target with research on my converging topics, and to provide a thorough reflection on the human dynamics within my workshops, symposia, campaigns, and informal mentoring. I could build on that targeted content research and test advocacy techniques with more confidence. Confidence will be required to tackle the wicked problems that form the body of the thesis.

The aim was to hone those essential skills in a structured way to achieve my future aspirations. I was guided by a gentle but firm hand throughout my Doctorate for which I am thankful. It was rewarding to work with brilliant and compassionate people from different backgrounds seeking the same outcomes as myself. Some colleagues specialise in my content areas of climate, governance, and advocacy, and others are kindred spirits who have guided me in diverse and inspiring ways. They all wanted to make a difference, make improvements and innovate our way out of broken systems. I was able to build on past work relationships, make new ones, and rekindle

energy for tackling future challenges.

A successful learning contract requires a significant achievement at its finish. For a clear outcome, I chose to transform myself into an ideal candidate for the role of a Sustainability Commissioner/Independent Reviewer. This allowed clear targets with a checklist of desirable attributes. The following section articulates learning objectives and elaborates the skills, knowledge, and attributes that are evidenced from reviewing a number of independent commissioner roles.

2.4: Learning Objective

To be an effective Sustainability Commissioner/Independent Reviewer, it is necessary to determine what skills, knowledge, and attributes are evidenced in the people who already hold these positions. This section discusses the desirable attributes of Sustainability Commissioners with whom I have had experience. Below is a list that includes a summary that delves into their technical backgrounds, their general powers, and their demonstrated impact on policy for climate change and sustainable development governance. This section links my doctoral projects to my objective of becoming an effective Sustainability Commissioner.

I have been fortunate enough to review the role and functioning of such offices. Those audits were undertaken in 2002, 2005, 2008, 2010, and 2012 with Independent Reviewers of the environment across eighteen jurisdictions. My team of colleagues continue to advocate for a National Sustainability Commissioner for Australia (mission almost accomplished in 2013), and an independent Sustainability Commissioner in Queensland. Below, in Table 2, I introduce this diverse team of commissioners with whom I have a healthy working relationship that allows ease for interviews and research.

Table 2 shows a concise profile of each commissioner, with academic background, jurisdiction period, scope of work including ownership of public petitions process, independent reporting to the public, direct involvement in climate change agendas, and a role in influencing sustainable development governance.

Sustainability Commissioner/Independent Reviewer Scope to Influence Policy							
Commissioner	Discipline	State/ Country	Period	Public petition	Independent reporting	Climate Change	Sust. Dev. Gov.
Joe Baker	Science	ACT, Aust.	1986–93	Yes	Yes	Yes	Yes
Peter Newman	Planning	NSW, WA	Various	No	Some	Yes	Limited
Morgan Williams	Science	NZ	1982–2007	Yes	Yes	Yes	Yes
Gordon Miller	Policy	Ontario	2002–Present	Yes	Yes	Yes	Yes
Johannes Galinas	Law	Canada	2002–2008	Yes	Yes	Yes	Yes
Scott Vaughan	Env. Econ.	Canada	2008–Present	Yes	Yes	Yes	Yes
Ian McPhail	Science	Vic, Aust.	2006–2009	No	No	?	?
Kate Auty	Law	Vic, Aust.	2009–Present	No	No	?	Some
Maxine Cooper	Planning	Aust.	2009–2011	Yes	Yes	Yes	Yes
Jan Wright	Science	NZ	2003–Present	Yes	Yes	Yes	Yes
Helen Hughes	Planning	NZ	1987–1996	?	?	?	Yes
Tim Horton	Urban Design	SA	2010–2013	No	Yes	Yes	Yes
J Michael Rackemann	Law	Qld	2000–Present	No	Yes	Yes	Yes
Sustainability Council	Various	Aust.	2013	?	Yes	Yes	Yes
Tim Flannery	Science	Aust.	2009–Present	?	Yes	Yes	Yes
Andrew Greaves	Business	Aust.	2013–Present	No	Yes	?	?
Phil Clarke	Sci/Educ.	Aust.	2012–Present	No	Yes	?	?
David Solomon	Law	Aust.	2009–Present	No	Yes	No	No

Table 2: Sustainability Commissioner/Independent Reviewer Scope to Influence Policy

In summary, Table 2 indicates that these Sustainability Commissioners/ Independent Reviewers arise from a range of academic disciplines. However, each operates under different legislation, time-period, and political climate,

which may skew their potential to fulfil the suite of possibilities for their role. To become more informed, I needed to understand the scope, function, and impact of each role. Impact begins with transparent participatory actions, which include:

- Public petitions – those personal views where the public can communicate directly with the Commissioner and lodge petitions to Parliament to review decisions and perhaps reverse a policy or decision of the governments of the time. This is powerful as it reassures a mechanism for democracy and judicial review, while the advent of web-based parliamentary petition signing and feedback expedites the process that may have taken over a year in the 1990s. This tends to provide more effective governance.
- Independent reporting – some commissioners do not have pure independence because the legislation allows a short-term minister to vet any reports prior to release, or indeed stop the release of an adverse report to the public and the media. A short-term minister then undermines the effectiveness of the role of a long-term appointed Independent Commissioner/Independent Reviewer. This is a governance conflict.
- Climate change audits and sustainable development governance reviews, which are solely for the purposes of my Doctorate. They relate to the work actually undertaken, not the capability nor scope of the office. These matters are discussed further throughout my study program.

By understanding these roles, and their evolution since 1986, I am better prepared to determine the necessary skills, knowledge, and attributes required for an effective Sustainability Commissioner. I now have a clearer focus for the Doctorate and my personal learning objective.

These general attributes required for a Sustainability Commissioner/ Independent Reviewer are:

1. Excellent interpersonal skills including active listening, sensitivity analysis, negotiation, mediation, reflection, public reporting, media management, diplomacy, cultural sensitivity, compassion, innovation, and integrity
2. Credibility with community and Parliament, and respect across levels of government and Westminster arms of government
3. Robust networks internationally, among peers, and with non-government organisations including professional bodies, public policy activists and civil society
4. Solid understanding of emerging sustainability issues with technical knowledge, evidence-based experience, and ability to rapidly acquire and apply new thinking
5. Understanding of complexity and a broad world view with continuous professional development at Commonwealth and International levels (Ombudsmen, Commissioners, Auditors General, Planning and Environment and Land Court Judges, Independent Reviewers), Membership of INTOSAI
6. Ability to nurture the potential of others
7. Ability to operate within restrictive legislation, budgets, skill shortages and deadlines
8. Ability to co-opt partnerships, where appropriate.

This list articulates desirable attributes from a range of sources, allowing me to begin to audit my skills, knowledge, and ability in preparation for focused learning. My doctoral study intends to build on these foundations (Davis,

2002b; Hawke, 1997, p. 321; State Government Victoria, 2011).

Having established a rationale and a learning objective for my study, the next section of this journey maps my learning contract.

2.5: Learning Contract

In the following pages, I craft a structured approach to several complex topics, interpersonal dynamics, and my personal journey to become a more resilient and flexible life-long learner, aiming for different techniques of communication to accomplish a Doctorate of Professional Studies.
This learning plan comprises a contract with USQ. It is a project-based approach that I summarise to provide a clear, yet comprehensive view. It includes:

1. A rationale for advancing this Doctorate with its significance in the fields in which I work
2. An articulation of a learning objective with a summary of how eighteen successful Sustainability Commissioners influenced the topics of my two major projects
3. A set of values underpinning the shift I seek
4. An action research approach
5. A framework illustrating research design
6. An overview of major projects: cities for climate change
7. An overview of Project Two: Sustainable Development Governance
8. A conclusion that completes the proposed journey.

My career has been focussed on these 'content' areas since 1995, while my 'process' skill sets have been constantly honed from 1982 to the present. However, this doctoral study requires more learning to sharpen my writing

skills and become a better communicator to more diverse audiences. In writing this learning contract, I encountered some interesting insights, which I will incorporate in later chapters.

2.6: Learning Plan at a Glance

My Doctorate is organised to allow recognition of prior studies and work-based learning, while developing a regime for addressing the topic in a systematic yet dynamic way. Table 3 summarises a learning contract that illustrates my scheduling of efforts in order to comply with course requirements.

Doctorate - Learning Contract	Plan	Implement	Review	Units
Accredited learning				7
Portfolio 8000	1			1
Recognition of Prior Learning	1			3
9001 Learning Plan	1			1
9003 CCC Plan Methods	1			1
9004 CCC Technical Report		1		1
9005 CCC Audit Accelerated Learning		1		1
9006 CCC Role of Sustainability Commissioner		1		1
9007 CCC Review/Publications			1	1
9010 SDG Plan and Methods	1			1
9011 SDG Technical Report (Rio+20)		1		1
9012 SDG Applications for Accelerated Learning		1		1
9013 SDG Role of Sustainability Commissioner		1		1
9014 SDG Review/Publications			1	1
2 capstone units			2	2
Total	4	6	4	24

Table 3: Doctoral Learning Contract

The study program incorporates Planning, Implementation, and Review phases, which reflect an action researcher's approach. The efforts applied for each phase generally reflect the planning, implementing, and reviewing priorities of my projects. This revised plan comprises accredited prior learning, four units for planning, six units for implementation and four units for review. The aim of action research is to apply lessons so we can advance thinking and practice. The next section interrogates this ideal.

2.7: Applying Learning to a 'Higher Purpose'

During this doctoral study, leading examples have emerged. In a perfect world, new lessons should be put into practice immediately. For me, this means applying my learning in places that have most impact. With the focus on independent review (with a Sustainability Commissioner or Ombudsman, or performance review), I need to move away from green consultancy and planning systems, towards independent public policy review of systems. Additionally, mentorship by leaders in this area will help me identify where my abilities – old and new – are of most value. This change requires 'a frank and fearless attitude', combined with diplomacy and stringent professional ethics.

The places with the best opportunities for independent review relating to my studies and where I have respect for people in senior policy positions who are practising innovation, include:

- Singapore (various)
- Vancouver (GVRD – Lois Jackson)
- Geneva (Healthy Cities – WHO and Urban Economics with Roderick Lawrence)
- Vienna (ACUNS – Michael Platzer)
- London and Commonwealth (CHEC, various)
- Washington (INTOSAI – Durwood)
- New York (various)
- Ottawa (CESD – Scott Vaughan)
- Oslo (Norway) or Copenhagen (Denmark) or Hammarby (Sweden)
- Kate Auty (Australia)
- Climate Commission, Sustainability Council, he Australia Institute
- Brian Roberts, Colin Fudge, Delwyn Jones, Dale Gilbert, (colleagues from Sustainable Cities and Built Environment Research Unit)

- Bill Chandler, John Byrne, Dyan Currie, Kati Holt-Damant, Juris Greste, Janis Birkeland (Urban Design/Planning)
- Ian Lowe, Bob Douglas, and Bob Rich. (Commissioners for the Future, Oz21)
- Tim Flannery, Veena Sahajwalla, Will Steffen and Roger Beale
- Mentors like Joe Baker, Zena Daysh, Ian Douglas, Eva Ekehorn
- Miriam Lyons (Centre for Policy Development), David Hetherington (Per Capita), Tim Wilson (Institute of Public Affairs), John Connor, and others (The Climate Institute)
- Climate gurus: Ross Garnaut, John Connor, Ian Howe, Jillian Broadbent, Anne Marie Wilson, Wendy Steele, Mary Robinson, Christiana Figeres, Marguerite Wolstrom, Marlene Moses, Lykke Leonardsen, Khairiah Tahla, Janine Rodin.

By connecting with these people, my work has the best chance of advancing both policy and practice. So, inspired by such leaders, I am more motivated to advance our common higher purposes.

2.8: Synthesis

The first chapter introduced purpose, while this chapter validates my capacity to undertake such study. It is anticipated that the convergence of urbanisation and climate change will have increasingly detrimental impacts on civilisation. These impacts may be sudden or incremental, and cut across governance, economic, and social spheres. Additionally, the slow burn of climate change is altering the 'natural systems on which on our healthy lives depend' (Ecologically Sustainable Development Steering Committee, 1992). There is a need to learn quickly, share generously, debate vigorously across different disciplines, and collaboratively create innovative solutions to address our common future: living with climate change. So, in the next chapter deeper meaning is brought to this worthy cause.

Chapter 3: Three Spheres of Enquiry

3.1 Introduction to Wicked Problems

3.2 Learning Sphere

3.3 Climate Change Sphere

3.4 Governance Sphere

3.5 Nexus of Three Spheres of Enquiry

3.6 Synthesis

3.1: Introduction to Wicked Problems

The previous chapter has outlined the initial part of my learning journey from a perspective of both professional and personal development. As a practitioner-researcher I have come to recognise, particularly over the past ten years, the importance of my role as a 'critical instrument' in my own research projects. It is apparent to me that this emergent self-awareness and capacity to reflect on my own work and actions, as well as that of others, has not been a single, one-off acquisition of a specific capacity or technical skill, but has been very much an emergent, incremental process of development that has grown through (and as a consequence of) the iterative cycles of my action research. Therefore, while this chapter will present in greater detail the 'what' of my research – its subject matter, its focus, its critical, theoretical, and operational ingredients – it is important to note that this picture of the 'what' has been a progressively evolving one as I have made increasing efforts to understand how to accelerate learning for governance of cities and resilience to change climate.

This chapter puts forward a simple model that identifies the core interdependent and overlapping areas of knowledge in this area, and represents the important dimensions necessary to effectively understand the focus of my research as outlined in this thesis. As such, this model is a snapshot of my learning and understanding, but is also a product of my research and a tool for helping like-minded practitioners along the path towards accelerated learning for cities and climate governance. In this way, it is similar to Elkington's model, the Triple Bottom Line (Elkington, 1999b), which encapsulates a simple notion of three core areas for inquiry for business understanding of sustainable development. In my model, I suggest that 'learning', 'governance', and 'climate change' are core areas for focus in bringing about material improvements in our world's response to the urban

impacts of climate change. This chapter sets out key information about each of these aspects and seeks to build linkages between them.

The model is illustrated by a Venn diagram in Figure 1 below. There are three distinct areas where two of the circles overlap with one another. These three 'dual' overlaps are characterised as:

1. Accelerated learning for climate sensitive cities
2. Interdisciplinary review for transformative stewardship
3. Long-term climate sensitive urban policy, practice and review.

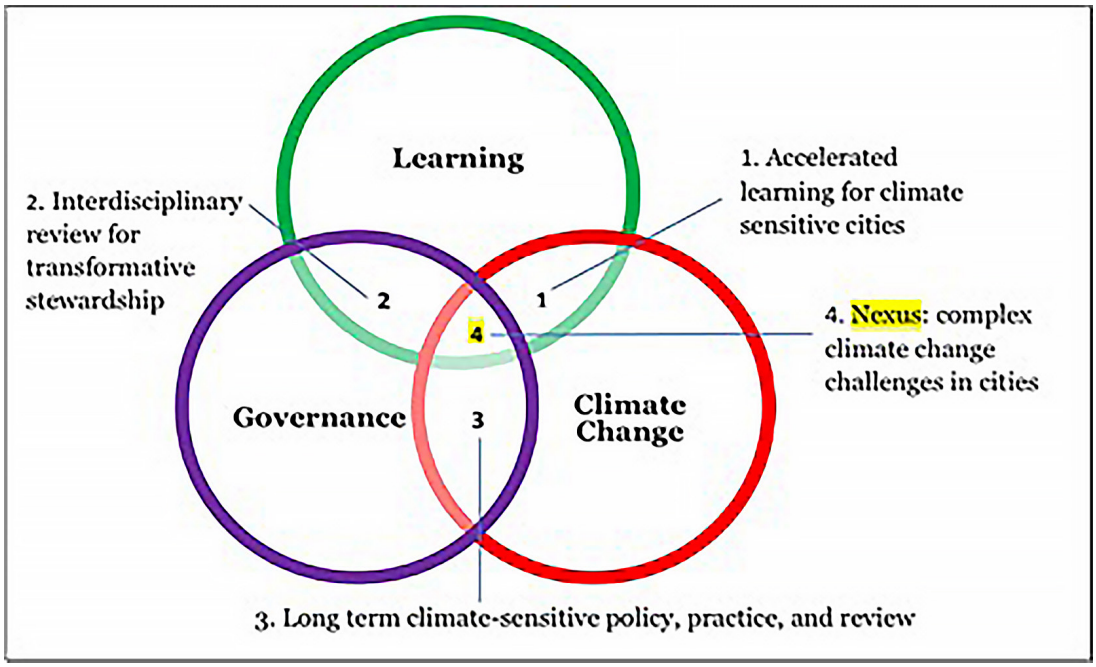


Figure 1: The Nexus of the Three Spheres of Enquiry

There is also one area where there is a 'triple' overlap. This area illustrates the focus of my research, bringing together the notion of learning for governance, just and sustainable cities and resilience to climate change. This is designated the (4) Nexus: Complex Climate Change Challenges for Cities.

In considering this model it is important to look more closely at the knowledge areas represented by the circles and their areas of overlap. The Learning Sphere covers components of andragogy, accelerated learning, interdisciplinarity, innovation through design thinking, advocacy, and ethical

practice. The Climate Change Sphere of Enquiry considers the state of the planet as a baseline, and explores comprehensive vulnerability assessment, meta-analysis of forty cities in crisis, proven techniques for urban retrofitting and design for sustainable cities, and ethical considerations for displaced people in migration and resettlement. The final Sphere of Enquiry is Governance. This sphere encompasses fiduciary duty, stewardship of capitals, shared urban governance, institutional learning, and independent review for ethical futures.

The research projects set out in Chapter Five have occurred within the overlaps of these Spheres of Enquiry, and demonstrate techniques, resolutions, and conclusions that support the creation of Climate-Sensitive-Cities®. Accordingly, the next section introduces our enquiry into the Learning Sphere.

3.2: Learning Sphere

In unpacking the spheres, I start with Learning. Considerations in this area include:

- Adult learning (andragogy) where participants transform from passive bystanders to active, self-motivated participants
- Accelerated learning where the essence is captured rapidly in order to practise efficiently
- Enhanced effectiveness through the introduction of interdisciplinary techniques for innovation and complex problem solving
- Enriched empowerment of participants to act for impact
- Provision of stamina and coping skills to ensure implementation successes
- Triple loop learning for ethical decision-making.

These steps are rarely applied to other scenarios. I apply these steps to my climate governance work.

Rapid learning involves efficient processes, which community and practice leaders embark upon as they progress from passive bystanding to leading transformative action (AtKisson, 2010) along a path that multiplies impact (Davis, 2012). Gladwell suggests 10 000 hours of study may be required to convert an amateur to an expert (Gladwell, 2000, 2008). Others believe that 'learning by doing' is the most efficient technique, especially in music and military expertise. Meanwhile, peacemakers call upon a range of interpersonal skills, high cognitive function, and shared reflections of self and others' thinking in order to maximise their efficiency in resolving cross-cultural and wicked problems (Schülke & Bauer, 1981). All these approaches need to be embraced to address the danger of climate change. Learning these approaches quickly is the key to empowerment for effecting rapid and effective change. These methods (and others) are enlarged upon in the

Accelerated Learning Model discussed in Chapter Seven.

Adult learning becomes a focus when interdisciplinarity is required to collaboratively create a plan for a just and sustainable future. However, documented andragogy processes alone do not result in lasting desirable change. The lessons from the Decade for Sustainable Education (especially those introduced to pre-school children) indicate that an attitude shift from 'world consumer' to 'global citizen' may be a more fundamentally valuable anchor for future generations (Knowledge Management and Education Branch, 2007). The specific values that underpin this transformation include a shift from 'me' to 'we', from more to enough, from short-term to long-term, from greed to need, from quantity to quality, from materialism to holism, and from rights to responsibilities. These lessons, which succeeded so well in children's education (UNESCO, Brito, & Smith, 2012; UN, 1972), might be worth transposing to adult learning in order to promote the same desirable attitude changes. This is reiterated by Mary Robinson and Desmond Tutu from The Elders (Robinson, 2012).

According to Rose, andragogy operates because 'adults are internally motivated and self-directed, bringing life experiences and knowledge to learning experiences; are goal oriented; are relevancy oriented; and are practical. Adult learners like to be respected' (Rose & Nicholl, 1998).

AtKisson suggests that accelerated learning involves taking sustainability theory; simplifying it; making it approachable, understandable and useable to just about anyone; using a structured process for full participation; and ensuring that the process leads to a result that produces a tangible, positive, high-leverage change in the world (AtKisson, 2010). These wise words must be backed up with a solid process that is flexible enough to cater for spontaneous group dynamics so that full participation can be achieved, and that allows for desired results to eventuate with the ownership of action

resting with the participants. As a consequence, I trawled through my HRD study books from 1980s, facilitator's guides from 1990s, executive coaching in 2000, community education techniques, tutoring tools and lecturer dynamics (2007), but was pleasantly surprised to find genuine fidelity in the German translation for human-ecology innovative excellence (Nestmann, 2002) and the international relations mediators' techniques for peacemaking (Schülke & Bauer, 1981). Those cross-cultural techniques are most effective for facilitating in different disciplines for a common outcome.

When I worked with Dutch and German advocates, I became more familiar with techniques that withstand scrutiny. One of my mentors, Dr Heleen Van Haaften, constantly referred to interdisciplinarity (Thompson-Klein, 1990) as it related to university faculties and disciplines. However, medical colleagues were more excited about broader input on well-being that was called 'Interdisciplinarity'. So I became attentive to the range of available techniques that were heavily documented, so I could argue for how I facilitated workshops and could easily transition from one technique to another if some aspects did not come together organically within a group. This gave me confidence to be braver when working with difficult people.

Armed with diverse toolkits, I aimed for the best outcomes through facilitation, but also sought the optimal input from each person. I am firmly of the view that each person who voluntarily participates, or actively pursues attendance in a specific workshop has something of value to contribute. Generally, we cannot buy that sort of passion for the topic! The facilitator's challenge is to ensure multiple opportunities for interaction and for sharing that value with cohorts to advance everyone's understanding and facilitate richer debate. Rich debate – or as activists may call it 'rich campaign' – relies on a range of knowledgeable perspectives in order to arrive at the right message and ensure maximum impact on the general population.

Rich campaigns require people from a variety of different backgrounds and knowledge-bases to work together. Consequently, involving different disciplines is an important feature of my projects and will be explained in greater detail in later chapters of this thesis.

As a result of working with diverse audiences, I gained increased understanding about the sensitivities of people's professional identities as well as the significant opportunities for advancement in joint problem-solving. As I learned more interdisciplinary innovation techniques, I practised them, and hence gained further insights and knowledge. Interdisciplinary innovation is worthy of its own chapter, but I wish to blend the design thinking principles for this decade (Dunne & Martin, 2006; Doherty, 2015) with the older proven systems with cross-cultural approaches to conflict management (Galtung, 1981) with the new arguments for collaborative creative coaching (Shankar & Brown, 2012) (Pastor & Patter, 2015). The following project chapters elaborate on my practice.

Enacting interdisciplinary innovation with rich debate and blended languages requires effective advocacy that harnesses the valuable lessons of the journey towards transformative change (Burnett, 2016). Advocacy is also worthy of its own chapter, but my purpose on this accelerated learning journey is to recognise the importance of a groundswell of understanding, enthusiasm, and willingness to share. Within the broad definitions of advocacy, a rich campaign is vital to ensure the original disciplines are acknowledged in appropriate ways and an identical message for action is clear. Although the word 'campaign' has origins in military tactics, the approach taken by advocates for sustainable development does deserve such a title.

A rich campaign is one that encompasses a greater population of participants, connects on many levels and in multiple modes, is clear in its intentions, and easy to engage with for desired actions. In Australia, the phenomenal success

of 'GetUp' has resulted from the connecting of all age groups, the inclusion of demographics that were not historically political, the provision of clear, justified messages, and the ease and choice of participation to activate the desired outcomes. This engagement in democracy may be the most significant ongoing achievement in recent Australian history, particularly with the youth and aging, migrants and indigenous, women and men, gay and lesbian, minorities, as well as mainstream Australians.

Advocacy generally intends to change attitudes and behaviour in order to achieve a higher purpose, reinforce a fundamental principle, or reiterate a life value. However, in order to shift policy towards a commitment to sustainable development or balanced policy on climate change, there is a need to consider impacts on the general population. Gladwell's *Tipping Point* was scrutinised by the Transform Australia team who determined that only 6% of the population in Australia (1.2 million people) may be the tipping point at which a rich campaign can change attitudes towards sustainable development with particular focus on Climate (Transform, 2010). Given the significant networks of those professionals involved, this campaign is a real possibility if the learning is shared and systems are in place to optimise the learning journey.

However, campaigning is exhausting, and even more so when only small measures of success are achieved. According to Sara Parkin in the 2012 conference, The Necessary Transition, and her book *The Positive Deviant: Sustainability Leadership in a Perverse World* (McIntosh, 2013), coping with reform success must be factored into our learning journey. Managing the milestones of success requires different skills from those needed previously. In many cases, this is where advocacy groups collapse (Parkin, 2010). The learning journey must continue. Wise experience has been shared by people such as: Anita Roddick, founder of The Body Shop, who bravely

introduced the 7-bottom-line corporate reporting for ethics, fair trade and safe products; former Minister Peter Garrett of The Australia Conservation Foundation and singer from Midnight Oil; Elizabeth Hay, formerly of Canada's Sierra Club, now parliamentary leader of The Greens; Greg Borne, former BP CEO, now transformed into a 'Borne-again Greenie' and Chair of the Australasian Renewable Energy Agency; Nate Hagens, former Lehman Brothers VP on Wall Street, now Bio-physical Economist; Mary Robinson (former Irish Prime Minster), now Chair of Mary Robinson Foundation for Climate Justice; Janine Benyus, who introduced biomimicry to everyday business and engineering; and Natalie Isaacs, founder of the organisation '1 Million Women' that presses for climate cooling. So, these people survived the exhaustion of success.

Conversely, youth leaders are inspiring, enthusiastic, articulate carers of the future, but how can we put old heads on young shoulders? I suggest by mentoring, partnering, and collaborative coaching! New techniques are needed for successful advocacy that translates into positive principles in practice and encourages the new system to become sustainable over time.

It is also necessary to consider how to evaluate the success of this approach to learning. The triple loop learning model considers doing things right (how: tick and flick), doing the right things (what: analytical review of performance outputs or extent to which organisational objectives are achieved), and questioning what is right (why: reviewing policy accountability or principle-based mandates) (Argyris, 2011). This model became the basis for my three- and four-day master classes and residential schools for Climate-Sensitive-Cities® in Asia and Europe.

In my preparations, I investigate doing things right through the C40 review. I question doing the right things in terms of decision-making in the short- and long-term with a climate policy and practice model (CPPC), and finally

I consider the ethics of broader considerations so humanity can win the war against climate change catastrophe through effective accelerated learning applied to a major multiplier for transformative action.

Socrates encouraged 'teaching people how to learn', which is accomplished in my accelerated learning trajectory. Machiavelli encouraged people to 'study objectively…with a scientific attitude…to politics and government'; this is inherent in my interdisciplinary approaches to good governance perspective. Schelling encouraged 'man as part of nature…human creativity is part of nature's productivity' (McGee, 2010), which is reflected in my creative approaches to combatting climate change through project narratives and artefacts. Accordingly, I refer to these philosophers in the development of the following sections. In order to interrogate the learning being applied, the next section focusses on the sharp end of environmental stewardship through the Climate Change Sphere of Enquiry.

3.3: Climate Change Sphere

Considerations in this area include:

1. State of the planet
2. World vulnerability assessments
3. Cities in crisis – C40 findings
4. Retrofitting
5. Migration
6. Ethical decision-making.

Having introduced the Learning Sphere of Enquiry, I now consider the Climate Change Sphere of Enquiry. The wicked problem of climate change is the embodiment of the need for more sustainable development, as the slow burn is impacting on everyday life, with the added spice of extreme weather events that include record-breaking snowfall, drought, fire, flood and cyclone to remind us that humans are indeed a part of nature. The concept that Schelling's 'human creativity is part of nature's productivity' (McGee, 2010) is one worth exploring.

For 'human–nature productivity' focusing on climate change, the past five years provide examples of accelerated learning globally: the sharing of human creativity to mitigate the worst impacts, adaptation to the new reality, caring for each other when crisis hits, and the resilience of the human spirit. Therefore, this section recognises the past bodies of knowledge but concentrates on more recent international and interdisciplinary efforts to learn quickly and act accordingly.

I examine the World Bank Forecast, the world risk reports, anthropogenic climate change, public policy, carbon pricing impacts, urban climate concentrations and longitudinal studies, Word Mayors City Covenant, C40 Governance, and Climate Justice Hearings. This research provides a

comprehensive, up-to-date foundation on which to build my argument.

In 2011, the World Risk Report, with new appreciation of the inherent injustice of climate change, presented a comprehensive approach to exposure, susceptibility, capacity to cope, and resilience, and suggested a rounded vulnerability approach to climate risk (UNU, 2011). It was a more just and ethical consideration of preparedness and responsiveness to the risks of slow changes and crisis situations globally. In the past, the bulk of attention was paid to the most communicative, not the neediest. This struck chords internationally and the World Bank, through a frank and fearless research institute, subsequently issued a forecast called *Turn down the Heat: Why a 4 degree warmer world must be avoided* (Potsdam Institute for Climate Impact Research and Climate Analytics et al., 2012). Accordingly, the International Panel on Climate Change, previously moderate and somewhat hushed in its warnings, became increasingly vocal and outspoken. There is concern for an impending threshold – another tipping point – where natural cycles are so skewed that oceans become acidic rather than alkaline; sea currents change because of variable water temperatures; animals lose their bearings and don't return home for reproduction; crops and plant systems collapse, ice-caps melt, and low-lying land masses disappear forever under rising sea levels (UNDP, UNEP, World Bank, & World Resources Institute, 2011). Resilience and recovery may not be an option. In May 2013, the Pacific Ocean measured 400 parts per million of greenhouse gas, exacerbating the loss of food crustaceans and spotlighting the dangers of beyond two degrees warming (McKibbon, 2013). For the twelve Pacific nations who are Australia's neighbours and Commonwealth sister countries, this spells extreme risks.

In 2011, The Commonwealth Heads of Government Meeting (CHOGM) was held in Perth, where the recommendations of the Eminent Persons Group

(Eminent Persons Group, 2011) were shared with the Commonwealth Peoples Forum through a workshop stream on climate, sustainable development, and environment. I was a rapporteur and our joint model for climate policy and practice was presented to foreign ministers for endorsement by 53 countries. This is the basis of a publication launched in February 2013 with the Commonwealth Human Ecology Council as a Civil Society initiative. For small island states in the Pacific Ocean, Indian Ocean, and the Caribbean sea, climate change means sea-level rise, sea water inundation of crop lands and essential infrastructure, disease and death, loss of communication, and loss of access to homes, which leads to the destruction of culture and traditions as populations are forced to migrate or die.

In Commonwealth countries, climate migration estimates range from 15% to 100% of their populations by 2050. In 2015, in Malta, CHOGM dedicated specific efforts to climate migration solutions. The displacement of peoples becomes a global responsibility with considerations for humanitarian aid, safe migration, resettlement, and ethics in decision-making for the short- and long-term. As a result, the concept of Commonwealth citizenship was introduced to trial safe migration between sister nations.

Apart from the global overview, there is a need to consider anthropogenic climate change. The arguments that change is a natural phenomenon (from ice ages to 'water world' to desertification of continents), needs to be reviewed as human behaviour exacerbates the speed of temperature rise and the increase of fluctuations to levels not experienced in measured history. Man-made impacts are manifested in the unprecedented variability of long-term weather patterns.

These are particularly evident in cities with unplanned urban development, in rural land-clearing, in the ocean's capacity to sequester carbon, and the forests' capacity to sequester same in soils and in thermal airsheds.

Greenhouse gases measured in 'carbon equivalents' underpin the pollution measurement and mapping. Greenhouse gases create holes in protective ozone layers around the earth that cause 'the greenhouse effect' and global warming.

Warming knows no statutory boundaries, so the carbon source in one place affects surrounding areas and often needs a carbon sink in another place. This raises the questions of climate justice and ethics: who benefits, who pays, who is disadvantaged, and if so, should we and how can we make this equitable? (The Australia Institute, 2008; Robinson, 2012) I review ethics more fully in the research chapter of this thesis.

In cities, these greenhouse gases with ambient warming effects are mapped and referred to as 'heat islands' (Newman, Beatley, & Boyer, 2009). In peri-urban areas where food for urban dwellers is usually grown, unplanned urban sprawl and forest clearing multiplies concerns for climate change impact on cities. Therefore, a city–regional approach has been adopted in many countries to manage these relationships (NRG4SD, 2002). In response, ecosystems services mapping, which is beneficial in visualising these regional impacts in impartial ways, has developed rapidly (Maynard 2005; Costanza, 2012; Bertrand, 2012). Modelling from such mapping also allows for plotting of alternative futures. Therefore, sound evidence-based public policy is needed with structured management regimes that support honourable principles that facilitate desirable practices to mitigate the impacts of climate change in all its manifestations.

In Australia, climate policy has advanced recently, despite being debated for three decades by scientists, farmers, fishing groups, conservationists, tourism managers, and town planners/urban designers (Garnaut, 2011). In 2007, then Prime Minister Kevin Rudd promised climate change policy, and after considerable argument, carbon pricing was introduced by his

successor Julia Gillard in 2011 (Hatfield-Dodds et al., 2011). The pricing regime legislated that a pollution payment from 300 of the most polluting industries be collected to fund the investment in long-term management of climate through renewable energies, in cross-subsidising most impacted and vulnerable people, and in a range of research and development initiatives. Carbon pricing was itemised on invoices and land rates notices so there was some understanding of pervasive impacts for people.

Some vulnerable people are already carbon-offset payment recipients, and from 2013 all Australians were taxed differently with a higher threshold before income tax is payable. This was a call to 'get smarter' on the long-term actions that are required to live with climate change. However, community groups and professional bodies have been keen advocates for decades, with specific continuing professional development active since 1990s. The 'critical decade' was articulated for Australia (Climate Commission Secretariat, 2011) with state-by-state priorities for action. Formal public policy allowed for progress at last, and provided greater awareness of the impacts of human behaviour on climate in the long-term. However, increased international collaboration was also vital. Consequently, 154 nations under the Council of the Parties (COP21), are implementing culturally appropriate public policy to address unique climate impacts for their populations and sovereign lands. This was strengthened with voluntary agreements resulting from the Paris COP in 2015.

Human populations tend to congregate in cities and towns, and therefore, in 2000, United Nations Habitat (UNH) was established to go beyond the Human Settlements Council under the United Nations Environment Program to independently address the issues of sustainable cities and reform the built environment. It was, at that time, the only UN Agency that worked directly with local governments and civil society. UNH introduced the Global Urban

Observatory (Global Urban Observatory, 2004), State of the World Cities reports (UN Habitat, 2011; UNESCO et al., 2012), and Planning Sustainable Cities (UN Habitat, 2009). The C40 was an initiative to share information among the top forty cites for climate change in partnership with International Council for Local Environmental Initiatives (Rok, Kuhn, & ICLEI European Secretariat, 2012), where a longitudinal study of interventions was reported. The results form a practice guide for local authorities worldwide; however, my project goes much further.

In concert with that were initiatives from World Mayors (CLGF and ULGA) who were signatories to climate reforms (Mayors of the World, June 2011). Originally, only 40 cities signed, but the quantum has now grown exponentially. This has sparked a governance conundrum: what if mayors ruled the world? (Barber, 2013) These matters were finally taken seriously in jurisdictions that were closer to changing people's behaviour.

The audit of actions to address climate change within these C40 cities provides the backbone for better urban governance (ARUP, 2011). Actions include suites of comprehensive interventions across the forty cities (populated by 297 million people) with impacts that range from ten, twenty, fifty, and one hundred years respectively. In short, many case studies of policy and funded practice-interventions resulted in this summary of:

1. 23 strategies for reducing vulnerability to climate stress
2. 22 strategies for better urban planning
3. 28 strategies for city greening and biodiversity
4. 20 strategies for new buildings.

This provides a basis for better practices for climate management in cities. Most cities can retrofit aspects to address their inability to adapt to climate change. However, some cities will be totally inundated or destroyed, so

options for displacement of those residents must be considered ethically. (This can of worms is worthy of its own chapter, but not in this thesis.) Local authorities cannot implement these initiatives alone. There is a need for long-term cooperation and partnerships to ensure the intended outcomes are properly achieved. So, my enquiry now leads from the technical fix to the operational systems required to enact these initiatives. This leads to the next Sphere of Enquiry in my argument: Governance.

3.4: Governance Sphere

Considerations in this area include:

1. Fiduciary duty
2. Stewardship
3. Shared governance
4. Urbanisation
5. Institutional learning
6. Independent review
7. Ethical urban governance.

In the last section, the Climate Sphere of Enquiry provided an impetus to the initial Learning Sphere. Now, this Governance Sphere addresses the responsibilities for action to be properly acknowledged.

This third Sphere of Enquiry teases out the governance issues that are at the crux of my argument for accelerated learning for climate change for cities. Governance can be defined as 'what government does', which begs the question of 'what is government for?' The best contemporary explanation involves fiduciary duty of care for the peoples, the greater public interest, the greater public good, the common good, and care for the commons (shared resources like the atmosphere, land, water, oceans, and outer space) (Coghill, Sampford, & Smith, 2012). In democratic societies the 'responsive rule' should apply. Paul Finn emphasises the importance of 'standards for conduct…to be expected of persons occupying fiduciary positions, that is, persons who, by virtue of position, responsibility or function, were expected to act in another's interest and not their own interest' (Finn, 1995). In international law, this is called Jus Cogens which relates to 'natural law' from 1758, and peremptory norms from 1923 in the International Court of Justice. These are the building blocks for sound urban climate governance.

The determination of good governance rests in sound stewardship. In ancient times, indigenous peoples, including Australian Aboriginal and Canadian Tribes, considered the impacts of decisions for a seven-generation period. In 1776, Adam Smith considered the 'wealth of nations' in the context of stewardship of capitals that was founded on an 'inquiry into the nature and causes of wealth' (Smith, 1776). In recent times, performance of sound stewardship is measured through foundations such as built capital, natural capital, social capital and cultural capital (Meadows, Randers, & Behrens, 1972; Elkington, 1999a). In 2003, spiritual capital became accepted in some circles where 'quantification of the value to individuals, groups and society of spiritual, moral or psychological beliefs and practices' provided a western approach to eastern values for life, such as in Bhutan and Tibet. Simultaneously, institutional capital became measured in some cases. However, for my purposes the scope is limited to the four basic capitals above, which can be easily measured in those four traditional ways.

The stewardship of four capitals has been generally adopted as the basis for measuring sustainable development. The sustainable development ethos has matured in a continuum that stretches from indigenous concepts and Adam Smith's nature and causes of wealth and wellbeing, to conservation awareness in the 1980s, environmental activism in the 1990s, to sustainability principles in the 2000s, to current sustainability ethics with respect for self, others, and the earth, as declared at the 2012 Earth Summit. This evolution illustrates how slowly contemporary society learns from ancient wisdom.

Since local governments adopted the Local Agenda 21 from the 1992 Earth Summit, the stewardship review has matured, with such disclosure never previously encountered. Unfortunately, such transparency was not always flattering for the decision makers, and over time the data was filtered from public view. This gave rise to independent reviews and higher-order

government reports, regionally, provincially, and nationally. Australia had its first 'State of the Environment Report' (SOE) through federal government in 1996. New Zealand published its first SOE in 1997 through the then Independent Parliamentary Commissioner. This caused tensions. Nevertheless, reviews by a higher agency resulted in better strategic plans for councils, with visioning sessions with community and industry, community plans, and shared actions over 30-year periods. Despite this, local authority policy makers change regularly through elections, although the residents remain, still honouring commitments from consultations with previous regimes. This indicates the ongoing relevance for shared governance and the importance of community consultation with participation along with independent scrutiny of stewardship.

Shared governance includes the acts of institutions that contribute to the regulation of interdependent relations to achieve desired shared outcomes over time. During the reshaping of capitalism in the recent years, the need for shared scarce resources, rather than individual ownership with exclusive access, has become apparent. In recent cases of flood, cyclone, hurricane, and fire, it has become evident that 'the commons' are everybody's responsibility (Otto-Zimmermann & ICLEI, 2011). In my Doctorate, the commons include air, beaches, oceans, land at risk of inundation, public parks and forests, deserts, rivers, riverbanks, estuaries and riparian swamp (Hawke, 1997). With good governance of the commons comes the question of fiduciary duty to care for the atmosphere and the environment (Coghill, 2012). Some institutions call this 'stewardship' because we can only be temporary stewards for intergenerational shared resources.

When the duty of care is considered, the role of independent reviewer (Westminster Judicial Arm) is crucial for better systems, directing better interdisciplinary learning, and enhancing the opportunity of a better

quality of life for all (Hawke, 1997). In 2015, the United Nations fifteen-year future plans included Sustainable Development Goal 16 (SDG16) for good governance. SDG16 was the first global enabling-instrument to frame process to achieve content-based indicators and targets, which further reiterates importance for shared governance and independent scrutiny.

It is pertinent, in urban climate governance, to ask what systems do we rely on and who shares responsibility? The Westminster system comprises:

1. The Legislative arm that makes law based on desirable objectives and principles
2. The Executive arm that implements systems to support the law
3. The Judicial arm that exercises the role of reviewing decisions made in order to ensure the spirit of the law is upheld
4. The Independent Review system, which is the fourth pillar in the Australian Constitution reinvigorated by Transparency International in 2017.

The sharing of urban climate governance includes:

1. **Local governments** – responsible for town planning, urban design principles, neighbourhood planning instruments, outcomes of community consultations, warning, evacuation and crisis care in disasters, emergency recoveries, mitigation with proactive early interventions, adaptation for prevention of future disasters, and responsibility for ratepayers, visitors and tourists
2. **State governments** – responsible for land and planning laws and respective courts. In Queensland, regional planning under twelve Sustainability Principles care for cumulative impacts of developments over scarce, valued resources, and regionally significant natural assets.

3. **Federal Government** – responsible for Capital City Plans, Water Acts, Environmental Protection and Biodiversity Conservation Act, and the Carbon Farming Initiative
4. **Community groups** (neighbourhood advocates, church groups, environmentalists, progress associations, water catchment associations and regional bodies) – argue for the highest values and 'in the public interest'
5. **Professional bodies** – demonstrate ongoing ethical practice, inspire innovation for better quality of life, and update members of changing laws, systems and professional education in order to provide well-informed expert witnesses who can be cross-examined effectively without losing respect
6. **Academia** – provides a safe place for learning and ethical innovation where young professionals are preparing for the real-world experience, and continuing professional development is encouraged.

With focus turning to urban governance, cities represent the most pressured resources in terms of existential needs, climate risk, expensive infrastructure and vulnerable people. In concentrating on governance of cities and their surrounds, I trace the evolution from 1960s to the vision for 2020 as that relates to scope for sustainable development, view of nature in relation to development, built environment design, and concepts underlying assessment and approvals (Birkeland, 2008; Birkeland, 2012). This evolution for the built environment is more commonly called human settlements or urban development, and contemporarily called 'cities'. Birkeland argues that the 1960s model for trading off ecology for economic gain has matured to a contemporary 'net-positive impact' approach to ethical development. Self-sufficiency is fundamental to resilience and living within a small or zero

carbon footprint. The micro interventions often spark macro policy for cities. In Europe last year, self-generating wind micro-turbines were built into the skin and façade of new buildings, called kinetic architecture, which results in a net positive energy footprint by powering surrounding precinct housing. Some buildings grow their own food on green roofs and walls and balconies. CH2 in Melbourne moderates its own temperature through salt balls for heat retention and termite-design ceilings with open windows for natural cooling systems. CH2 manages its own waste as does the whole city of Hammarby in Sweden, also making energy in-house from its own waste in 3-day cycles. These micro components accumulate within a macro urban policy. The integrated Hammarby initiative was championed by the independent Urban Design Commissioner a decade ago. These simple technologies can be applied anywhere, proving that anthropogenic greenhouse gas does not need to exacerbate climate-change in cities but can be managed in-house and provide a net-positive impact to a city. Therefore, accelerated learning with policy in practice, demonstrated with shared responsibility (governance), can empower people and communities to live abundantly despite the risks and slow burn of climate change.

In the meantime, smarter policy options need to be considered for retrofitting cities where possible. When state and local government bemoan funding for climate mitigation or adaptation, it begs the question of the costs of natural disasters that are becoming more extreme every year. The recovery and inappropriate rebuild after Hurricane Katrina in New Orleans (Blakely & Carbonell, 2012) is an example of 'wilful blindness' where governing decisions proved contrary to the honourable intent (Suzuki 2013). Many countries have learned that the old rebuild models are not feasible for long-term trends for climate change and sound city governance (Nelson, Pruetz, & Woodruff, 2012). The Philippines with its typhoon genocide estimated at over 2 million people and US$14 billion of damages during two hours of

devastation, declared 'no-go zones' and permanently evacuated whole towns. Meanwhile, in Canada and Australia, land swaps and tradeable development rights facilitate resettlements (Pruetz & Pruetz, 2007). In 2013, New York and the east coast of the United States experienced Hurricane Sandy resulting in death, damage, and no electricity for up to 3 weeks, which triggered governments to evaluate essential infrastructure investment in future. In 2013, a super storm across Europe and UK allowed a better understanding of impacts of loss of essential services elsewhere. In Asia, some governments factor in expected deaths, losses and interruptions during each of the two monsoon seasons per year, but they are under global scrutiny for fiduciary duty to vulnerable peoples, and doing nothing amounts to negligence, crimes against humanity, and genocide. The need for better governance to deal with extreme climate events becomes obvious. In the meantime, however, the incremental slow burn of climate change may not be properly acknowledged or acted upon. I provide more research details on this later in this thesis.

Governments learn from independent reviews, evaluations and public inquiries. These are the most valid and efficient ways to understand shortcomings in policy and regulation, because they are based on public complaints, petitions, submissions or hearings evidence that argue deficiencies and unintended consequences of the government policy. Government integrity is founded on four key principles which can easily be aligned to independent reviewers' functions (Accountability Round Table, 2013):

1. Fairness aligns with the Ombudsman
2. Transparency with the Integrity Commissioner
3. Accountability with the Auditor General
4. Honesty with the Criminal Misconduct Commission (later renamed Crime and Corruption Commission).

In sixteen global jurisdictions, a Sustainability Commissioner (SC) may better be positioned to scrutinise climate governance. In hindsight, the crime continuum that could be adopted for climate imprudence would include ignorance, incompetence, mismanagement, misconduct, negligence, tort, wilful blindness, fraud, corruption, ecocide and genocide (Gore, 2014; Brisman & South, 2013).

In Canada, the SC role is enacted within the Auditor General Legislation, and is described as 'an auditor general for the environment', commencing with an audit called the 'State of the Environment Report'. However, the focus on better city governance for an independent reviewer was realised in 2010 with an Urban Design Commissioner for South Australia (Horton, 2012; Oakley, 2011) and Commissioner for Cities in Sweden in 2009. Similar roles were intermittently allowed in New Zealand over the past 20 years, but the endurance of a Sustainability Commissioner is uncertain (Hawke, 1997). In the countries that have independent Offices for Sustainability Commissioners, the review of 'stewardship of 4 capitals' is a basic mandate (Meadows et al., 1972; Hawke, 1997; Davis, 2002). The role of the Office closely aligns with city and regional governance, care for the commons, climate risk and governance, community interests, and indigenous and cultural heritage protection. This role requires diverse professionals working together for continuous improvement.

Therefore, I consider independent review by Sustainability Commissioners is an effective method of accelerating learning about fiduciary duty, impediments to good governance, and empowerment of institutions to make immediate positive changes for climate sensitivity.

3.5: The Nexus of Three Spheres of Enquiry

Having considered each of the spheres of enquiry and the 'dual' overlaps, the focus of my unique contribution is the 'triple' overlap of the Three

Spheres of Enquiry. This translates to investigating rapid pathways for just and sustainable systems for interdisciplinary review for the ultimate purpose of climate-sensitive cities. It begins with accelerated learning for climate sensitive cities for mixed professionals and communities, catapulted by independent review to focus on highest vulnerabilities with the spirit of innovation and good governance. This framework is the foundation for designing my masterclasses for continuing professional development for a range of urban players.

3.6: Synthesis

To attune our thinking, this thesis so far has introduced the importance of tackling wicked problems of climate in cities in Chapter One, and the significance for me personally and professionally in Chapter Two. In this third chapter, some context is provided in order to design a model to tackle the wicked problems, so that my research efforts are more directed.

The simple model of Three Spheres of Enquiry defines overlaps that allow me to concentrate my efforts for highest value – the sweet spot. Systematically, the focus for learning and climate is the accelerated learning for climate-sensitive cities; the focus for governance and climate is long-term climate-sensitive policy, practice, and review; while the focus for learning and governance is independent review for transformative stewardship. The sweet spot is the nexus of all three: interdisciplinary review for just and sustainable Climate-Sensitive-Cities®. In short, I aim for ethical urban climate governance. The areas of overlap have provided a deeper understanding of the complex transdisciplinary dimensions of the research. With this background it is then intended to look more closely, in the next chapter, at Methodologies.

Chapter 4: Methodology

4.1 Introduction
4.2 Philosophy
4.3 Values
4.4 Action Research Questions
4.5 Action Research – A New Lens
4.6 Everything Happens in Threes
4.7 Project Design
4.8 Synthesis

4.1: Introduction

Methodology is fundamental to planning how to tackle any action research, otherwise time and effort may be wasted. I use a tiered approach and a suite of techniques, so this may be described as 'mixed methods'. Because humans are dynamic subjects, I need to be just as dynamic and agile with my active participation, so I prepared a toolkit of thinking models and human engagement practices to exercise in my projects.

In this chapter, I reflect on my values and my research philosophy. In a sometimes negative and holocaustal field, I make Hope a primary element in my philosophical vision. The value of Hope underpins my projects and energises desirable outcomes.

I also consider action research approaches that describe planning, interactive methods, and evaluating results. My roles are diverse and include: organiser/proponent, observer, advocate, innovator, steward/matriarch, author, rapporteur, mediator, facilitator, entrepreneur/funder, visionary, maven/researcher/expert witness, and network/partner. This is further illustrated in Figure 56. I select understandings from a range of works that include Cherry (2002), Dick (1997), Zuber-Skerritt (2012), Schneider (1988; 1992), Guba and Stufflebeam (1968), Argyis (2011), Lawrence (2013), and Alber (2010). Their methods are used to guide my project design and provide both a general and explicit framework in which to operate. These approaches and specific techniques were proposed in my original Learning Plan, devised in 2012. During and after projects, results are reviewed against the expected outcomes articulated in the project proposal. The lessons lie in recognising actual outcomes of each project. My grand conclusions are the consequences of such experiments, and are labelled 'meta-analyses' in my project narratives. Those consequences are categorised as advancements in knowledge, action, and learning in Chapter Seven.

The analytical review was designed to be easily understood and to answer the research questions in a way that is useful to others. Having a uniform format surgically presents the crux of the tough questions. Furthermore, it becomes transparent for determining meta-analyses; it crystallises the relevance and impact of my determinations. In all encounters with individuals, corporations, and groups, my role as a research-practitioner is explicit. This network of critical friends allow for different perspectives to thoroughly test my direction.

In the final pages, I describe what career steps arise from my learning adventures. Figure 2 below illustrates a hierarchy for conducting this doctoral study. It takes philosophy, action research method, and research priorities, and aligns them with wicked problems, three spheres of contribution to focus efforts, project designs, seventeen narratives, consideration of outcomes, and sample project artefacts.

This chapter explores the possibilities and defines the logic for this Doctorate.

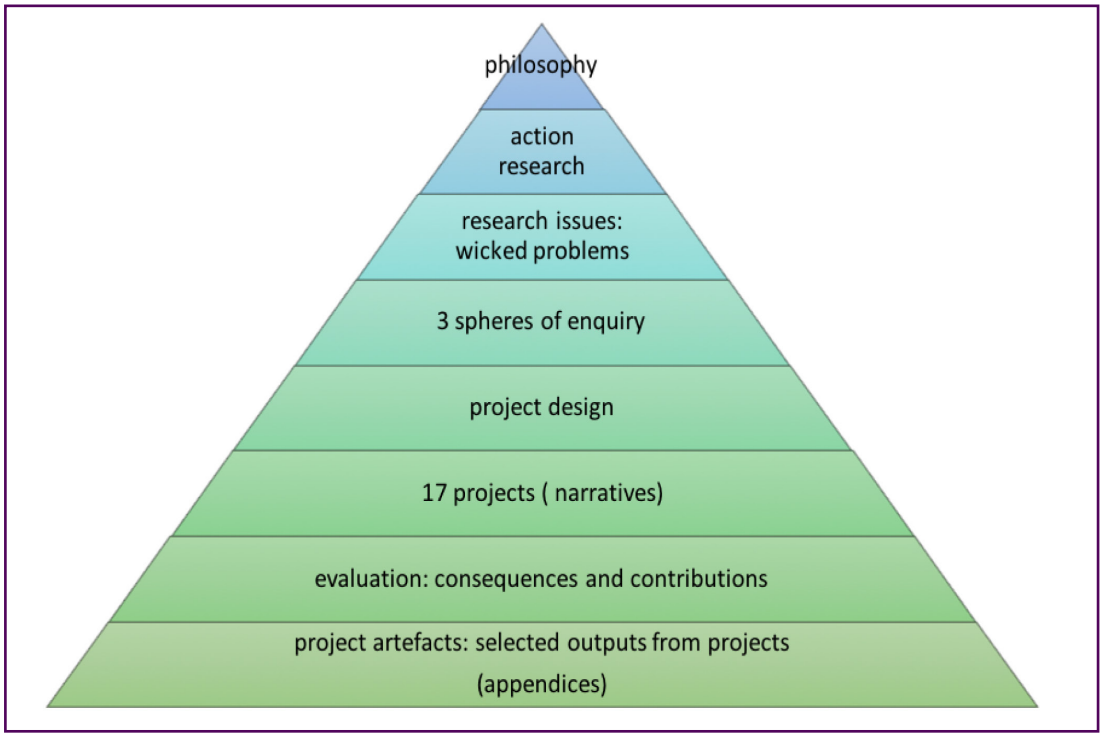


Figure 2: Hierachy of Logic for Undertaking this Action Research Doctorate

4.2: Philosophy

I need to have an optimistic attitude to tackle the wicked problems of impending doom to civilisation and the planet. I also remember, understand, apply, analyse, evaluate, and interpret the scientific evidence (Aainsqatsi, 2011), and argue the most effective options for creating resilience and empowering people to make a difference in their circles of influence, their communities, and their professional working lives. It is important that I bring a highly positive attitude to my projects, with enthusiasm for inclusive yet conflicting perspectives, diplomatically resolving crises (Galtung, 2001), and finding innovative solutions for future wellbeing (Pastor & Patter, 2015). Furthermore I must inject others with positive energy so that they are empowered to do the same (Parkin, 2010). My point of difference from other academics is that the results of my projects are a co-creation between the participants and myself. They are a demonstration of Expansive Learning (Engestrom, 2001).

Some climate researchers appear negative as they concentrate solely on defining problems and extrapolating their impacts. My approach fills a yawning philosophical gap; it accepts the evidence of the existence of complex problems, but also emphasises the development of innovative solutions, and acknowledges that regenerative cities with brighter futures are more than just possible, more than just probable, but actually exist right now. Sharing effective strategies, accelerating learning with a large toolkit of techniques, and implementing solutions in situ is my forte. My interest is in education winning the race over catastrophe.

4.3: Values

The development of fundamental values provides a sound base for optimism. My value-sets align with eco-spiritualism and planetary wellbeing. Sustainability principles are universal and for that reason they can be applied from preschool interactions to the ethics of boardroom decision-making (Dunne & Martin, 2006; Queensland Government, 2006; UNESCO, 2007; Knowledge Management and Education Branch, 2007; Davis, 2012a; Davis, Lowe, & Maher, 2004).

Figure 3 below illustrates the shift in values that nurtures sustainable development in decisions made in daily lives. These sustainability values underpin thinking about ways to create 'the future we want' (UN, 2012). The shift from a world consumer to a global citizen is fundamental. By addressing values, I can operate above cultures, dialects, disciplines, and professions. This doctoral study seeks to accelerate the shift in our attitudes, decision-making abilities, and, ultimately, our behaviours (i.e. moving from the left to the right columns).

World consumer	Global citizen
Me	We
More	Enough
Materialism	Holism
Quantity	Quality
Greed	Need
Short-term	Long-term
Rights	Responsibilities

Figure 3: Values for Sustainable Development

The desirable shift from the 'world consumer' to 'global citizen' means caring more, sharing more, doing more with less resources, being happy with enough instead of perpetually longing for more (or only the 'best') material objects, working to long-term horizons with attention to acting in the right direction right now, and realising that hard-won rights have responsibilities attached. The Wall Street 'greed-is-good' value set is not compatible with

intergenerational equity (Rudd, 2008; UN, 1972). Today's short-term selfishness won't provide a healthy future for tomorrow's generations.

Because of this, and recognising the elephant in the room, my values call me to question the morality of preventable carnage resulting from the incompetence, negligence, or wilful blindness of disengaged urban decision-makers. One example of this was the occurrence of Typhoon Haiyan in the Philippines that took two million lives in two hours (UNISDR, 2011). Who is responsible? Only mother nature? My research aims to determine this.

Having cultivated these values, I can work with diversity, and above idiosyncrasy and language barriers, to establish a common ground to build upon. This ability is useful for my practices. As an optimist, I actively seek to get the best from each person's involvement, believing that everybody comes with a unique background, skill-set, and knowledge, and is able to contribute in some special way to any situation. With this attitude, group facilitation and exploring new techniques for common ground becomes more comfortable and accessible for all involved.

Once I secure that value base, I can explore the research questions to find some useful answers, or at least to what extent those questions can be answered, and under what circumstances.

4.4: Action Research Questions

Given the values set out above and the 'values shift' underpinning my doctoral study, I have focussed on what issues need to be addressed during this study program. The posing of questions allows me to be systematic. I developed the questions below to tease out the issues, to pave a path for the journey. Question One reflects on technical information as a credible base. Question Two contemplates accelerated learning through institutions. Question Three considers interdisciplinary advancement particularly as it relates to governance. Question Four examines the role of Sustainability Commissioners/Independent Reviewers in relation to the findings of the previous questions.

1. Does society have enough technical capacity to respond effectively to climate and sustainable development challenges?
2. Can people learn fast enough to implement positive change through responsive institutions?
3. Can people accelerate learning across disciplines and cultures, and maintain momentum to prevent backward steps?
4. Do Sustainability Commissioners accelerate learning, inspire joint innovative solutions, and the maintain vigil? How?

These questions provide basic infrastructure for my action research. In order to be credible, I had to be up-to-date with technical advancements in the three chosen themes (accelerated learning, cities for climate change, and sustainable development governance). The literature reviews focus on these Three Spheres of Learning for Climate Governance, and my demonstration projects concentrate on the Nexus. The personal reflective practices I deployed are adapted from Bloom's Taxonomy (Bloom, 1956). By assuming different roles, I can interrogate demonstration projects from different

perspectives so that I build a richer picture of the state of play in Learning for Climate Governance.

I had to establish if there were opportunities for improving my understanding of philosophy, and how I might lead others towards the type of thinking that leads to desirable transformative action. I had to determine what worked and why in a sea of diversity. I wished to recognise the magic formulae that produce desirable changes effectively and efficiently. I had to determine what 'maintained the rage' (the vigil). I aimed to identify institutions that can and do achieve these things. I planned to gain those understandings and skills and achieve the same in my spheres of influence. With these research questions embedded, the following section illustrates my action research approach.

4.5: Action Research – A New Lens

In the past few years, my independent reviewer role has been refined as a result of connecting this study with international projects, national reforms and local initiatives, responding to decisions, and, in many cases, leading positive change. It has been an optimal time to study and participate in these reforms because the live examples of slow burn and extreme events for cities have never been so evident or impacting so many lives. I can call upon long-term colleagues and new relationships to guide and encourage me. Piecemeal approaches allow better decision-making with more ethical pathways to prepare for the future (Preston, 2001). It is an excellent time to share learning and to build a common understanding of fairer futures (Slaughter, 2010). It is evident that disasters have brought out the worst responses in institutions and the best in people (UNISDR, 2011).

My previous work required action research methods for justifying preferred policy options, giving evidence in court, and making recommendations for reforms. Since then, my models have become more sophisticated. My experiences enabled me to evolve, learning newer models, and absorbing others' experiences to tackle the task at hand. This evolution is described in greater detail in chapter seven. My relevant background includes:

- 1989–2002: Auditor-General Programs (Fitzgerald-era management ethics audits)
- 1991–1997: Queensland FMS Program evaluation roles (Australasian Evaluation Standards)
- 1997–2000: Charter of Social and Fiscal Responsibility→Output budgeting→Managing for Outcomes regime for amalgamated portfolios
- 2000–to present: Logical Frameworks for international projects, World Bank Models

- 1998–present: Pressure State Response environmental reporting with ISO 14 000
- 2002, 2005, 2008: Sustainability Audits, benchmarking 26 regions with global dashboards
- 2004–to present: Earth Charter Framework reporting for charities
- 2008: COAG reforms – funding formulae for policy accountability
- 2010: UN Global Compact principles with introduction of ISO 26 000 for social responsibility
- 2012–2016 Sustainable Development Goals development and progress reporting on targets, indicators and measuring national and regional performance.

The following Figure 4 encourages new perspectives towards action research.

Figure 4: New Lens for Action Research (Unknown origin. Adapted by Elkington,1997, and by Davis, 2004. Readapted in 2013

The three perspectives illustrate several dimensions for this Doctorate (Unknown origin, adapted by Elkington 1997, by Davis 2004, adapted again 2013). This is an innovative way to ensure all divergent viewpoints come into focus. A pattern arose as the cumulative rich perspective manifested. The following section expands on this.

4.6: Everything Happens in Threes...

My action research occurs in three areas: Action, Knowledge, and Learning (Cherry, 2002b). The study program is then accomplished in three phases: planning, implementation, and review (Alber, 2010 p.259).

More 'threes' that are pertinent include:

- Sustainability can be basically measured through a triple bottom line: environmental, social, and economic indicators (Elkington, 1999)
- Benchmarking can be explained by a model with three aspects: Pressure-State-Response for UNEP (Berger & Hodge, 1998).
- Content for this doctorate is arranged as Three Spheres of Enquiry: climate, governance and knowledge with a three-phase process: research, action and evaluation.
- My methodology has three strands: philosophy, strategy, and practical workshop tactics.
- My conceptual framework includes triple loop learning: doing the right things (efficiency), doing those things the right way (effectiveness), and doing those things for the right reasons (ethics).

> *Triple loop learning involves principles. The learning goes beyond insight and patterns to context. The result creates a shift in understanding our context or point of view. We make new commitments and accommodate new ways of learning. This type of learning challenges us to understand how problems and solutions are related, even when separated widely by time and space. It also challenges us to understand how our previous actions created the conditions that led to our current problems. The relationship between organizational*

> *structure and behaviour is fundamentally changed because the organization learns how to learn. The result of this learning includes enhancing ways to comprehend and change our purpose, developing better understanding of how to respond to our environment, and deepening our comprehension of why we choose to do the things we do.*
>
> *(Adapted from Argyris; Wierdsma and Swieringa [parts translated from German]; Hargroves from Masterful Coaching; Extract from my publication, 2012).*

Figure 5 illustrates the multiple perspectives accessed in triple loop learning, and the cycling (and recycling) that promotes enhanced knowledge, understanding, and judgement in both organisations and the individuals who populate them.

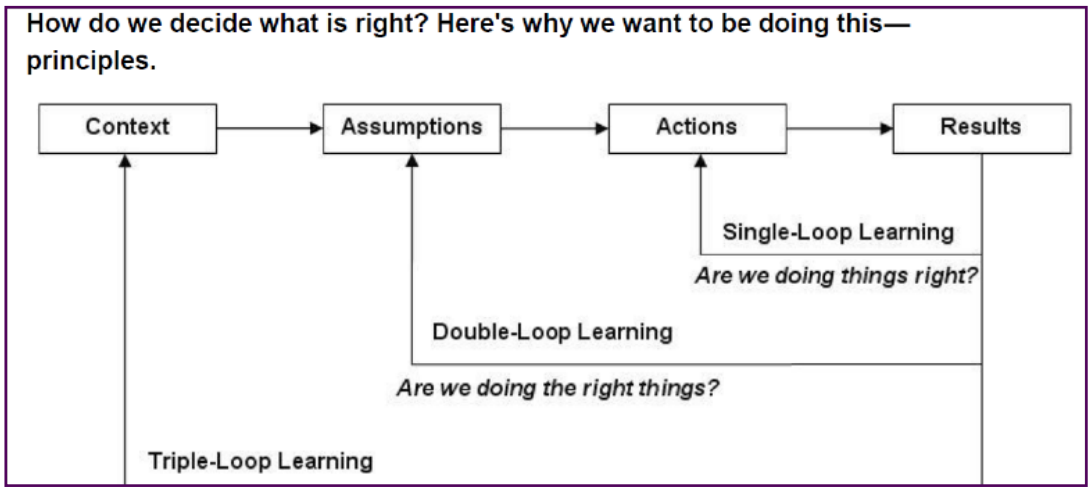


Figure 5: Triple Loop Learning – How Do We Decide What Is Right?

This ethical evaluation framework can withstand legal scrutiny and can enhance professionalism.

In this chapter I acknowledge a suite of methods that became the base for my mature practices during the projects:

- Participatory Action Learning and Action Research (Zuber-Skerritt, 2012)
- Triple Loop Learning (Aygris, 2011)

- Accelerated Learning (Rose, 1987)
- Interdisciplinary Innovation (Thompson-Klein, 1990)
- Resolution Thinking models with toolkits (Shankar & Brown, 2012; Schülke & Bauer, 1981; Galtung, 1981)
- Design Thinking – 1926 concepts to 2015 practices (Burnett, 2016)
- Public Policy Cycle (Schneider, 1992; Davis, 2012) Climate Infrastructure Investment Evaluation Tools (traditional cost benefit to resilience standards to moral compass measures)
- Independent Review of Urban Climate performance (ARUP, 2011)
- Ethical Perspectives: climate migration and climate justice principles (Cullinan 2012; Robinson, 2012).

There is a wealth of background knowledge and tools that allow me to go boldly into next step of project design.

4.7: Project Design

Projects were chosen that concentrated on the nexus between Learning, Climate Change, and Governance within the parameters of the Three Spheres of Enquiry. However, it became clear that I needed to progress the dual overlaps of Learning, Climate, and Governance (Figure 6) before I could converge on the sweet spot of L4CG.

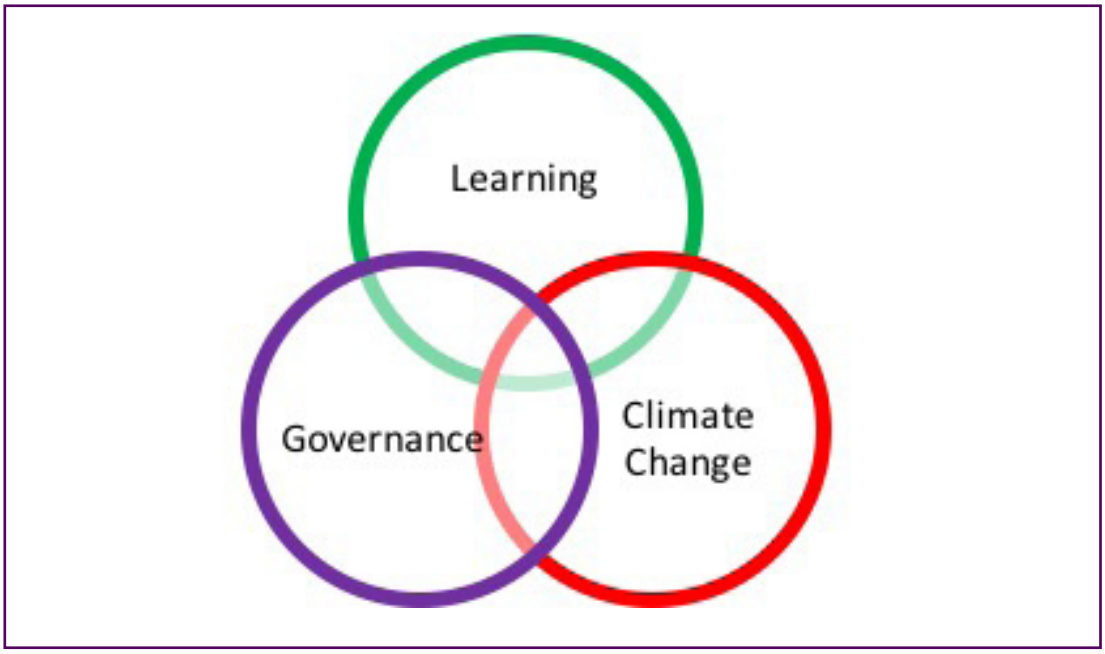


Figure 6: Project Design

Through this perspective, I take the following steps in my project study:

1. Research the current state of play.
2. Plan interventions.
3. Invite specific cohorts and diverse personalities.
4. Design, test, and exercise proven and new techniques for accelerated learning and experiment with safe spaces for shared innovation.
5. Recognise different approaches from diverse disciplines.
6. Use as many tools as needed to bring participants to a shared understanding/decision.

7. Identify and acknowledge any innovations.
8. Report results to ensure all participants agree with perspectives, accuracy and intent.
9. Implement resolutions, and encourage other to do so.
10. Evaluate results and propose the next steps or alternatives.
11. Throughout the whole process, determine how best to make a positive difference with focus on intent.

In essence, these Three Spheres become my glasses.

In concert with this, a two-page summary for each activity (event, workshop, court evidence, symposia, dialogue, synthesis reporting, or informal session) during the study is documented in Chapter Six. Each event is plotted against how it performed on the accelerated learning trajectory, my roles, the processes involved, the type of actions arising, and the actual lessons learned by me, and for the group/institution generally. Table 4 shows the projects and their Spheres of Enquiry.

Projects at a Glance: referencing to Spheres of Enquiry			
Project Name	Learning	Climate	Governance
1. Preparation for Rio +20	√	√	√
2. Australia's vulnerable cities	√	√	√
3. CHOGM workshop	√	√	√
4. S4S Pacific Climate Women	√	√	√
5. State of Commonwealth Cities			√
6. UDAL retrofitting cities 4CC	√	√	√
7. Transform Australia	√	√	
8. Green-tape Reduction Parliamentary Submission	√		√
9. Single State Planning Policy workshop	√		√
10. Expert Witness Planning & Environment Court	√	√	√
11. Integrity Inquiry	√		√
12. SEQ Housing Vulnerability Parliamentary Report	√		√
13. Regional Landscapes Advisory Committee	√	√	√
14. BCC City Projects value multipliers for environmental design	√	√	
15. BCC New City Plan Reference Panel		√	√
16. Greenspace Futures	√	√	√
17. Climate Sensitive Cities my textbook/manual	√	√	√

Table 4: Projects at a Glance

As evidenced, the projects accumulate strength for my Nexus of Three Spheres of Enquiry. The narratives offer meta-analyses of the projects that advance understandings of Three Spheres of Enquiry, sometimes with unexpected, unintended consequences. That is part of the adventure of Participatory Action Research and Action Learning, as captured when Ortrun Zuber-Skerritt recently edited other authors' works (Zuber-Skeritt, 2012). I wished to capture their wisdom in the way I designed and delivered my projects, especially in these areas:

- Passion and philosophy
- Research review and enhancement
- Project design and findings
- Participatory techniques
- Overall learning.

As a participatory learner and action researcher, this study deliberately plans, acts and reviews. I charter a course from passive bystanding to transformative action. I develop an accelerated learning trajectory founded upon the proven works of others of the past decades, then combine learning theory with advocacy practicalities and futurist thinking models in order to build a framework for hope. Apart from tracing the technical dynamics of group work, I document conceptual models from the 1960s to the present with a formula of what is necessary to respond to the challenges ahead. I appreciate the insights of many diverse champions who are willing to share their wisdom in order that we may achieve a pathway to 'our common future' (Brundtland, 1985). The aim of each group session is to gain the greatest input, personally and professionally, from each person, and then to collectively move forward. This process becomes an empowering practice rather than a depressing exercise in inability to make a difference in overwhelming circumstances.

I elaborate on my design and testing of methodologies to ensure that a longer-term approach is taken towards active transformation. These methods for informed advocacy are tested regularly in Australia and internationally. In the past decade, I have been fortunate to represent Australia at international policy-making fora and I regularly meet with kindred spirits to debate hot topics. In some cases, my role is organiser and facilitator, while in other cases, I am presenter, provocateur, rapporteur, or participant. At all times, processes are plotted on the learning trajectory against my high expectations for positive change.

Figure 7, on the following page, is a summary of decades of work throughout Europe on interdisciplinary techniques.

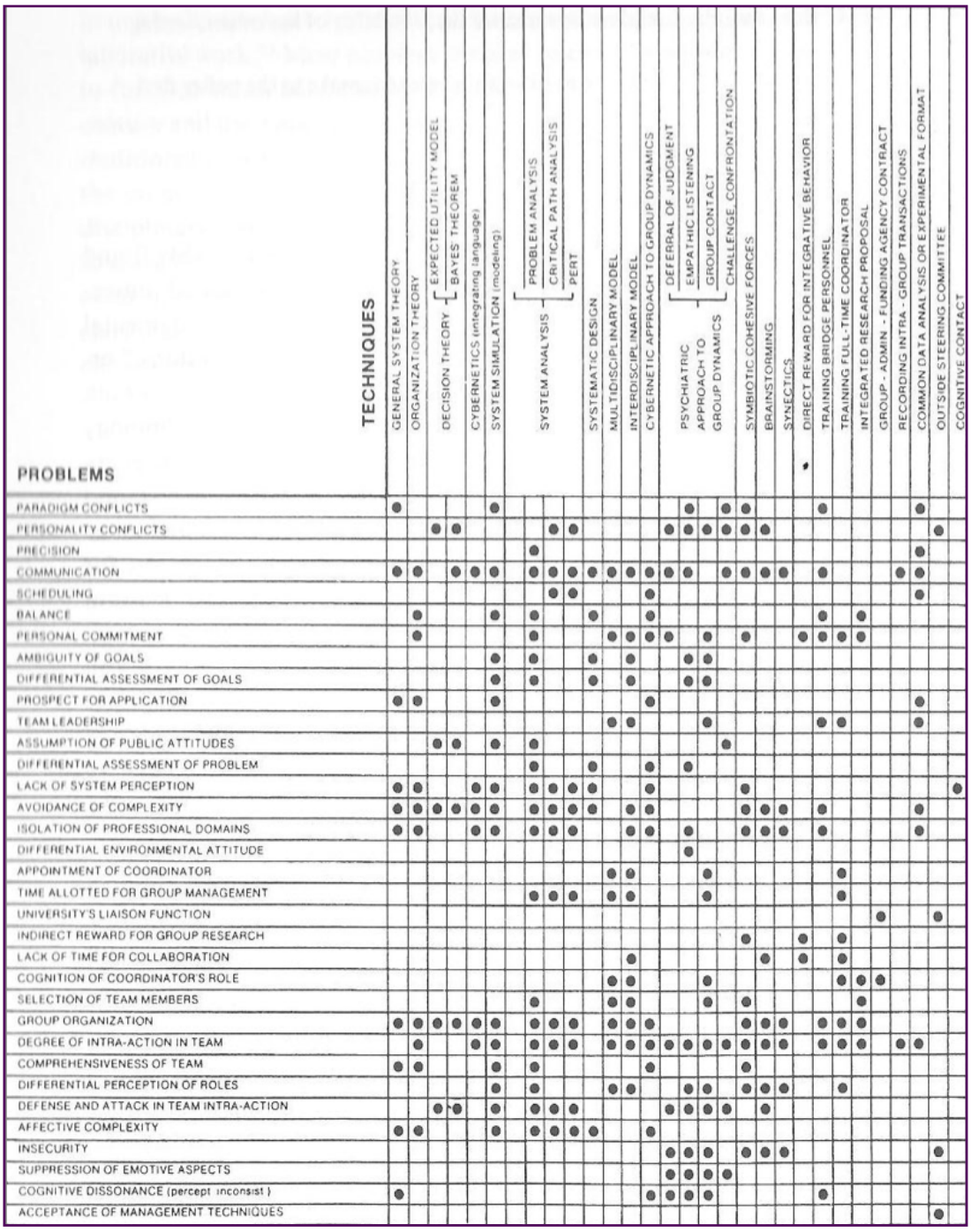


Figure 7: Interdisciplinary Techniques – Problem/Technique Interaction Matrix (From Thompson-Klein, 1990)

As a Practitioner, this interdisciplinarity matrix reassured me of the many tools I could use in practical settings. I felt more confident in project design for this Doctorate.

4.8: Synthesis

This chapter has built on the previous one, which introduced the Three Spheres of Enquiry. I have now detailed the three methodology levels for my study, namely philosophy, research parameters, and project design. With an informed position and specific plan of attack, I now revisit the Three Spheres of Enquiry and identify my unique focal points for creating positive change. Chapter Five deals with the evolution of climate change research with relevant histories and recent advancements, allowing me to become better equipped for tackling projects.

Chapter 5: Research Summaries

5.1 Introduction

5.2 Research Priorities

5.3 Research Summaries at a Glance

5.4 Synthesis.

5.1: Introduction

Research is the basis for decisions on how to move forward armed with sufficient evidence to ask deeper questions. To apply the methodologies from the previous chapter, the following pages provide a meta-analysis of my research summaries. The details of these research summaries form Appendix One. I rely on all of them to shape the task ahead. In order to be logical in presentation, I introduce international findings that influence regional governance and local action. I then concentrate on learning and governance specifically as they relate to climate change in cities. A list of research modules is presented below. To further identify research modules with their corresponding spheres of enquiry, Figure 8 illustrates where the modules fit with my line of argument for this thesis. The next step in this chapter is to summarise the myriad of reports (some translated from other languages) into headings that help navigate these wicked problems and that allow synthesis of the important matters to concentrate my effort.

In concluding this chapter, I provide a matrix that directly links this research to the Three Spheres of Enquiry with methodologies to pave a pathway for action.

5.2: Research Priorities

Climate Governance

1. Planet Under Pressure
2. World Resource Audit
3. World Risk Index
4. Global Cities and Climate Change
5. Global Benchmarking Cities for Climate Strategies
6. Commonwealth Countries
7. South Pacific Region
8. Australia
9. South-East Queensland

Learning for Climate Governance

10. Formal Education Systems (Sustainability & Climate)
11. Interdisciplinarity and Innovation
12. Fiduciary Duty and the Atmospheric Trust
13. Climate Ethics
14. Futures Thinking for Cities

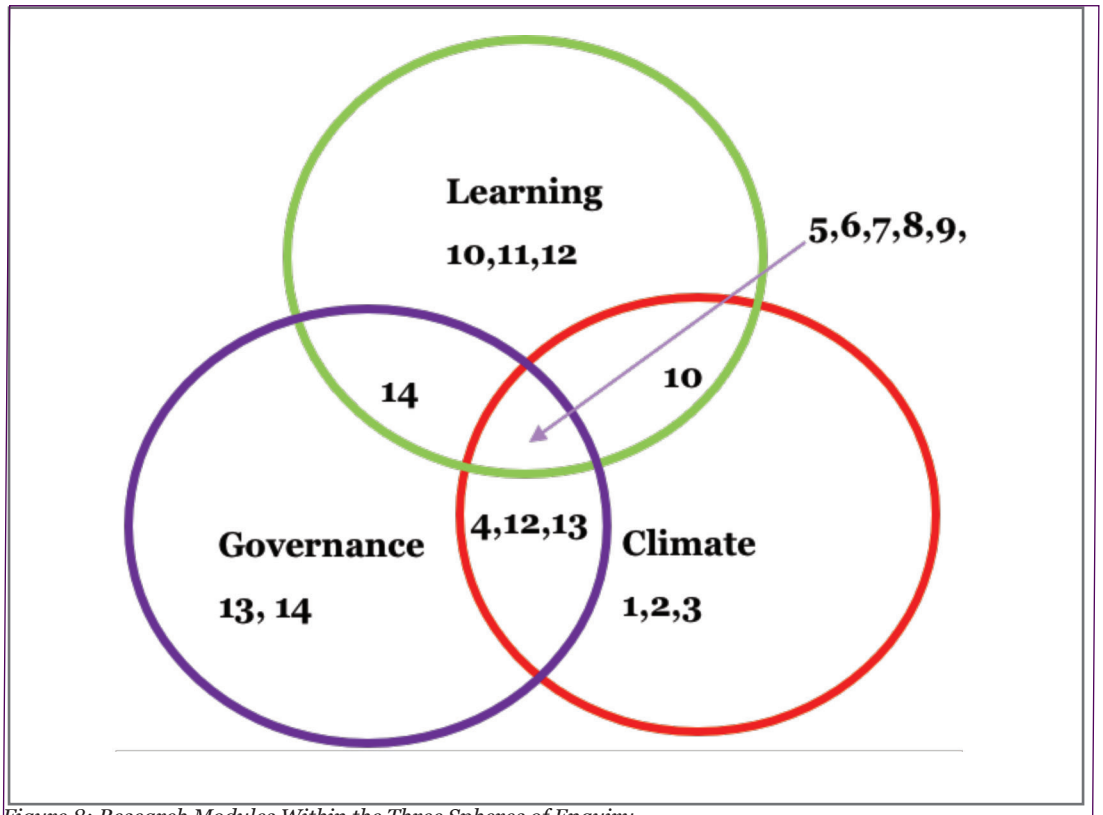


Figure 8: Research Modules Within the Three Spheres of Enquiry

Figure 8 illustrates the relevance of each of the research areas as they interrelate so that there is a sound foundation on which to build my argument.

In the previous chapters, I introduced the scope of my thesis with limitations so that my wicked problems can be better defined enabling me to focus effort and bring attention to the latest thinking on these Three Spheres of Enquiry namely: Learning, Climate, and Governance. In this chapter, I revisit Three Spheres of Enquiry in order to elaborate on how I researched topics that influence my understanding for dealing with my wicked problems. I have chosen to divide research efforts into the understandings between climate and governance research and then focussing more deeply on learning for climate and governance. In this manner, I build a better appreciation of the matters at hand and the future options to address my wicked problems as a researcher, practitioner, and then facilitator for accelerated learning for

climate city governance.

In 1967, the 'wicked problems' were defined with ten negative characteristics that demonstrated that some issues have deep complexity and almost irrational interconnections with other issues, that researchers and practitioners could rarely solve (Churchman, 1967). That fatalistic concept has been revisited over time, so wicked problems have been redefined as researchers, practitioners and policy makers have become more innovative about interconnected solutions (Hatfield-Dodds, 2013). Recently, the term 'unruly' has been adopted instead to provide a positive set of characteristics that still pose enormous challenges (Ansell, 2013). Because my endeavour is limited to three Spheres of Enquiry for wicked problems areas, I am able to also limit my research to addressing the intersection of those spheres:

1. Accelerated learning for climate-sensitive cities
2. Interdisciplinary review for transformative stewardship
3. Long-term climate-sensitive policy, practice, review
4. The Nexus: Complex Climate Change Challenges for Cities

In the following pages I package research summaries then tease out the actual research gems that influence my thinking for my projects and future work. The 'research summaries at a glance' allows for quick analysis of points while the actual summaries include models, theories, practice findings, and synthesis. The comprehensive research summaries are divided into:

- Climate Governance: from international law and up to date policy, to Commonwealth to regional to local governance regimes for climate management
- Learning for Climate Governance: inspecting understandings and techniques that need to considered for a common future including focussed education, interdisciplinarity, duty of care, futures

thinking, climate ethics, and innovation.

The following tables present research summaries at a glance highlighting messages from my targeted research for my projects. A comprehensive summary of this research follows in the Appendix. The tables describe the research paper number, the scope especially useful when referring to governance systems, the focus of the research, and the lessons learned in a most concise manner.

5.3: Research Summary at a Glance

Focus – Climate Governance		
Scope	Lessons Learned	
RS	Global	
1		Planet under pressure, (studies)
		• The planet's future is everybody's business (UNESCO, Brito, & Smith, 2012). • We are living beyond our means at accelerated rates, polluting and hastening catastrophic collapse of civilisation as we know it (Gurría, 2013). • Longer term view is required for all decision makers (OECD). • Planetary Boundaries are exceeding in biodiversity, climate and the nitrogen cycle (Rockström et al., 2009). • Better science and open communications are fundamental (IPCC, 2013). • Interdisciplinary sharing needs communities engaging for integrated action. • 4 degrees warming spells disasters and tipping points for oceans, flora, fauna and poor people (Potsdam Institute for Climate Impact Research and Climate Analytics et al., 2012). • 2013 saw tipping points – 93% of carbon is absorbed by oceans making them acidic rather than alkaline.
2		World Resources Audit
		• Early warnings attempt to improve understanding and to change behaviour. Substantiating statistics are evident (UNDP, UNEP, World Bank, & World Resources Institute, 2011). • The cost of doing nothing is unacceptable and immoral (Moon, 2014). • Any investment in the right direction mitigates some adverse impacts. • A comprehensive set of strategies can accelerate improvements towards resilience (PBL Netherlands Environmental Assessment Agency, 2012).

3		World Risk (excellent maps)
		• This is a well-considered approach for assigning priorities for action because of its circumspect understandings of the impacts and recovery capability (UNU, 2011). • Exposure as an uncontrollable factor can be most reliable determinant of the index, as human intervention is not required. For example, in Asia or the South Pacific, exposure is clear but the overall results vary in direct correlation to the capacity for human resilience (Finucane & East West Centre, 2009). • Almost all Australian cities are in the coastal zone, and therefore risks multiply. Although there is significant exposure, our capacity for resilience is high, and our vulnerability is diminished accordingly.
4	Global Cities	
		• People's use of resources causes accelerated climate change. People who live in cities cause greater concentrations of greenhouse gas that exacerbates climate change. City people are most vulnerable in times of crisis. The poorest of these people are the most at risk (UN Habitat, 2011a). • Cities in most vulnerable 'ecozones' are the worst impacted. City managers need to decide on a suite of strategies including retrofitting for safety or migration for its vulnerable peoples (UN Habitat, 2009). • There is no magic formula, but there are common themes and a set of principles that could apply for ethical and well-considered interventions. • The OECD recognises a range of governance techniques for cities to implement climate policy (Low carbon futures action).
5	C40	Benchmarking, Mayors' Powers, 4734 Interventions, 300 Million People
		C40 strategies make cities more sensitive to climate. The ingredients are good science with proven techniques, strong leadership with ethical decision-making,

		interdisciplinary innovation for implementing coordinated multiple outcome initiatives, and community empowerment to take collaborative preparatory action (give mayors moral courage).
6		The Commonwealth
		• CHOGM recommendations, state of the Commonwealth cities, 53 countries • The Commonwealth is a microcosm of the world, where early initiatives are tested (Eminent Persons Group, 2011a). • Rich and poor are impacted by climate, especially in cities and especially the young people (Gamlen, 2010). • Small Islands States are worst impacted and the long-term viability of some countries is questionable. Ethical considerations are difficult for retrofitting cities or migrating people (Commonwealth Foundation, 2010). • Climate migration for Commonwealth Citizens is a challenge that needs to be addressed in an ethical framework in order to honour the values and obligations of the new CHOGM charter (Eminent Persons Group CHOGM, 2012).
7		South Pacific
		• Climate crises (excellent images) • Australia's nearest neighbours are very vulnerable, exposed to risk in the worst ecozone, and have limited systems for coping with disasters and embedding resilience (UNISDR Asia and Pacific, 2011). • The medium/long-term view is pessimistic. Scenarios are explicit. • Efforts to retrofit cities may be outweighed by the need to migrate to safety (Flannery, 2012; Herpen, 2012). • Acidification of oceans spells the end of crustaceans, fish stocks, livelihoods & coral atoll island populations (Yamamoto & Esteban, 2011).

8		Australia
		• The Rio+20 'Natural Capital Declaration' was voluntarily signed by some Australian insurance companies (Queensland Floods Commission, 2011).
		• Forecasts, disaster inquiries, governance, risk, attitudes • 91.2% of Australia's population live in vulnerable urban areas. Australia is in a high exposure ecozone but has resilience mechanisms for self-sufficiency and recovery from cyclones, floods, droughts, fires. Many inquiries into disasters help guide future actions (Climate Commission Secretariat, 2011). • This is the 'critical decade' to stop causes, to mitigate risk and to make sensible development decisions for future hard and soft infrastructure for urban people. • Forecasts for extreme events and multiplier effects through sea level rise are explicit. Critical thresholds are articulated and mapped. • Australian attitudes towards climate are changing with greater awareness (Stefanova, 2013). • The economic institutions (and property council) are overdue to take proper cognisance of climate risk. Insurance industries are leading reforms and partnering a matrix of policy responsibilities with government (Chief Justice Robert French AC, 2013).
9		South-East Queensland
		• Risk was considered, along with next generation planning and designing resilience. • 6 cities are covered by a regional plan that provided certainty about development and protected areas, and allows partnerships for regional resources and integrated transport systems (Planning, 2008: Council of Mayors (SEQ, 2011b). • There is now a general concern about emerging loss of democracy as participatory planning systems are ignored in recent times. A trend towards short-term economic stimulus has replaced a theme with twelve regional sustainability policies (Low-Choy et al., 2012a; 2012b).

	• Despite floods and climate pressures, fewer preferred practices are being implemented. There is little government investment in climate mitigation despite collections from rates (land owner taxes) for that purpose. The onus for care will rest with residents as long as the state and local government's fiduciary duty of care is not questioned (Low-Choy et al., 2012b). • Ecosystems Services provided free by nature are changing as climate impacts, rapid development invades and carbons sinks (forests and greenspace commons). Mapping of ecosystem disruption in SEQ is not adopted by government for fear of finding 'negligence' in decision-making. 'Continuous urban development' in its current form, is exacerbating climate impact for the whole region. Thresholds and tipping points are acknowledged by the research community (Maynard, James, & Davidson, 2010). • A new approach to planning and design for climate is being developed by interdisciplinary professionals with community, but it may take some time to embed in local government or enshrine in state legislation, despite motherhood protocols from federal government. If there is sufficient push from the bottom and the top, something useful may result in time (Kennedy, 2010; Towards Tomorrow's Queensland, 2013; Planning, 2008).

Focus – Learning for Climate Governance (L4CG)		
	Scope	Lessons Learned
10	Education systems	General Audit Findings: Schools, professional bodies, community
		• Ancient wisdom guides international conventions in UNESCO and consequently school curricula, continuing professional development and community education. Mother Earth, Greek Goddess Gaia, Latin American Pachamama, Roman Goddess Terra and Asian Otukan principles explain the interconnectedness and delicate balance of humans, earth and the greater 'Community of Life' (UNESCO, 2007). 177 countries recognise the rights of Mother Nature in different legal instruments. Only 17 do not, including Australia and USA. Education for earth-centred governance is gaining strength. (Chief Justice Robert French AC, 2013; Boyd, 2013).
		• In Australia, a Framework for the 'Decade for Sustainability Education: Caring for the Future' has nine components that shape curricula in primary and junior high schools. The Earth Charter influences the values statements (Knowledge Management and Education Branch, 2007). • Despite the Earth Dialogues in 2006 and the ambitious Australian Vision People's Summit 2020 in 2008, schools have now narrowed focus and reduced funding has restricted directed efforts. However, school teachers can apply those components inherently in classrooms. (The Productivity 2020 Team, 2008; Australian Government, 2008).
11	Professional	Interdisciplinary and Innovation
		• Techniques for interdisciplinary action are evidenced in health care, resource sharing, and town planning. French, German and Japanese literature has been translated for human ecology debate and complex peace negotiations (Commonwealth Human Ecology Council, 2011; Nestmann, 2002).

		• Cross cultural respect is the basis for building trust when working together for a common purpose. 'Light bulb moments' are different for different cultures according to Galtung: Teutonic, Nipponic, Gallic and Saxonic – each having different trigger points (Schülke & Bauer, 1981). Negotiations resembling peacemaking techniques may be required to achieve a joint resolution within a timeframe. Kulhman suggests 'dance steps for innovation policy'. • Diverse thinkers provide rich understanding when sharing cause and effect for problem definition and possible solutions. Mediation skills may be required for agreeing elegant solutions (Quakers Australia, 2013; Vida, 2014). • Interdisciplinarity is a way of inclusive thinking rather than having a project result from a group of multiple disciplines, or cross-disciplinary language, or a trans-disciplinary personal academic journey (Costanza, 2013; Lawrence, 2013; Thompson-Klein, 1990). • .Wicked problems need rapid acquisition of knowledge and well considered responses (Churchman, 1967; Hatfield-Dodds, 2013; Ansell, 2011). • Accelerated Learning is applied in music and warfare to convert amateurs into experts. Accelerated learning techniques are developed from many sources. • Gladwell suggests 10 000 hours of study to become an expert (Gladwell, 2008; Kwik, 2013). Techniques include un-learning, dissolving limiting beliefs, enabling state of mind and encouraging teaching and/or writing. • Design thinking documented since 1926, emerged from systems thinking and accelerating innovation (Dunne & Martin, 2006). In Australia, design thinking is applied to primary & secondary education (from 1992) and integrated urban design (from 2008). Now it is encouraged in most disciplines for process efficiencies, emerging problem solving and evolutionary innovation. (Pastor & Patter, 2015).

		• The Sixth Wave of Innovation explores clean technology, institutional reforms and market matrices (Bradford-Moody, 2010). Collaborative Creative Communities respond to crises (Shankar & Brown, 2012; Zuber-Skerritt, 2012). • The Greendex monitors the rate of innovation across each country in relation to housing, transport, food and goods. Australia's innovation is incrementally decreasing while low GDP countries are leap-frogging with technology through rapid widespread adoption. • Sustainable Futures formulae include good science, smart technology, foresight and moral courage (Slaughter, 2010; Littleboy, Hajkowicz, Moody, Parsons, & Wilhelmseder, 2012). • Wicked problems need to be met with scientific understandings, rich interdisciplinary debate, design thinking, sixth wave innovation, and moral courage (Hatfield-Dodds, 2013; Davis, 2015).
12	Legal	Fiduciary Duty and the Atmospheric Trust: Care for the Commons
		• Fiduciary duty is discussed in courtrooms, but must be understood and considered in any decision-making environment where other people are impacted. • Governance can be defined as 'what government does', which begs the question of 'what is government for?' The best contemporary explanation involves the fiduciary duty to care for the peoples, the greater public interest, the greater public good, the common good, and care for the commons-shared resources like the atmosphere, land, water, oceans, and outer space (Coghill, Sampford, and Smith, 2012). • In democratic societies the 'responsive rule' should apply. Paul Finn emphasises the importance of 'standards for conduct properly to be expected of persons occupying fiduciary positions, that is, persons who, by virtue of position, responsibility or function, were expected to act in another's interest and not their own interest' (Finn, 1995).

		• In international law, this is called Jus Cogens which relates to 'natural law' from 1758, and peremptory norms from 1923 in the International Court of Justice. These are the building blocks for sound urban climate governance.
13	Ethical	Climate Ethics
		• Mary Robinson proposes seven justice principles. • There are seven legal approaches to handling climate justice issues relating to 'environmental refugees'. • Professional bodies have 'codes of ethics' for 'do no harm' and 'use your specialist skills for just purposes' (Gardiner, 2006; Bull, 2013). • Making decisions to assist in disaster events takes moral courage when considering internally displaced and non-resident people (Gardiner, 2006). • The 'Anthropocene is not ethical' as it does not respect the interconnected relationships required for global balance. A healthy earth-centred philosophy does (Wild Law, 2012).
14	Planning	Futures Thinking for Cities
		• UNEP's Foresight Project findings underpin the Rio+21 themes for Green Economy and Sustainable Development Governance. Cross cutting issues were highest priority with social and institutional reforms, then food, water and climate before energy. International interdisciplinary qualitative surveys were conducted (UNEP, 2012). • Many tools are deployed for Futures Thinking (Birkeland, 2008). Of the twenty reviewed, each has its limitations, so a suite of tools might be required to manoeuvre the dynamics of emerging challenges. • Planning for longer term for cities may be a mix of fear and hope. Learning from international city performance evaluations provides a springboard (Newman & Jennings, 2008). Ten steps for building 'cities as sustainable ecosystems' are summarised and 10 points for 'designing resilient cities' are being implemented as best practice by Melbourne (Newman, Beatley, & Boyer, 2009). Brisbane has fallen past 20th as an international liveable city.

		• Urban Design incorporates environmental care and climate change impacts. Because cities comprise more than essential infrastructure, environmental, social and cultural aspects deserve higher priority (Major Cities Unit, 2011b). • A 'sustainable futures formula' might comprise science, technology, foresight and moral courage. Slaughter calls this 'meta-scanning': but consideration is needed for sustainability values along with equality, optimism, ethical transparency, presence and personal commitment (Slaughter, 2010; Davis, 2015).

This hierarchy of recent research brings a systematic approach to building on diverse sourced information, setting the scene for a broader informed basis for action to combat climate change in cities. The data is proven from trusted informed sources with sufficient peer review to withstand scrutiny from many disciplines. Therefore, I am gathering metadata on which to accelerate forward on a different trajectory.

The original lessons arise from myriads of reports, proceedings and publications that are summarised. The wealth of imagery assists with complex information presented in a digestible format, which lends greater understanding for people with first languages other than English. Diagrams can often provide linkages that pure words only allude to, so I feel the visuals are important tools for diverse thinkers to digest complex information quickly.

5.4: Synthesis

Although much of my research focusses on problem definition in Climate Governance (CG), I found solutions lay in the learning summaries (L4CG), which propose specific ways forward and 'dance steps for innovation'. Hence, I am performing action research 'dance steps' for 'winning the race between education and catastrophe'. As a result of reflections on these research findings, I realise that there is an urgent need for a positive approach to this research and a message of hope for future generations.

This comprehensive research focusses on Learning for Climate Governance. It is the foundation for opening minds for developing a fairer, safer, and more ethical and sustainable world.

Chapter 6: Demonstration Project Narratives

6.1 Introduction

6.2 List of Projects at a Glance

6.2.1 Project 1: Your Voice Rio+20
6.2.2 Project 2: Australia's Vulnerable Cities
6.2.3 Project 3: CHOGM Climate and Commonwealth Peoples Forum
6.2.4 Project 4: Pacific Women
6.2.5 Project 5: State of Commonwealth Cities Project
6.2.6 Project 6: Retrofitting Cities for Climate Change
6.2.7 Project 7: Design Shop: Transform Australia
6.2.8 Project 8: Greentape Reduction Bill
6.2.9 Project 9: Single State Planning Policy (SSPP)
6.2.10 Project 10: Expert Witness
6.2.11 Project 11: Integrity Inquiry
6.2.12 Project 12: Housing Vulnerability in SEQ
6.2.13 Project 13: Ministerial Advisory Committee
6.2.14 Project 14: City Projects
6.2.15 Project 15: BCC New City Plan Reference Panel
6.2.16 Project 16: Living Lungs for Brisbane
6.2.17 Project 17: Writing a Technical Text Book

6.3 Synthesis

6.1: Introduction

This chapter provides an analytical review of projects in order to make more sense of the wicked problems in Chapter Three. This review uses the methodologies described in Chapter Four, is contained within the broad scope of projects from Chapter Five, and synthesises the results of these efforts in a way that is digestible. After reflection, I designed a uniform format to concentrate the results under the headings of:

- Project: importance, scope, topics, my role, the institutions involved, techniques deployed, a comparison of expected results against actual results
- Lessons: knowledge, action and practice, and evaluation citing innovation
- Meta-analysis: this project overall and 'So what' for my Doctoral study
- Artefacts: created as a result of the project. This was an efficient and effective way to share my transformation from bystander to informed advocate.

Although all projects are building blocks in this transformation, the sharp lessons were consolidated in nine of seventeen projects. These lessons were shaped by other projects and concentrated on the nexus of learning, climate and governance; hence I revisit the spheres of enquiry marking the nexus projects, and then provide a content list of projects with acronyms commonly used, to prepare for the detailed analysis of lessons learned.

Figure 9 builds upon the diagram in Chapter Three, to add project numbers to the Three Spheres of Enquiry, with additional emphasis on the Nexus where project numbers directly relate to the intersection of Learning, Climate, and Governance.

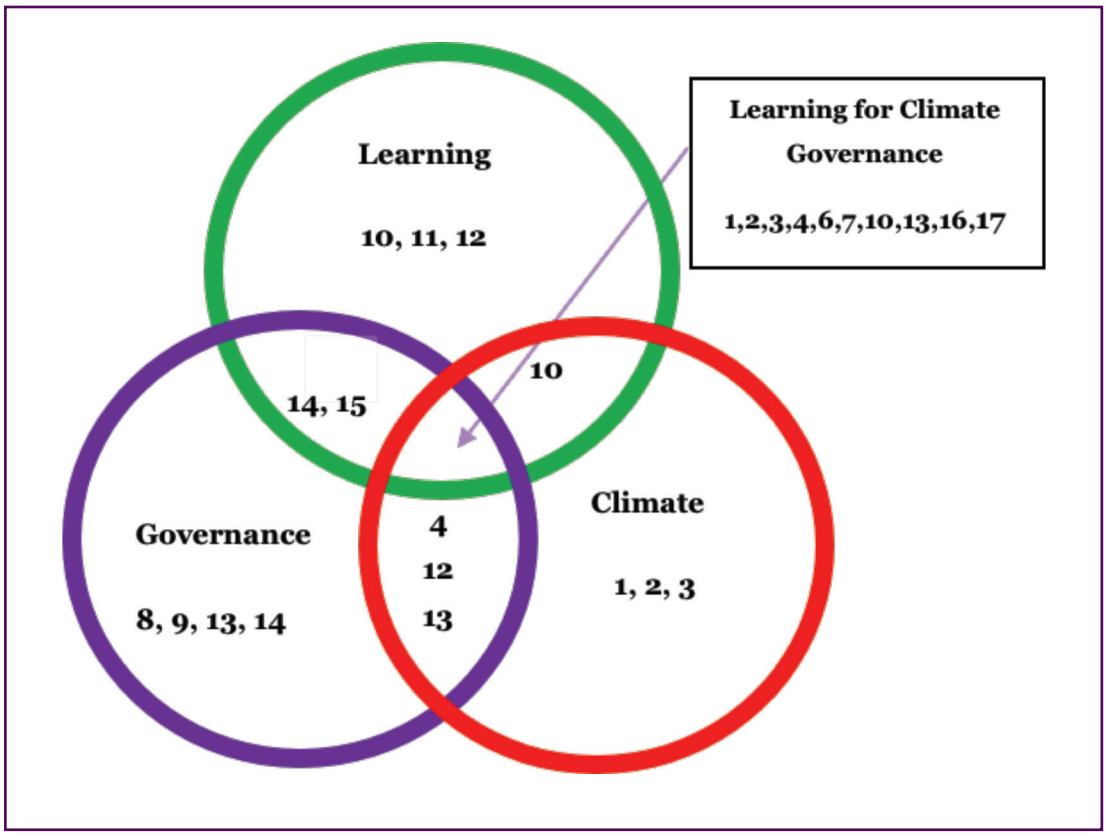


Figure 9: Refined Project Design

In Figure 9, projects as numbered concentrate on all three areas, but are supported by the other projects in order to have a valid line of argument. I need the depth of the other projects to advance possibilities beyond the rhetoric to make my own unique contribution. Therefore, to introduce the projects I provide a list of projects by geographical scope in a logical progression, and a list of acronyms that might assist in summary notes.

6.2: List of Projects at a Glance

Global	6.2.1	Project 1: Your Voice Rio +20
	6.2.2	Project 2: Australia's Vulnerable Cities
Commonwealth	6.2.3	Project 3: CHOGM Climate/Peoples Forum
	6.2.4	Project 4: Pacific Climate Women
	6.2.5	Project 5: State of Commonwealth Cities Project
Australia	6.2.6	Project 6: Retrofitting Cities for Climate Change
	6.2.7	Project 7: Design Shop: Transform Australia
Queensland	6.2.8	Project 8: Greentape Reduction Bill
	6.2.9	Project 9: Single State Planning Policy (SSPP)
	6.2.10	Project 10: Expert Witness
	6.2.11	Project 11: Integrity Inquiry
SEQ	6.2.12	Project 12: Housing Vulnerability in SEQ
	6.2.13	Project 13: Ministerial Advisory Committee
Brisbane	6.2.14	Project 14: City Projects
	6.2.15	Project 15: BCC New City Plan Reference Panel
	6.2.16	Project 16: Living Lungs for Brisbane
Textbook	6.2.17	Project 17: Writing a Technical Text Book.

6.2.1: Project 1: Your Voice Rio+20

(Preparation for Rio+20 workshops, March 2012)

Project Description:	
This project was to allow proper democracy from grass roots (SEQ) to enter global debates through the analysis and future directions for the Rio+20 accredited organisations and prescribed processes. My responsibility was to provide a baseline of recent research, to take findings from our local people to the other parties and to ensure our voices were included in the Rio+20 pre-summit deliberations. Our voices were shared with those of other NGOs working on draft Principles and draft Sustainable Development Goals (SDGs). Local qualitative remarks and stories influenced reports elsewhere in UNCSD, WFUNA, Earth Institute, UN Habitat (in New York) and CESD in Sierra Club (in Ottawa) and INTOSAI (in Washington).	
Importance	This project was a rare opportunity to exercise local democracy for global policy. The preparation was important to bring people up to speed quickly on what international stakeholder forums were recommending. The diverse mix of attendees on 31 March 2012, provided breadth of knowledge and experience from different perspectives. The importance of feedback after Rio+20 cannot be underestimated. Ongoing achievements arising from our debates are shared with the group database.
Scope	• International • SEQ contribution to other forums in lead up to Rio+20, and delegations SDSD, Earth Institute, CESD, INTOSAI, WFUNA, UNCSD forums.
Topics	• Green Economy • Sustainable Development Governance.
My role	Lead organiser, joint author, editor, workshop facilitator, rapporteur, delegate, ongoing newsletter editor.
Institutions	Commonwealth Human Ecology Council, Friends of South East Queensland, UNAA, Earth Charter, Students, Sisters for Sustainability, Indigenous representations, Community Justice, Religious leaders, Planners, Water Engineers, Local Community Group Leaders, (no politicians nor councillors), Academic Council for UN Systems, Australian Green Development Forum, Qld Youth Environment Council.

Techniques	1. Research, discuss, and debate, evaluate last decade with international alliances (stakeholders' forum). 2. Synthesise, organise and invite SEQ representatives and general databases/networks. 3. Prepare discussion paper (emailed and handed out on the day). 4. Have roundtables of expectations (interdisciplinary trust-building). 5. Work in groups. 6. Develop principles to practice (groups of 5 in situ). 7. Develop passion for an SDG (team by number). 8. Have fun at lunchtime. 9. Share whole of groups' reflections. 10. Report back to group and international alliances (agreement with New Zealand case).
Expected Outcomes	• Awareness of what other organisations were recommending and background arguments for change for Rio+20 deliberations • A general sense of expectations to take to other delegations.
Actual Outcomes	• Awareness, networking, sharing practice stories as they applied to fifteen draft principles, one ugly debate, remainder harmoniously motivating • Relating to South-East Queensland – Green Economy and Sustainable Development governance • Passionate argument about favourite draft SDG and suggestions for applying locally • Cross-pollination of ideas and appreciation of diversity in views and stances • Agreed way forward • Stronger relationships with New Zealand, Canada, Commonwealth, USA, Europe.
Lessons	
Knowledge	• Learned from other groups/people about SD issues, alternative governance models, different priorities, social coping mechanisms/movements, more understanding of economy options.

Actions/ Practice	• The storytelling about practices was very useful. • The how to put Sustainable Development Goals (SDGs) into practice locally was most inspiring.
Evaluation/ Innovation	• There was an unknown level of understanding at beginning, but all had the discussion paper so we wanted to move forward from that. • Reflective time at end was the most valuable feedback loop. Other feedback was emailed in the later week(s). • I was unable to ascertain innovative outcomes because each person had a different experience. Some promised to do things differently. • My experience was to gain further insights from others words in order to become a better representative for them in New York. Best inspiration was from The Presentation Sisters on global economic reforms linked with Australian tax regimes.
Meta-analysis	
This project	• Right mix on the day, one ego bruised, good exchange, storytelling and joint information packaging • Valuable package to take elsewhere, and valuable preparation for delegations • Rare opportunity to take big issues (local voices on global process) and to implement change locally.
So what?	• Local views fed into global processes and delegations made • Evidence from Rio+20 processes is Natural Capital Declaration by banks and insurance companies and alternative wealth reporting system that recognises environmental, social and intellectual capital • SDGs not approved in 2012 but a smooth transition from Millennium Development Goals for 2015 is planned.
Artefact	Discussion paper.

6.2.2: Project 2: Australia's Vulnerable Cities

(Presented to UK (CHEC) and European Association for Environmental & Resource Economists, 2011)

Project Description:	
I was awarded a scholarship to share Climate Impacts with the European Economists. I am a member of the international organisation operating through ANZ. While over there, I went to London and presented to the Board and UK members for CHEC. 'Australian Vulnerable Cities' was based on the work of over 200 Australian professionals with Vampire Index data, ecosystems functionality, and mapping capital cities risks while providing a prescription for future wellbeing.	
Importance	• Acceptance of techniques and my contribution by a different professional body in a different world region • Allowed me to amalgamate information from various sources in order to give a quantitative and visual picture of Australian Cities, an update with our policies and what might be recommended for the future. I became aware that Perth was one of the most exposed cities in the world.
Scope	• International audiences • Australian Cities – latest intelligence systems with economic, social and environmental data • Vampire Index includes (1) household incomes, (2) housing stress (>30% household income) and (3) fuel & energy vulnerability as percentage of household income • Urban Design (retrofit and design for sustainable cities/communities).
Topics	• Longitudinal mapping (Vampire Index) of capital cities since 2001 for trends • Predictive mapping for risks • Ecosystems Services: functions, services and benefits: market mechanisms • Urban Design options • Prescription for future.
My role	Scholarship winner, researcher, author, presenter, student hungry for more techniques and tactics from other countries, editor.

Institutions	• International and European Association of Environmental and Resource Economists (sister for ANZSEE) • Commonwealth Human Ecology Council • Urban Research Program (Griffith Uni, AHURI and Curtin University) • Urban Design Alliance (resulting from Envirobusiness partnership).
Techniques	1. Scholarship application and competitive process 2. Research and applied amalgamated findings 3. Interdisciplinary input from 200 scientists, professional bodies and public policy representatives 4. Draft Presentation tested locally for proper scrutiny and validation 5. Delivery of presentations 6. Questions from the floor – build those answers into next presentation 7. Ongoing relationships and hot topic joint papers/ projects.
Expected Outcomes	Awareness through delivery of paper/presentation.
Actual outcomes from audience	• Awareness, understanding of alternative data systems • Excitement for Australian techniques and multiple perspective approaches • Concern for quality information not being accepted by government decision makers • Ongoing relationships.
Lessons	
Knowledge	Many ways for sharing data, mapping most useful across languages, pictorial presentation valued, beyond economics.
Actions/Practice	• For me it was a disciplined approach to gather diverse sources of data into a coherent story. I had to synthesise myriads of information to make a lucid argument, then end on a positive note for prescriptive actions and better city design with corresponding better infrastructure investment.

	• I wanted to honour the work done by so many other special people and add value. I believe that such work has not been packaged in a holistic way before because each discipline and project was disjointed from another.
Evaluation/ Innovation	I appreciated the opportunity for meta-analysis, to create interest from a cross-section of professionals. I exercised my brain to synthesise so much history and data to recognise others' hard work. I was able to be bold in prescriptions for the future because I did not have to be bound by local cultures.
Meta-analysis	
This project	The process forced me to synthesise so much research and make it useful for foreign uninformed audiences. I have ongoing relationships as a result.
So What?	• Accepted as a professional in the international climate and economic community as opposed to purely regional planning and review roles or as a community NGO representative • Interdisciplinary approach, opportunity for new holistic perspective • Format appropriate for people with first language other than English.
Artefact	PowerPoint Presentation.

6.2.3: Project 3: CHOGM Climate

Commonwealth Peoples Forum Workshop, 2011

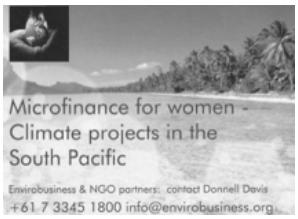
Project Description:	
The Commonwealth Peoples Forum reports to and recommends action of the 53 Prime Ministers/Presidents. Our forum focussed on climate and environmental care for sustainable development across the Commonwealth. The recommendations arose from workshop speakers, questions from the floor and agreements to directions and specific actions. My contribution was to package all the matters arising into one diagram to symbolise the logic and to simplify the complexity in order to have CHOGM endorsement of 'we the peoples' practical ways forward.	
Importance	CHOGM meets every 2 years with representatives from 53 Countries bound together through Queen Elizabeth II, with 6 objectives. In 2011, a new charter and the push for urgent reform with a 'Commissioner for Human Rights, Rule of Law and Democracy' were partially adopted. Along with the reforms came the argument for Climate interventions and the plight of 35 Small Island States facing climate impacts and forced migration. The three reports from the Ramphal Commission entitled People on the Move gave greater understanding of the impacts and the urgency for ethical actions across all countries.
Scope	• Commonwealth countries: • 250 representatives of the people (only 100 Australians allowed) • 35 Small Island State Foreign Ministers • 53 Prime Minsters (and Queen Elizabeth at the ceremony) • Interdisciplinary drafting team (many voices for one story).
Topics	Climate Change Initiatives for Sustainable Development – selection of 53 countries.
My role	• Nominee, active participant, joint rapporteur, ongoing news updates

	• Article for CHEC Journal UK); report back to alliance groups.
Institutions	• Me: Commonwealth Human Ecology Council, FOSEQ, Envirobusiness, Sisters 4 Sustainability. • Others: Planning Institute (CAP), Engineers Institute, CASLE (surveyors & land economists), ACOSS (social services), Red Cross, medical representatives, former Ministers for Education, Health, Environment, current Mayor, an indigenous Queen from regional Africa.
Techniques	1. Preparation for this workshop 2. Roundtable 3. Workshop speakers (3) 4. Questions 5. Crafting recommendations for policy, funding, actions, alliances, reporting, EPG 6. Diagram synthesising others' concepts (my work) 7. Presentation to Ministers 8. Clarification thereafter 9. Planned actions together from participants 10. Ongoing relationships (including mentoring for women's climate projects).
Expected Outcomes	• Talk fest • Useless comment to Minsters who won't take action.
Actual Outcomes	• Strength in alliances inside workshop and thereafter • Pulling together for 4 point argument with one diagram • Request strategic intervention by Foreign Ministers. • Strong delegation to Ministers (chaired by Kevin Rudd because Australia hosted CHOGM) • Recommendations blended EPG efforts to CHOGM (good traction) • Impetus for my project in Pacific with climate women microfinance project • Social media, photos, NGO assessments processes started, cross-pollinated with other workshops at the CPF at CHOGM.

Lessons	
Knowledge	• Greater understanding of climate – health – women – empowerment relationships • Understanding of disaster management, new warning systems and recovery strategies • Basic techniques from Bangladesh transferable to Queensland farmers • Ethics debates for professionals intervening in climate projects without the full impacts assessed (Engineers can fix anything but people) • Sequencing of impacts and when to walk away • Climate migration estimates for all Small Island States and neighbouring safe havens • Commonwealth Citizenship debate (following Ramphal Commission reports).
Actions/Practice	• Design with nature • Multiple-discipline modelling is necessary • Go back to basics then rebuild your city for resilience • Evaluate the role and relative importance of so-called 'essential infrastructure' • Extreme events protocols: Day 1 food, water & shelter, by day 3 hygiene & disease, by day 5 let's start to get lives together again.
Evaluation/ Innovation	• Leadership can come from anywhere, but local is quickest and most relevant. Coping capacity is correlated to social cohesion locally, then regionally, then nationally. International assistance usually occurs for major disasters. • Question governments on 'duty of care' actions. • The innovation was to apply public policy systems to climate change in a systematic chronological order. One diagram captured all presenters and questions, which mapped way forward for foreign Minsters endorsement of Peoples recommended commitments. This dovetailed with Eminent Persons Group recommendations to CHOGM.

	• I wrote a text guidebook to capture my lessons culminating from past 15 years and to build on public policy techniques to be practical about climate change for the Commonwealth countries. The focus was on responsibilities for actions for urban design, strengthening coping capacity and building in resilience systems. • I gained good energy and practical advice to tackle Pacific Project with good relationships and transparent processes.
Meta-analysis	
This project	Provided hope and direction
So what?	The project triggered a series of synergies, including impetus to write a book.
Artefact	Model for public policy decision-making for climate. (CPPC).

6.2.4: Project 4: Pacific Climate Women



CHEC, Sisters 4 Sustainability,

Pacific Climate Women's Project, 2013

Project Description	
As a result of recommendations arising from CHOGM, CHEC and Envirobusiness developed a program to provide women in the South-Pacific with microfinance training for Climate Projects. Women were nominated by local NGOs to feed into a system for a three-year program starting with a trip to Brisbane and Canberra for formal conference (Society for Human Ecology and International Sustainability Scientists), formal training program for microfinance for climate projects in Pacific with field trips with examples of women's work elsewhere, and ongoing mentoring on the projects developed during the program to be implemented at home. Women represented Micronesian, Melanesia, and Polynesia regions.	
Importance	Pacific Islands are at highest risk of climate impacts. Women are the most efficient tool for effective change in local communities. Microfinance/microenterprises are the most direct mechanisms to motivate for local action. Specific training for this, although commenced in 2004 was unable to be resurrected until 2012. The CHOGM recommendations approved by Prime Ministers (South-Pacific Forum) provided urgency for attention. Women chosen from the communities are being recognised by their governments as country leaders. A range of unexpected support had catapulted the projects in unexpected ways. Climate debates are becoming commonplace and decisions are waiting for formal government systems. Unmentionables (climate migration and resettlement for youth and aging) are being argued with confidence.
Scope	South-Pacific Women and nominating organisations/ countries, with mentors self-nominating within Australian professional bodies/communities.
Institutions	• Envirobusiness, CHEC, S4S • Soroptimists, Frontline, World Organisation for Girl Guides and Girl Scouts, CLGF, Sisters of Mercy • Hosts for field trips, Australian National University

	• Climate Covenant, Climate Leadership Centre, Climate Action network, Climate Youth, International Society For Human Ecology and International Sustainability Scientists.
Topics	1. Human Ecology and Climate 2. Women's Development (Empowerment) 3. Climate: food, water, crops, health, adaptation and mitigation, community education and resettlement systems 4. Sixteen Mechanisms for Funding Micro-enterprise 5. Success Stories from Elsewhere (70 model practices) 6. Small Business Development Program (for implementation at home) 7. How to Use Mentors Effectively.
My role	Proponent, coordinator, joint agitator, program logic and curriculum designer, tester, mentor–seeker, mother hen, conference speaker, volunteer coordinator, rapporteur, facilitator, music conductor/dancer/ singer, grant acquitter, author for published articles/ newsletters/journal/social media, ongoing monitoring role as confidence builder and trouble-shooter.
Techniques	1. Design and draft training program to include Springboard women's development, Grameen movement, Climate Ideas, small business management, community development, and mentoring. 2. Test it. 3. Identify and publicise opportunities to women's organisations and climate networks. 4. Seek, organise joint meetings, foster ongoing relationships with nominating organisations, build trust with those country visa systems, avoid corruption by those countries' officers, get women through the logistics to arrive in Brisbane in time despite floods & cyclones and plane re-routings. 5. On arrival, introduce tropical Australian food, culture, and bureaucracy in preparation for duty in Canberra.

	6. Understand differences for each woman's religion, diet, habits, and lifestyles. Build trust individually and with mentors and families. 7. Start microenterprise training (informally) and consider highest priority microenterprise proposals for back home. 8. In Canberra: conquer transport systems, participate in student's day at ANU, participate in week-long international conference, write and practise for our presentation(s), and enjoy cold Canberra. Luckily, we were all larger ladies and all wore my warmer clothes. 9. Back in Brisbane, formal training began with morning lessons and later fields trips to self-sufficiency projects, worm farm for mobile toilet scheme, solar microwave water purification, methods of rain collection with no hard surfaces (because roofs are thatched palm fronds). Redcliffe erosion of 2 avenues with mansions and land eaten away by wild ocean waves, community gardening with no soil (only sand and compost to grow household food), and solar lighting/wind up torches for midwifery at night. Bunnings became Disneyland. 10. Guest speakers probably learned more from the women, than vice versa. Building appropriate aged-care for those who do not wish to migrate was a priority. Self-Build programs like Stef Zanakis and Craig Johnson success in indigenous skill development for modular and emergency housing with second-hand and alternative building products were inspiring.
Expected Outcomes	• Women to learn about climate projects done elsewhere by women • Women empowered to make changes through small enterprises. • Ongoing telephone and email support for three years.

Actual Outcomes	• Whole Canberra conference appreciated women's stories of how they would tackle climate impacts in their own backyards. Excellent support mechanisms and ongoing networks for them internationally. 63 offers of expertise and technology in situ with no cost to women.
	• Women suggested more mechanisms for future microenterprise programs – 31 dedicated mentors volunteered for 3 years for phone and email contact and strategic door-opening for donated goods and services. • Women's pride was evident as they represented their countries in their national dress (but fully covered). • Women are taking on many projects in collaboration with other women back home. They will be the coordinators, not just the doers. • Justice Place event provided overwhelming empathy, support, and practical advice such as sharing shipping containers for regular church aid.
Lessons	
Knowledge	• Greater understanding of Tongan volcanoes as safe havens, northern territories of PNG at the end of the Kokoda trail, and eminent devastation of Kiribati and its 100,000 people. • A gentle pulsating spring tide in the daytime might flood the school out and demolish a community gently as books and papers and belongings float about. There is a sense of helplessness even in this slow motion devastation. • Extreme events are terrifying and result in loss of life and property. • Cultural differences are significant, especially the role of the women in the community when given the chance to be the only country representative at an international forum as they transform to proud gracious ambassadors. Religious sisters are so strong and practical. The elders can be pretentious

	• until they realise 'we are all in this together'. Other women just run amok with new-found luxuries and act like spoilt children. However, they are our chosen community leaders.
Actions/Practice	• Legal migration options were heavily debated. At that time AusAid funded training schemes for business migration but in late 2013 most funds were cut. • Informal training is the most effective means. • Field trips were most informative. They cried to see houses at Redcliffe eaten away by tides but their homes were the same – theirs were just not mansions.
Evaluation/Innovation	Although I did not achieve the high expectations I had of the formal training, I was overwhelmed by the strength and emotional resilience these women displayed. They shared generously so I packed up formal training manuals for them with capacity building kits for others. Internet downloading is expensive for them. They treasured butchers paper business plans, but no formal business kit was achieved, so a regular 'funder' (in Australia) would not have enough to make an approval. They don't waste energy on climate theory although they enjoy seeing what others have done to combat specific problems. Their lives sounded like when I grew up in Far North Queensland, so I had no trouble relating. Some of the customs were based on extraordinary things. We had long conversations about traditional medicine and contraception.
Meta-analysis	
This project	I needed courage to tackle the difficult moral issues in a practical way.
So what?	Ask me when they complete their own projects in their own countries.
Artefacts	Journal article extracts/formal grant acquittal report/ Rotary presentations

6.2.5: Project 5: State of Commonwealth Cities Project

Project Description	
The project arose from four Commonwealth Associations having concern for sustainable development in major cities. The terms of reference changed a number of times so there was a moving feast of information exchange. Homeless International worked with Com Habitat (CH) who engaged Commonwealth Association of Planners (CAP) who approached Commonwealth Human Ecology Council (CHEC). The brief changed from the size of the slums to right to shelter to sustainable cities to planning future cities to human ecology, but the assessment was finally agreed for a sustainability audit of primarily 12 cities across the Commonwealth. During 2009, the Commonwealth Consultative Committee for Human Settlements (CCGHS) where CHEC is long standing member, introduced the climate risk component and the urban migration dilemma because they were major drivers.	
Importance	• This project was potentially embarrassing because the brief was always deficient. The 2009 draft report to UN Habitat was patchy, in contrast with the comprehensive work usually produced by the Commonwealth for international public scrutiny. The project was a poisoned chalice. However, a more systematic approach in 2010/2011 brought forward data on the cause rather than just measuring symptoms of problems. Ongoing working together with the global cities network (GCN) means that better understanding and data exchange for a standard setting is possible. • An exposure draft for ISO international standards for Sustainable Cities resulted.
Scope	• Undefined originally (estimated numbers of homeless, relative land mass under slums) Urban Observatory • Refined to sustainability audit (benchmarking cities like Europe/NRG4SD/GCN) • Redefined to include climate impacts • How to make this intelligible for use by decision-makers?
Topics	Moving feast.

My role	• As little as possible • Reviewer as a CHEC representative, Reviser of Terms of Reference, advocate for improvement in CCGHS, supporter of CAP • Watching brief for future state of Commonwealth cities reports.
Institutions	• CHEC, CAP • ComHabitat, Homeless International, CCGHS, • UN Habitat, GCN,
Techniques	1. Review draft 2009 report (UK & UN Habitat Governing Council Kenya). 2. Participate in CCGHS debate and make clear recommendations (Trinidad). 3. Rewrite annexures to include climate information and Urban Indexes (Australia). 4. Participate in Urban Debate in Perth (2009, 2010, 2011) with Curtin University. 5. Coordinate with PIA representatives, Will French and CAP president elect from Toowoomba (Dyan Currie). 6. Cooperate with CAP past Presidents (John Anderson, UK, Christine Platz, South Africa), and CHEC delegate Eleanor Morris, (Scotland), and Narelle Townsend (UNH office in New York). 7. Share useful data and techniques for Sustainability Audit approach with proforma for reporting and PowerPoint of similar project findings. 8. Review and proofread subsequent drafts 9. Support CAP presentation to CHOGM. 10. Forget this project but learn from the mess.
Expected Outcomes	Some useful data

Actual Outcomes	• Embarrassment for people who thought they were sharing statistics alone. • Good people wasted their time. • Unstructured and not managed well. • It had limited value from actual 'draft' reporting. • In 2011, a one page summary was presented to CHOGM.
Lessons	
Knowledge	• All gained better understandings of the result of homeless and slums • Reason for homelessness not defined or surveyed whether war-torn political refugees, just poverty, internally displaced rural refugees resulting from drought and climate change, or international climate migrant. Many countries are landlocked and boundaries are arbitrary or change in every flood (like Cameroon and Nigeria with highest slum numbers). • The brief was to benchmark cities, but until the Global Cities Network became involved, it only got as far as primary and secondary research, not into a useful framework.
Actions/ Practice	Always argue for strong terms of reference. If deficient, stop and start a new project with new terms.
Evaluation/ Innovation	• I felt powerless. • I had no authority to 'sort it out properly'. • What an opportunity missed!
Meta-analysis	
This project	Opportunity missed for such an important project.
So what?	• Triple loop learning • Did they do things right? No • Did they do right things? No • Did they have principles to know what was right? No • Did they use adopted standards and benchmarking? No • Did anyone learn from this? I hope so!
Artefact	One Page Summary to CHOGM 2011

6.2.6: Project 6: Retrofitting Cities for Climate Change

Project Description	
This is a series of events dedicated to retrofitting Australian Cities specifically for climate. The Institute of Landscape Architects was an early adopter. The Urban Design Alliance commenced in 2000 with ten objectives for improving quality of life, balancing natural assets with hard infrastructure, and being socially responsible to design cohesive communities that honour human rights (i.e. shelter for all, resilience capacity). The recent language is 'net-positive development' so all assets (built, natural, social and cultural) are enhanced through participatory integrated design. Climate is impacting Australians severely and the forecasts are for more extremes and 'slow-burn' activity. The Australian Green Development Forum was also established in 2000 but deals with the construction end of the equation. The International Conference for New Urbanism was convened to showcase projects and conduct a master class. When I became executive officer for UDAL, I continued this work in cooperation with Queensland University Technology, Columbia University (NY), Curtin University, Auckland University, with five professional bodies and many project partners. We tested several tools for evaluating options from a range of professional and community perspectives.	
Importance	Retrofitting a city is a better investment than starting anew in most cases. In order to retrofit, good research, professional advice and evidence must base any future proposal. This is where essential infrastructure is questioned, where hard infrastructure can be replaced with passive use, and where community can reality test proposed developments. However, without the reality check there may be a grave mismatch between a short-term engineering feat to conquer nature or a long-term decision to 'design-with-nature' in mind. Retrofitting cities has the opportunity to keep the good and reconsider the 'ineffective' in times of change. Even food scarcity/food security in urban areas can be addressed by designing into passive land-use or on roof tops or green walls. The opportunities for innovation abound.

Scope	• Urban Design • Climate projection with modelling of impacts on cities • Vulnerability Trends since 2001 census • Future Thinking (integrated design thinking and EbD).
Topics	1. State of Australian Cities (baseline) 2. Forecasts 3. Impacts Modelling: Flood, Cyclone, Fire, Drought, Food Scarcity, Social Change 4. Vulnerability trend mapping 5. Peak Oil Impacts (household expenditure on fuel/ energy public transport) 6. Urban Design 7. Future Cities.
My role	• Melbourne: researcher, participant, newsletter writer • International Council New Urbanism: member, Project reviewer, master class • AILA & UDAL: Organiser, Program Logic and Speakers, newsletter editor • UDAL: Organiser, Marathon joint conference with video & launch of book • UDAL: Organiser, Enquiry by Design, rapporteur • AGDF 2012 – 2013: CPD, Board member, session speaker/chair, facilitator.
Institutions	• Envirobusiness • Urban Design Alliance (4 universities, 5 professional bodies, other members). • Australian Council for New Urbanism (ICNU event).
Techniques.	1. Enquiry by Design 2. Talking Heads 3. Future scenarios – modelling 4. Integrated Design 5. Master Class 6. Continuing Professional Development (workshops) 7. Interactive group work for specific objectives 8. Indigenous wisdom (Land Law, River spirit singing) 9. Vulnerability mapping, ecosystems mapping, 3D scenario modelling

	10. Historical Journeys (dams flooding, drought, city inundation, housing risk) 11. Catchments Modelling for diversion risk (when creeks became pipes).
Expected Outcomes	• Greater understanding of risks and opportunities for improvement • Greater understanding of future scenarios, in order to create flexibility in urban form.
Actual Outcomes	• Excellent respect for other professional views and analysis • Excellent sharing of ideas and constructive criticism • Interdisciplinary innovation (rather than lowest common denominator) • Openness to share and incorporate indigenous wisdom • Openness to accept vulnerability reports vetted by ecological scientists • Appreciation of hard-fact histories and recognition of stupid decisions of the past. • Enthusiasm to implement concepts immediately into current work • Recorded in videos and shown in universities and at workplaces • Continuous showcasing of projects that implement change • Groundswell of professionals to shape the future in well-considered ways. • For me, great sense of satisfaction.
Lessons	
Knowledge	So much, in so many dimensions.
Actions/Practice	• Interdisciplinary energy and innovative environment • New design techniques and good debate • Enquiry by Design was the most useful tool for evaluating options from a range of professional and community perspectives.
Evaluation/Innovation	• Lots of opportunity for innovation, micro level and macro systems. • Most useful adventure in my career. • I can apply every discipline and skill to this arena.

Meta-analysis	
This project	This is the creative area of my work which I love.
So what?	• This is my calling. But the Design aspect is not enough. Without diligent public policy, none of this will result. • At the moment, the 'end of the pipe fixes' by way of independent review of decision makers, is the only way to bring this to attention. • I need to connect design to good green governance for better Climate Policy for Australian cities or any cities.
Artefact	Hotlinks to videos, UDAL records.

6.2.7: Project 7: Design Shop: Transform Australia

Project Description	
The Transform Australia organisers invited 60 people to participate in a 'design shop' being facilitated by Matt Taylor, a futurist who works with NASA. Participants were community leaders, NGO leaders, and social change advocates throughout Australia.	
Importance	• Getting 60 'change-leaders' to sing the same song across Australia is a major achievement. • Australia is/was on a trajectory to 'unsustainable' practices, so by gathering a strong alliance was an important step forward to focus energies for better joint policy development and advocacy. • Each participant filled up the emotional tanks to go further with more confidence. Margaret Mead announced: 'Never doubt that a small team of committed citizens can change the world. Indeed, it is the only thing that ever has!'
Scope	Help to transition Australia to a more just and sustainable place.
Institutions	• Transform Australia comprises those 60 participants, plus other invitees. • Sponsors and hosts were Grocon Sydney. • Matt Taylor was the workshop 'architect' from USA. • Community and think tank leaders from all regions plus matriarchs and patriarchs from broad range of NGOs and Youth representatives.
Topics	1. The future for Australia – how to transition from here to there? 2. Design shop process protected (but on video) 3. Futures thinking techniques (3 whole days of different methods) 4. Structured group work, team work, individual work, plenaries at start and end 5. Informal networking during meals (early starts, late lunches, late dinners).

My role	• Participant, group leader, Earth Charter advocate, scribe, rapporteur • On-the-ground implementer • Connector, maven, salesman (from Gladwell's Tipping Point).
Techniques	• Structured process over three days • Looked like chaos but it was actually order • Teamwork but different team mix every day • Whole-group feedback sessions were excellent for cross-pollinating and building impetus • Team conversations or results videoed and shared afterwards.
Expected Outcomes	Love-in, chest-beating, philosophical debates, drafting a fluffy document to lobby some change
Actual Outcomes	• There was respect for process because of difficulty in framing and connecting 60 diverse people intimately for three whole days (8am to 8pm). • After the first day, we were comfortable with each other. Team mixes changed which facilitated diverse discussions, and practice reporting. Heartfelt stories glued the groups together. Mutual respect grew tangibly. • Diversity was the key. • Each person would have taken home a different package and to-do list. • Relationships and joint projects were ongoing across Australia. • There was ongoing sharing of achievements and relevant research.
Lessons	
Knowledge	• Pattern Language • Social Media and using IT differently (across generations) • 6% population is the tipping point for sustainability action across Australia. • Three personality types needed to make advocacy work, other personalities needed to implement successful new ways.

	• Empowerment theories are useful for community groups & individuals. • History since caveman for exponential change helps future leapfrogging. • Who's who in Australia? – the opportunity to meet and work with luminaries and future leaders. • Our agreed workshop logo became an umbrella (concave) with information gained from all directions and concentrating in the middle for analysis. • Importance and techniques for engaging youth, students and young professionals • Importance of the Elders' and respect for indigenous wisdom.
Actions/Practice	• Design Shop techniques for futures thinking • Alternative visionary tools for express much in minimal space & time • Elegant language from different disciplines paint rich pictures from new perspectives • Storytelling and emotional outbursts were accepted • All on video for 3 days! Can refer back at any time • The PowerPoint synthesising our work is useful visual reference.
Evaluation/Innovation	• At that time my energy was low, and my expectations of this venture were minimal because the many phone conversations with the original organiser were uninspiring but this was a necessary step we had planned for 2 years. • The first day was a mix of bad-news reality check and inspiration from others achievements. • The third day was like old friends systematically conquering the obstacles before a sustainable future for Australia. • How exhausting but uplifting, if you were an optimist. (I am an optimist.)
Meta-analysis	
This Project	• I was able to implement most of my to-do list in my own backyard (Queensland). • I have used these techniques (sometimes inherently) elsewhere locally and internationally since.

	• I have a more optimistic view of the future as a result, and a network to help me if I ask.
So what?	• Australia is in a better position, because if we need urgent reform, we have 60 people and their networks, to rally. • One participant committed suicide, sometime after this event. Hence, the need for ongoing support for fragile people and all our teams. • I am better prepared with a stronger backbone.
Artefact	PowerPoint presentation: Outcomes of Design Shop to Transform Australia. Also in Hansard.

6.2.8: Project 8: Greentape Reduction Bill

Qld Parliamentary Hearing

Project Description	
The Green Tape Reduction process has been underway for several years with my community group, Friends of South-East Queensland (FOSEQ), active in previous Ministerial Inquiry Group meetings. The proposed legislation was originally designed to streamline approval systems and conditioning on environmentally harmful activities. Four levels of impact were defined. However, the new government in 2012 heralded the bill to prevent intervention by residents, neighbours, community groups and third parties from impeding progress. The state of Queensland is now 'open for business' so all developers were welcome to come and invest on the 'fast track'. This was a different philosophy from the past where some resemblance of environmental impact was assessed prior to permits being approved. The new government was not keen on long public consultation. Six day's notice on a website was allowed. FOSEQ had years of experience to contribute, so an urgent effort ensued.	
Importance	The arguments put forward by members of FOSEQ to then Minister Tim Mulherin and Minister Kate Jones in the Joint Inquiry were valid and appreciated. During the working group meeting a suite of conditions were prepared for the 'unclear' areas. The lower impact of dry cleaners and spray painters in the suburbs were almost pedestrian, so a suite of standard conditions could be the base for any approval. The high impact of underground coal mines and port development was expected to be more rigorous with full environmental impact statements for community consultation prior to specific conditions being applied. The levels in-between were grey. These grey areas included intensive animal husbandry (chicken sheds, cattle feed lots), caravan parks in regional open space, quarries in pristine landscapes, power lines dissecting medium sized farm blocks, truck depots anywhere, industrial sheds in flood zones, fuel stops in flood zones, intensive residential housing in flood zones, childcare and preschools in polluted areas, high polluting industries next to cow's

	milk and produce farms, hazardous waste next to race horse breeding farms, medical nuclear waste dump next to river and 40,000 (rich) population, unexploded ordinances shed next to the primary school, and toxic 'super-dump' next to the private boys school. A review and monitoring regime was drafted by the joint inquiry. Then there was an election. The new government wanted to 'fast track' everything including new legislation. Draft bills were available for public submission within 6 days. Most new bills required a parliamentary committee comprising half government and half opposition. The briefing and hearing was organised together, which was two days after submissions. Evidence was heard from selected conscientious submitters. FOSEQ was invited to give evidence under parliamentary privilege and made five recommendations for change.
Scope	• Background information and Inquiry participants arguments documented • New Bill analysed • Submission drafted after FOSEQ meeting (Last Saturday each month) • Evidence for hearing invited • Parliamentary hearing process and cross examination (by 6 members) • Proofing Hansard • Committee deliberations • Acts amended with complimentary policy and standard conditions for most/all of the examples given in the submission.
Institutions	• FOSEQ and member organisations • Queensland Parliamentary Committee(s).
Topics	1. Environmental Protection Act 2004 amendments 2. Environmental Regulation 2008 amendments 3. Waste Regulations.
My role	Researcher, coordinator, synthesiser, author, joint presenter, editor, advocate.

Technique	1. Background briefings for years (FOSEQ) 2. Ministerial inquiry representation for years 3. Active participation in reforms at departmental level 4. Subscribing to new government 'consultation by website' 5. Drafting submission for approval of FOSEQ members previously impacted 6. Lodging submission online 7. Providing evidence and addressing cross examination 8. Applying matrix of risk, responsibilities, rights, rewards and rehabilitation (my methodology for five R's) 9. Providing five recommendations to the committee 10. Reviewing draft Hansard (next day) 11. Awaiting results after committee agrees way forward.
Expected Outcomes	Evidence considered.
Actual Outcomes	• Pulling together FOSEQ members with different issues all caught under this legislation • Joint synergies • Healthy submission • Recommendations addressed (some partially) • FOSEQ is respected in community and in Parliament.
Lessons	
Knowledge	• Some new parliamentary committee members were clueless, and had never dealt with environmental or developmental impacts before. • FOSEQ members cross-pollinated well, despite the diversity of issues.
Actions/Practice	• FOSEQ members strengthened each other to argue better ways for Bill. • Synergies still prevail. • Applying matrix of risk, responsibilities, rights, rewards and rehabilitation.
Evaluation/Innovation	• Categorising and streamlining development seems so sensible but not easy to achieve when members are impacted in differing ways.

	• Proforma standards and conditions help community, developers, and environmental enforcers. • With good people around, FOSEQ can do marvels in just a few days.
Meta-analysis	
This Project	FOSEQ and members have credibility in new Parliament.
So what?	The Government originally wanted to streamline. FOSEQ has credibility among its old and new members because we changed the outcome. Members feel empowered, and so do I. The change of focus to shirking fiduciary duty, slackened duty of care, and obstructing community concerns was an acknowledged step backward for Good Green Governance.
Artefact	Parliamentary Submission: Greentape Reduction Bill Committee Hearing.

6.2.9: Project 9: Queensland Single State Planning Policy (SSPP)

Project Description	
The new government in Queensland wished to amalgamate a decade of reform by bringing the eighteen State planning policies into one abridged version. Decades of legal decisions comprised each State planning policy. There was concern that 'fast-tracking' economic development by only meeting one slim state planning policy might lose all the nuances for better practice for mitigating risks for social and environmental wellbeing. Climate is almost absent. A response was drafted after three workshops to determine issues and craft recommendations for improvements. The submission was met with a computer-generated email receipt and no further discussion was invited. However, the community became well informed about the possible future of development, and decided that they greatly preferred the existing system, which was more comprehensive and transparent.	
Importance	• The fiduciary duty by government for care of 'the commons' is being eroded by dumbing down requirements of developers in order to 'fast track' short-term economic development in Queensland. • The foundations of the law were missing so the draft State planning policy would be useless in the Planning and Environment Court in the form it was presented for consultation. The only 'principles' in the draft were mechanical processes. • Inequity was evident. • Climate is almost absent; in fact the plan seeks to accelerate the causes and effects. • The limitations of the draft included 'Regulatory land-use only', economic development in 4 areas only, local government would carry the burden of care in future so existing residents would subsidise development (through paying higher rates), climate changed impact is ignored while polluting behaviour is encouraged, buffers around their polluting behaviour which means the neighbours are disadvantaged without natural justice, and no precautions for natural hazards.

Scope	• All future economic development for mining, agriculture, coal, and tourism would be fast-tracked under the SSPP. • Workshops began April 2013 and submission was drafted late June 2013.
Institutions	• FOSEQ • Regional Landscapes Advisory Committee • Planning academics • Community groups concerned about the future of Queensland.
Topics	• Assumptions in the draft • Limitations of the draft • Legal Hierarchy • Fiduciary duty • Meta-analysis (from 3 workshops) • Design Blindness • Net positive development model • Model: The evolved current planning system (whole pipeline).
My role	Organiser of two mini-workshops, researcher, attendee other workshops and public briefing, drafter of community discussion paper, facilitator, joint author of formal submission.
Techniques	Each workshop was different.
Expected Outcomes	Better understanding of the simplified State Planning Policy.
Actual Outcomes	• Community realised that the new regime was singularly focussed on the backward model of '4 pillars of economic development' and was generally uninformed. • Community was obliged to object because to say nothing was to condone this approach. • Five recommendations sound like motherhood statements. The fundamentals were totally ignored in the draft policy that government wished to use as a legal tool, so the basics approach was the most appropriate. • Strong support received from previously quiet FOSEQ members.

Lessons	
Knowledge	• The four pillars for economic development were not long-term visions for Queensland, and would cost a lot in the short- and medium-terms despite its stated intentions. • 'Prosperity without growth' was revisited and understood by more members than previously. • 'Net-positive development' was workshopped and community is better prepared to argue those approaches in everyday lives. • If the government does not consult, the community does not know its new expectations and obligations. How can a government enforce something that is 'secret'? This undermines democratic principles in so many ways.
Actions/Practice	• The new government processes and attitude is so different, so communities have to work in different ways to be able to be informed, or to get directions and advice from government. • This project brought different members together who may not have been active much in the past.
Evaluation/Innovation	• FOSEQ used this process to strengthen its membership, and had very few expectations for the impact on the draft SSPP itself. • FOSEQ objected because to say nothing was to condone backward policy. • The lack of response at all from the submission questions the functionality within this department. No feedback indicates a black hole or waste paper basket so our efforts may be in vain. The departmental website indicates there would be a decision by December 2013.
Meta-analysis	
This Project	• The fundamentals needed to be articulated, so going back to basics on democracy, principle based planning, fiduciary duty and care, legal frameworks, planning obligations, role of professional bodies, community consultation and design blindness also took FOSEQ back to basics.

	• By taking stock of our role and interaction with a new government, we realised that our role might change to educating government (new public servants and new members of parliament) if we seek to promote sustainability for Queensland.
So what?	This project was cathartic.
Artefact	Submission: Response to Draft Single State Planning Policy

6.2.10: Project 10: Expert Witness For Planning and Environment Court.

Project description	
An expert witness is appointed as an officer of the court and is expected to demonstrate high professional standards while being scrutinised and cross-examined by a range of active parties and through judicial review. The expert must not take instructions from any active party. Karawatha Forest is part of the declared 'Greenspace Corridor' in South-East Queensland. A developer proposed 3 different options to build in the forest corridor for townhouses, relocatable homes and a caravan park. The development was refused by both state and local governments, but the developer appealed the refusals through the Planning and Environment Court. The communities who use or are riparian to the regional park objected strongly. The council is required to respond, but the communities sent representatives to co-respond. A series of alternative dispute resolutions (ADR), case management and judicial reviews ensued. Part of ADR involved narrowing the 47 reasons for refusal to allow expert witnesses to present evidence, options and professional judgements. Lay persons (neighbours) were also allowed to give evidence in statements to court. Through an evolution over 4 years, I became the climate and sustainability expert witness replacing Joe Baker and Stuart Hoverman. Each party can provide an expert, but only the developer wished to nominate for climate and sustainability. The developer also changed experts. The Council did not provide an expert in this area. Therefore it was important that the community provide somebody reputable.	
Importance	**Fiduciary Duty and Care for the Commons** • Karawatha is one of Brisbane City's few carbon sinks that sequesters greenhouse gas free-of-charge by nature. It provides temperature moderation (cooling) for the region and it a biodiversity hot spot. Karawatha is an important link in the corridor. The SEQ Regional Plan protected this by nominating as Regional Landscape and Rural Production Area Classification (RLRPA). It is not part of the urban footprint and outside the urban boundary. It has no infrastructure by Brisbane City Council or Logan City Council, because it is on the boundary and it is a forest. Nearby Transport infrastructure investment includes an innovative nature bridge and underpasses so animals don't cause major road accidents on Compton Road.

.	• Karawatha is subject to local school visits, University field trips with eco-audits, PP Bio international research project, medical experiments for ADHD children and nature deficit disorder research, inventions for climate monitoring imaging with Boston University, local residents enjoyment, bird watching, platypus research in ephemeral ponds, bush walking, mountain climbing, extreme bike marathons, picnics, and greenspace recreation. • The L-shaped land under scrutiny used to belong to government. A private school was allowed to build in a strategic corner but the private school sold the remainder of the land to Board Trustees who assigned it to individuals who wished to develop the land to make money. The land under proposed development is home to internationally-protected rare Green Thigh Frog, refugee koalas as well as indigenous, rare endemic flora species (like midnight orchid), endangered quolls and squirrel gliders and many more. • It is inappropriate to build there but most of the 47 reasons were met with compromises by the developer, and innovative technologies to mitigate the impacts. It is still conditional 'permission to pollute', to urbanise and to house people in a declared greenspace which is/was 'the commons'. **Where is the fiduciary care for the commons?** The front end-of-the-pipe rules were defined. The research and elected uses are enshrined. The end-of-the-pipe is being challenged in the court because all developers have a right of appeal. By systematically breaking down refusals into 'permission to cause harm' by mitigating risk in revised plans and conditions, the developers may be approved if expert witnesses keep finding innovative ways to build in the forest.
Scope	• Queensland Law precedent • SEQ regional significance • Limited to climate and sustainability expert report
Institutions	• Planning and Environment Court • Dept. Planning and Infrastructure (and successors)

	• Dept. Environmental Protection and National Parks (and successors) • Karawatha Forest Protection Society • Friends of South East Queensland • Envirobusiness
Topics	• Report 1 (2012) • Carbon sink • Micro-climate • Sustainable Building Design • Biodiversity Corridors • SEQ corridor values and significance of Karawatha Forest • Bushfires • Public Transport, active travel and traffic • Other issues • Points of disagreement between experts • Supplementary report (on final design plans) 2013.
My role	• Originally: objector, co-respondent, researcher, ADR representative • Finally: Expert Witness for joint reporting with Scott Losee • An expert witness is appointed as an officer of the court (with high professional standards to be scrutinised and cross-examined). • My previous lives required independent review with evidence for cross examination in fraud and negligence cases with Auditor-General and other cases in program evaluations and Ministerial Inquires.
Techniques	1. Define brief. 2. Research. 3. Analyse. 4. Negotiate. 5. Prepare draft joint expert witness report. 6. Redefine (with final designs). 7. Debate and jointly write supplementary report. 8. Prepare for hearing statement and cross examination.

Expected Outcomes	Clear evidence with professional judgements on hot topics relating to the 3 alternative proposed developments.
Actual Outcomes	• Scott Losee was one of my staff from 1995–1997 and I had reviewed his work in Council on later occasions, so we had no trouble working together or arguing our points of view and the basis for judgements. • Scott did extra work to estimate travel times for proposed residents to go shopping by public transport. His findings were compelling. • We investigated innovative building design to mitigate impacts of fires as 101 bushfires in a five-year period was evidenced. Being burnt alive on the top floor of a townhouse or a caravan with no escape route was untenable. Plans changed subsequently. • There remained a number of areas of disagreement, including the scope for sustainability as it relates to these 3 proposed developments. These allow a judge to focus scrutiny.
Lessons	
Knowledge	• Tracing foundations for assumptions and policies becomes more important when arguing professional judgements. • Although I had intimate knowledge of the 47 concerns, I needed my other experiences as a qualified environmental auditor, designer, owner-builder and social-housing developer in the same shire with similar building standards. • I was excited by innovative solutions but knew that the developers may never put the ideas into practice. Therefore, I felt I was inadvertently giving 'permission to harm'.
Actions/Practice	• Negotiations were better than expected because Scott and I respected (and used) each other's work previously. • Although we disagreed, we had alternative academic backgrounds, experience, and reasons for our judgements.

Evaluation/Innovation	• Scott was getting paid $390 an hour, so I reassessed my own value in the market place. • Expert witness must give parties, especially the judge, room to make some 'judgment in the greater • Public interest' by having glaring points of disagreement.
Meta-analysis	
This Project	• I was upset that some of the innovative solutions were actually giving developers the 'permission to harm'. • My professional judgement was that the proposals were totally in the wrong place. However, the expert process does not generally entertain that because all the reasons for refusal 'can be argued, conditioned, or redesigned'.
So what?	• The law system does not necessarily deliver justice. • 'He who has the most gold wins' is the new golden rule! Forget Matthew 7 as the basis for ethics
Artefact	Expert Witness Statement for Planning and Environment Court

Post script: *On 14 Oct 2013, the New Minster for Environment approved a management plan for Greenspace Corridors, which provides actions and outlines compliance for corridors. In May the following year, the same Minister 'Against the Environment' allowed voluntary compliance of private landowners with the declaration and no mandatory buy-back of highest valued land. In March 2014, the court case continued with only 11 of the 47 reasons for refusal left to be addressed. In 2016, the land was sold, with 197 pages of development conditions, so any future case must start again. In 2018 the development is built, breaching many conditions, and people are moving into expensive townhouses.*

6.2.11: Project 11: Integrity Inquiry

(Open Government Forum, 13 August 2013)

QUEENSLAND GOVERNMENT

Project Description	
In Queensland the then Premier Campbell Newman wished to streamline the oversight roles funded from State Government coffers. All independent reviewers were caught under this Integrity Inquiry.	
Importance	• The Premier sought more power and less oversight which undermines the basic principles for democracy. He sought to redirect funding to other priorities, despite legislation being in place for over a century, in some cases, to ensure independent roles were properly conducted. • Cost of red tape vs cost of weak systems
Scope	• Government integrity is founded on four key principles that can easily be aligned to independent reviewers' functions (Accountability Round Table, 2013): 1. Fairness aligns with the Ombudsman 2. Transparency with the Integrity Commissioner 3. Accountability with the Auditor General and 4. Honesty with the Criminal Misconduct Commission. • However, those roles alone may not be enough to demonstrate democracy in this era, where informed citizens seek a voice where there is perceived inequity and wrongdoing. 'Public office is a public trust'.
Institutions	This Open Government Forum attracted Auditor General, Ombudsmen, and Parliamentary Committees, justices from tribunals, Integrity Commissioner, Police Commissioner, Policy reviewers, as well as public policy Academics, Accountability Roundtable, Transparency International, journalists, and regional governance groups. Others were Mining and Resources lobbyists, Environmental Defenders Office, and concerned citizens (who were not officially invited but were allowed to attend at the 11th hour by Parliament Staff).

Topics	1. Premiers wish list 2. Academics' reminder of why independent review is crucial to democracy 3. Triage 4. Right to know 5. Open data 6. Planning for development 7. Independent Reviewers' submissions on roles, functions and systems improvements 8. Interest groups' voices 9. Methodologies shared 10. Resolutions, action plans for accountability roundtable, and advocacy from many parties.
My role	Observer, scribe, rapporteur, introducer.
Techniques	Listening skills, analytical synthesis, recommendations for regional governance groups shared with independent review advocates (Open Governance Network).
Expected outcomes	• Range of functions of independent reviewers to be curtailed • Roles would be discontinued • Funding eroded or ceased • Demise of democratic principles.
Actual outcomes	• Better understanding of the efficiency of review roles • Many steps to better governance with less stress on departments and Minsters and Members of the Legislative Assembly by the public • Best arguments for more funding to achieve greater results as outlined by Premier in his introduction • Strengthening democratic processes while covering Premier's vulnerabilities • Nobody lost status except reshuffle of Parliamentary Committee for Police Corruption, which was due anyway with retiring members.
Lessons	
Knowledge	• Greater understanding of intricacy of the roles of commissioners, ombudsmen • E-commerce principles applied to government functions almost eliminate corruption.

	• Opportunities to streamline mundane roles and fast track development of higher priority investigations and systemic problems
Actions	• There are techniques for sharp advocates and academics to use Premier's words to advance their own argument in most convincing way. • Learning across range of roles was shared and inspired positive change. • There was overdue introduction of better open government systems to Queensland public.
Evaluation/Innovation	• The lack of preparation was evident. • Independent review armed with good governance gloves can advance more in one day than 5 years of incremental tinkering and petty bickering reporting in local tabloid: The Courier Mail. The conclusion was a fly-in/fly-out vote of thanks from Director-General who had not heard any deliberations, and was completely off point. No wonder the natives were restless.
Meta-analysis	
This Project	• Independent review is crucial for good governance and efficiency in delivering quality services to the public by all arms of the Westminster system. • This accountability framework could facilitate a future mandate for Sustainability Commissioner.
So what?	Innovation and operational efficiencies can be catapulted by sharp independent reviewers retrofitting systems for government's executive arm in the first instance, legislative arm in time, and the judicial arm immediately across roles of independent reviewers. This reiterates the roles of open government networks, CHOGM and SDG 16 on facilitating good governance. This could easily apply to other sustainability commissioners and urban design commissioners in other jurisdictions.
Artefact	Summary for the Australian Parliamentary Studies Group.

6.2.12: Project 12: Housing Vulnerability in SEQ

Community Reviews and Parliamentary Reports (2012–2013)

Project Description	
Housing demand, development, location, supply, access, conditions, and affordability are all issues in South-East Queensland. The burgeoning population increase over two decades has been partially met with new developments. However, research discovered over 10% of houses are vacant, household sizes are diminishing to singles and couples not families, vulnerability relating to household income-mortgage stress and percentage income spent on 'fuel and energy' category is escalating, private rental waiting lists are long, and access to public-social housing is even more difficult. Affordability and homelessness are growing issues as perverse finance incentives skew banking systems and mortgages. New developments are being built in the wrong areas. This exacerbates vulnerability for both people and the natural environment multiplied by climate risks. During 2012, ten workshops, conferences and site visits were convened.	
Importance	• The 'right to shelter' is embedded in the UN Declaration for Human Rights. A 'duty of care' is expected from Government(s) for its most vulnerable peoples. Youth, students and aging are most vulnerable but almost all residents become vulnerable as other indicators are investigated. • The new Queensland Government has reframed housing and a series of dislocated pieces of legislation is impacting adversely on the community. Social-housing tenants are not given the same rights as others, and are denied systems for natural justice. In 9 months in 2013, Public Works and Housing sold 25,000 social-housing properties further marginalising those people. In 2014, all social-housing will be outsourced to providers like the UK model that collapsed. The future homelessness and unaffordability in SEQ is daunting.

	• Development systems are forcing local councils and existing residents to subsidise unwarranted and unwanted development through local government rating systems. There are better ways to develop and provide adequate suitable housing in SEQ.
Scope	• Queensland • South-East Queensland
Institutions	• FOSEQ, Urban Design Alliance, Institute of Architects, Planning Institute of Australia, Brisbane City Council Plan Reference Group, Logan & Redlands Council representatives, community housing representatives, integrated design commissioner from South Australia • Logan and Redlands Regional Development Australia (federal agency) • Local Councillors and Urban Development Committees • Parliamentary committees (in 2012 & 2013) • Queensland Association for Universal Housing (Disability) • Queensland Residential Tenancies Authority • Queensland Department for Public Works and Housing • Queensland Civil Administrative Tribunal • National Foundation for Australian Women (leading national review).
Topics	• Queensland Housing: vulnerability modelling, universal housing design • Private rental and social-housing • New communities & development generally • Home ownership, affordability and systemic reforms.
My role	• Co-organiser, researcher, coordinator, participant, spokesperson, presenter, rapporteur, advocate, panel review member, supporter, newsletter editor • Report editor, spokesperson.
Techniques	1. Sustainable communities hosted by AIA in conjunction with many organisations 2. Universal Housing Design for older and disabled people. 3. Housing forum 8 speakers 4. Professional body survey and findings 5. Residential Tenancy Reference Group

	6. Future housing impacts for SEQ – development under SPOLA 7. Vulnerability mapping and updates 8. Storytelling and formal presentations by individuals and groups on personal case studies and 9. FOSEQ workshop to integrate findings and develop possible resolutions 10. The overview of SEQ final workshop: 11. Identifying the most vulnerable people 12. Storytelling of real life issues 13. Some strategies undertaken to address these issues 14. Empowerment – self-help/self-build/granny flats/co-housing 15. Empowerment – financial options 16. Future of housing in SEQ 17. Drafting a submission for Parliament by 30 Nov 2012 18. Drafting submission for COAG housing review.
Expected Outcomes	• Better understanding of the state of housing in SEQ • Enough valid information to understand relationships and make well-informed recommendations
Actual Outcomes	• Valid statistics and trends, longitudinal studies • Better definition of vulnerability to include emerging pressures on families • Concern that governments won't adopt vulnerability reports because this implied negligence in decision-making. • Empowerment strategies together resulting from heartfelt storytelling • Project to mitigate adverse impacts between renters, defaulting mortgagees (home owners), and banking (repossession) systems. • Clarity arising from the intricate web of housing issues and urban plans • Members articulating causes and symptoms in functional ways
	• All councillors and parliamentary committees and MLAs accepted report and the final submission was published on Parliamentary website Federal senators support a national review with vulnerability mapping.

Lessons	
Knowledge	• Everybody learned something new. • I appreciated the honesty and pain some social housing tenants were enduring along with lack of natural justice in the system. The reason for eviction might be reporting plumbing problems or electric stoves/appliance shorting out, although the problem may be seen 'landlord responsibility' of Public Works and Housing and their subcontractors.
Actions/Practice	• Site visits to common ground and other new social housing providers' alternative accommodation types were beneficial • Tim Horton's approach to Adelaide's housing issues was valuable • Proposed development in risky places were not favoured as a solution to affordable housing.
Evaluation/ Innovation	• The whole process turned an overwhelming problem into a series of issues that were interrelated but addressable jointly and severally. • The one recommendation to Parliament was to appoint an independent housing commissioner with mandate, functions, and role with futures approach, with reporting and funding systems to be considered.
Meta-analysis	
This Project	**Recommendation:** That an Independent Queensland Parliamentary Commissioner for Housing be appointed for a seven-year term (like Auditor-General and Ombudsman) as an Officer of the Parliament with full and open access to information. Mandate: To protect the basic human right to shelter (examples: UN Habitat and Mary Robinson) as fiduciary duty of government for the people of Queensland (Coghill, 2012).
Recommended Functions	• Monitor 'state of the housing' for Queenslanders • Undertake audits and special studies of vulnerability • Investigate complaints in the conduct of public petitions • Make recommendations and provide direction • Report to Parliament and Public.

Recommended Role	• Annual review of 'The State of Housing' reporting to Parliament, public, policy makers in Federal, state, local governments, and non-government organisations, with special attention to priority issues. • Oversight of the Registrar of Public Housing (Housing Bill 2012). • Protection of whistle-blowers, throughout complaints, investigations and resolutions. • Be informed by Vulnerability Reporting by ABS and Vampire Index. • Provide directions for equity of treatment and equality of rights for negotiations for adequate and appropriate housing (Aged care, students, residential caravan parks management, relocatable home park management, mining towns, indigenous designed housing). • Facilitate the establishment of Queensland based Financial Innovation Network that showcases alternatives to bank mortgage foreclosure, encourages co-housing, microfinance/ microenterprise for self-build housing, and retrofitting for disability and aging.
	• Provide directions to Ministers for Public works and Housing, Planning, Communities, Transport, and Energy and Water, and COAG representatives, RTA, RTI, housing organisations as others as required, for systemic improvements to existing housing and proposed future cities/communities. (This role might normally be undertaken by a Sustainability Commissioner or integrated Urban Design Commissioner in the case for sustainable development). Funding should provide for small core team with seconded project staff from appropriate agencies and organisations. Reporting should be streamlined, electronic and accessible.
So what?	• This is now a national campaign for National Foundation for Australian Women. • A rich country should not treat its poor like this. If we did a 'wealth of nations' assessment now, Australia would be deficient.
Artefact	Parliamentary Submission: Housing Vulnerability in SEQ

6.2.13: Project 13: Ministerial Advisory Committee

Regional Landscapes and Open Space

Project Description	
In 1994, the Goss Government planned South East Queensland to have a regional open space system (ROSS), to prevent a Miami/Los Angeles style urban sprawl by having dedicated open space and green landscapes between urban areas (called inter-urban breaks). An advisory committee comprising community leaders, departmental representatives across six portfolios and invited NGOs was established. The first chair was Peter O'Reilly Senior. The second chair is Professor Darryl Low Choy. This group demonstrates higher level democracy with ongoing community participation and testing prior to policy making. In 2003 Minister Terry McEnroth disbanded the group but public outcry saw its reinstatement with different 'terms of reference'. In 2012, the government branch supporting this work was made redundant. However, the group itself continues with community support. The redundant officers attend meetings now as community members because they believe it is the right thing to do. I was a presenter in 2000, became a voting member in 2001, an observer in reshuffle in 2003 and full member thereafter.	
Importance	• Care for the commons is a basic fiduciary duty (Malthus 1834 law) • Carbon sink for SEQ (also called living lungs) • Through many changes of government, this advisory committee survived and provided well-argued positions on many topics to the Planning Minister(s). It serves as a litmus test for new policy and a forum for research and debate. • 5th level consultation in action. (Other parts of government apply 1st level edict). • This group triggered the 'state of the region' audit that was embargoed and was never released to the public.
Scope	• Queensland policy • South-East Queensland Practice • International Research (Ecosystems Services & Nature Deficit Disorder)

Institutions	• Six government departments (until 2012) • One federal member/senator in early days • University professors leading initiatives • Community leaders • Professional body representatives • Tourism Industry • Local government representatives (formerly officers, four subregional executive officers, then councillors, then one COMSEQ representative) • Developer representative.
Topics	1. Planning legislation, policy, regulations, provisions 2. Recreational uses/mixed use in open space/water catchments as public parks 3. Parks, regional parks, national parks, Regional Open Space Scheme(ROSS) 4. Wellbeing, sustainability indexes, nature deficit disorder, longitudinal surveys 5. Economic value of green space 6. Economic multiplier of green space within new developments 7. Regionally significant green belts as climate sinks 8. Carbon credit scheme trials 9. Technologies to improve wellbeing multipliers 10. Scenic Amenity Assessment project and now internationally accepted methodology 11. 'Statutory covenants in perpetuity' as a tool for intergenerational care 12. International Landscape Conventions (EU & UK), Greenbelts (Africa), Greenspace Alliance (Canada), Green wedges elsewhere.
My role	Active member, community voice, researcher, workshop facilitator, advocate.

Techniques	1. Ordinary meeting every eight weeks since 1994 2. Annual Forum 3. Ad hoc issue-based workshops as required. 4. Excursions/field trips/guest participation in international forums 5. Ecosystems Services Project (200 scientists & community volunteers for six years).
Expected Outcomes	Constant vigil on planning and greenspace balance.
Actual Outcomes	• Collegiate approach to debating delicate and serious subjects • Longevity – credibility and respect over time. While Minsters and public servants are so transient, this advisory committee continues. • Confidence to call urgent meetings of catchment groups and natural areas alliances when city planning regimes propose inappropriate laws.
Lessons	
Knowledge	• Enormous transfer of knowledge – each meeting • I kept all reports religiously for thirteen years and I refer to them when necessary. • I have a better documented corporate history than the public servants. • I can link a range of information on vulnerability and risks that others don't consider readily.
Actions/Practice	• Chairmanship is military style but the chair learned more skills. • Sharing within the group is easy and comfortable. • Active membership allowed me to interrogate EU and UK systems for landscape conventions and charters. • I have international linkages to ecosystems leaders in other countries indirectly but with some background information sharing from my perspective, generally sourced from this group's research.

Evaluation/Innovation	• I am comfortable playing devil's advocate in this group. In fact, they worry if I don't. That must be my informal role. • Without the synergies and strength of the group there would be no greenspace in SEQ. • Eleven properties have been bought back with three self-sufficient entities employing a caretaker to managed mixed use (i.e. Springbrook, Glenrock, and Mt Mee). A percentage of land sales tax to Treasury was allocated to buy back scheme, but in 2003 those funds disappeared although estimated at $8 million/ year. The (then) Auditor-General did not investigate.
	• There is a need now more than ever for intergenerational care for natural capital. The ecosystem services values for the region far outweigh ad hoc development for private gain.
Meta-analysis	
This Project	RLOSAC is an institution in itself.
So what?	• We need to take more care of the commons. • The ecosystem services values for the region. Community assets benefits exponentially outweigh the ad hoc development for private gain.
Artefact	Word map and summary of achievements

6.2.14: Project 14: City Projects

Designing and Managing for Life, Effective Asset Management, Value Multipliers for Smart Environmental Design

Project Description	
Brisbane City Council City Projects (Lex Dewar) convenes in-house training for efficient continuing professional development (CPD) for staff. The event that I chaired was full, with 83 staff attending. The learning objectives included: • Understanding the new mandate within council • Extending the life of public assets and facilities and being adaptive to climate and functional demand changes. • Improving smarter environmental design to value the inherent flexibility and long-term horizons in public investments in future. • Emphasising energy efficiency, water reuse and minimisation, waste reduction strategies, innovative materials/virtual walls, win-win for tenants, and more flexible future functionality. • Ensuring professional debate across disciplines to encourage stronger projects teams across council.	
Importance	Accelerate learning through CPD for multiple disciplined professionals and practitioners.
Scope	Effective public asset management: through sustainable design, construction, maintenance, retrofitting and disposal.
Institutions	• CPD points for range of professional bodies by prior approval. • Professional development for urban designers, planners, architects, landscape architects, parks managers, water managers, building inspectors, accountants, traffic engineers, infrastructure engineers, other civil engineers, and on-the-ground staff. (City projects staff, other divisional staff, from eight regional offices) • Envirobusiness

Topics	1. New council mandate 2. Sustain your ability in asset management 3. Lifecycle sustainability and design 4. New Initiatives in Infrastructure Asset Management 5. Effective Public Asset/Facility Management (private sector perspective) 6. What is a green building for? 7. Interactive session 8. Lessons and thanks.
My Role	• Assist organising. • Chair the morning session. • Facilitator for group work.
Techniques	1. Brainstorming with internal city projects team 2. Design program logic and desired outcomes 3. Speaker seeking, kit to prepare speakers 4. Chair for the day 5. Facilitator for interactive session 6. Summary of lessons learned on the day.
Expected Outcomes	• Understanding new mandate for council (introducing new managers) • Sharing techniques and practical examples.
Actual Outcomes	• Smooth and respectful introduction of changes (with a sense of humour) from executives • Excellent examples from John Hunter demonstrating design (as an engineer) • New standards usually so boring now allowed for innovation (by ISO President) • Private sector perspective on return on investment was useful • Academic researcher was pedestrian and not prepared for this audience • Networking across council (7000 staff but these hundred don't know each other). Even I introduced people to each other who I thought should be working side-by-side.
Lessons	
Knowledge	• John Hunter prepared excellent spreadsheet handout on current projects

	• BCC led project trials for indoor human health measures (indoor air quality, electrostatics, indoor plant effectiveness, orientation, pressure values in the workplace, and Melbourne CH2 examples) • Flood proofing public facilities was crucial • Opportunities for landscape architects to exponentially improve council's parks, recreational investments as well as built public facilities.
Actions/Practice	• Many speakers originally contacted were not available. Two speakers were sacked just prior to forum. Facilities Management Australia President was overseas. • Those who prepared for the audience were well appreciated. • Many topics were raised by audience in a proactive way. • Ecosystems services and accounting were topics worthy of additional CPD event. • The potential of those working inside council is not 'tapped' effectively yet.
Evaluation/Innovation	• This project was much better than I expected. • New managers used the opportunity for breaking the barriers and introducing new mandates. • John Hunter was outstanding in his work but he does not effectively connect with people. His work needs to be recognised for others to promulgate it. • There is new respect for performance-based ISO standards and building improvements. • Parks managers recognised the long-term functionality and maintenance minimisation, especially in extreme climate events. There is minimal budget whereas the built infrastructure is always well provided for in accounting terms. AAS31 needs a revisit so natural capital gets a similar maintenance budget. • Future CPD events were proposed by the audience.

Meta-analysis	
This Project	BCC staff value assets as more than just line items on a set of accounts. Their 'whole of life functionality' was a better indicator of value as reflected in their discussions and everyday work.
So what?	• I linked project managers with accountants with designers and engineers, which is rarely achieved inside BCC. • This was an example of good green governance if proposals were allowed in practice. John Hunter's work was good theory into practice with a framework of good governance.
Artefact	Overview document

6.2.15: Project 15: BCC New City Plan Reference Panel

Project Description	
In 2002, City Shape was an initiative of the Brisbane City Council to engage as many people in its plan for the future. Several things arose from that initiative – Eleven 'neighbourhood planning' projects with intense local input, Urban Futures Board, Innovation Panel and an ongoing city planning reference panel chaired by the Head of Planning (who changed over time). I have been involved with all those groups during the decade but I maintained a strong role on the reference panel. I was appointed as a Brisbane Ambassador in 2003. For many years I was the only female on the reference panel. I was invited as a person but my interests were broad ranging from community justice, green futures, recreational space, social housing, urban design, climate responsiveness, and efficient infrastructure investment. The panel members comprised a core of people, but extras were invited to ensure industry input was canvassed. The industry representatives changed regularly. Many policy proposals and infrastructure logic proposals were tested in this group prior to state government interest checks and external consultation.	
Importance	This was originally a fifth-level consultation democracy process for the first few years. People decided what shape Brisbane should be and a hybrid was voted as a better way forward. As people were more involved expectations were high. However, all these changes take so long to eventuate even in local intensive neighbourhood plans. In later years, the reference panel recommendations were over-ridden by new State Government 'State interest' checks which had a different set of priorities from that agreed by the planners, urban designers and community representatives. This was heart breaking as the new city plan had included some perverse directions that were deliberately designed out by these dedicated volunteer teams.

	The process was so skewed that a 180˚ turn was observed, as developers were allowed code self-assessment to build anywhere including flood-risk zones and more recently school ovals for sale by State government. This is unethical and irresponsible. Appreciation of different roles and disciplines from crisis perspectives and disaster recovery teams then integrating with social planning and resilience modelling.
Scope	Brisbane: • One million households (who pay rates – 17% in 2018) and counting • 42% greenspace now down to 27%.
Institutions	• Brisbane City Council • Professional bodies – UDAL, PIA, AILA, Engineers Australia, Social Planners • Industry bodies – Housing Institute Australia, Building Services Authority, Property Council Australia, Urban Development Institute of Australia • Community groups – FOSEQ, ASPO.
Topics	All Matters Urban.
My Role	Member, Devil's advocate, Researcher.
Techniques	1. Variable as staff changed regularly 2. Guest presenters from council, external and State Government policy areas 3. Question and Answers 4. New research shared – not very often – members brought that to the table 5. Recommended changes 6. Checking that minutes were true and sometimes they were not 7. Intensive sessions 2009–2010–2011 8. Totally disbanded before new City Plan went for consultation in 2013 because very little resembled what we recommended in either policies or practice.
Expected Outcomes	We expected some similarity to our painstaking efforts.

Actual Outcomes	• We were so offended that we made complaints into the system during public consultation period. • We expect little impact from our input as State Government is allowed to overrule in the 'State public interest' with old fashioned 1970s style economic development. • 51 new growth areas are planned. Some are not based on sound principles espoused, and are irresponsible in terms of climate risk. This places BCC at risk of mismanagement, negligence, tort or blatantly corrupt decision-making, no matter what the State Government argues about State interest checks.
Lessons	
Knowledge	Enormous gathering of innovative concepts and minutia detail during the decade.
Actions/Practice	In our meetings, there was a healthy respect for alternative views where the Property Council often tried to dominate, but the others responded with well-argued research findings, different policies, and alternative approaches.
Evaluation/Innovation	• The journey and professional working relationships are valuable. • The final outcomes are heartbreaking for anyone who cares. • The Premier was acting like he was still Lord Mayor. This behaviour was incorrigible.
Meta-analysis	
This Project	This project was a great opportunity for me to find a strong backbone to argue best practice elsewhere, and base decisions on UN Declarations, basic human rights and transparency. This gave tools to staff to argue internally.
So what?	In a decade, the pendulum has swung towards corruption, negligent decision-making, and mismanagement under duress. Professionals and community feel so disempowered.
Artefact	Newsletters to community groups.

6.2.16: Project 16: Living Lungs for Brisbane

Brisbane Greenspace Futures

Project Description:	
Brisbane has seen a Natural Areas Alliance and 174 habitat groups active in protecting and maintaining 38 creek catchments and forests, parks and 44 urban community gardens. The Brisbane Catchments Network comprises feisty women and retired men who care about green futures, climate mitigation and natural places to act as a pressure valve from city life. Brisbane Environment Council is also vocal, but sometimes unstructured. All these people have big hearts, doing the right thing without payment but win the occasional grant to buy equipment. These people are ad hoc advocates of Friends of SEQ. In 2013, when the Brisbane draft new city plan was released there was an uproar. A structured approach to tackling greenspace was organised, with submissions and ongoing projects to make local government more accountable.	
Importance	• This is on the ground climate action (although the attendees don't call it that). • On the ground action can make a real difference to quality of life, local practices, government policy and 'our common future'.
Scope	• Brisbane • Research from other cities management of natural assets, koala maps and local laws.
Institutions	• Brisbane Environment Council • Brisbane Catchment Network (catchment management and habitat people) • FOSEQ • Regional Landscapes for SEQ • Climate scientists • Urban Gardens Representatives • Planning Professor(s) • Ecosystems Service Project representative.
Topics	1. Welcome and Roundtable Introductions (DD) 2. Scene set (DD) actions by international ecocities a Greenspace in Brisbane & regional landscapes (Steve MacDonald) b Climate perspectives for Brisbane (Scott Losee)

	c Koala futures (Ted Fensom) maps & trends Backyards (A/Prof Tony Hall) d B4C – Catchment networks summary from last week's session (Wayne Cameron & Louise Orr). e Sale of school ovals to developers f Facilitated session (DD) g Summary of topics for submissions (BCC and COAG) by individuals and groups and forum voice. 3. Thanks, and close @ about noon (Ted Fensom).
My role	Organising committee, chair, facilitator, background paper author.
Techniques	1. Background paper emailed prior so people are up to speed upon arrival plus handouts on the day 2. Introduction – welcome diverse interests, individuals and groups 3. Six speakers with questions and answers 4. Interactive session with proposals for ways forward (whole group because of time constraints) 5. Fourteen resulting actions and documents to be shared as a matter of urgency for submissions, letters to Ministers, councillors and newspapers, and submissions to City Plan 6. Ongoing networks and relationships to support specific actions arising from attendees – new group name/resurrected name: Natural Areas Alliance.
Expected Outcomes	• Love-in for complaints airing • Some information sharing to give some direction to submissions.

Actual outcomes	• New positive relationships for self-managed projects • Generous information sharing • Enthusiasm for action – collaboratively and individually • Excellent speakers with recommendations for actions that are plausible • Impetus, sharing outcomes of actions and additional research • Excellent example of community empowerment resulted.
Lessons	
Knowledge	• Ecocity comparisons with strategies showcased • Landscapes comparisons with other capital cities (Sydney and Melbourne) • History of cyclones in SEQ (1956 newspaper) and adaptation since • Koala mapping and trends most upsetting, biggest threat is 'inappropriate/invasive' development, not climate change • Development should be prohibited from highly biodiverse and highly vulnerable areas. (This will not be the case under new city proposals) • Local Area laws due to change at same time – not advertised. Some proposed changes untenable – so we need to argue urgently • Backyards – underestimated green resource – new housing & banking system promotes largest floor area per block – no backyards to play, grow natives, encourage birds & lizards and promote natural cooling systems. Housing design in Perth even worse, but better than UK • 100 school properties were being made available for sale for private development undermining priorities for children's active sports, suburban open space, and community use of public land.

Actions/Practice	• Many actions resulted from individual efforts and group cooperation to tackle specific issues raised. Natural selection of groups. No lack of volunteers. • Each person had issues closest to their hearts - all voluntary. • Some issues required whole group attention so we needed a name. Result was 'Natural Areas Alliance' but use informal systems to communicate. I have a full database and know other network members.
Evaluation/Innovation	• This project was an excellent example of community empowerment. • Even professors and scientists becoming activists during the meeting.
	• An increase in the scope of submissions to BCC and COAG was a natural result. • I want to bottle these people and bring them to mundane internal policy meetings.
Meta-analysis	
This project	• Although there was excellent community empowerment, there needs to be a robust system of governance to ensure that actions will result in some impacts. • I am concerned that internal systems are not healthy/ not working.
So what?	Independent reviews may not be available for recourse – Ombudsman, Integrity Commissioner, Auditor-General needs dollars to chase, CMC only has four strict objectives that don't relate to the environment only internal corruption; administrative review does not extend to green policy decision-making (yet) although it is making social policy investigations, and there is no Sustainability Commissioner for Queensland yet.
Artefact	Background discussion paper and report afterwards.

6.2.17: Project 17: Writing a Technical Text Book

Climate-Sensitive-Cities® (Launched 2013).

Project Description	
As a result of the Climate Workshop at CHOGM, and the response to the public policy cycle approach, I was encouraged to tease out that model to enable better climate practice. In my public policy experience and formal study in early 1990s, I was able to conceive this being a tool in so many ways for different disciplines. I needed to keep language simple and provide visuals, charts and continuum to allow people and professionals with first languages other than English to adopt a way forward. The cycle allows a completeness not often considered. For each situation there are options to weigh up, and priorities to deliberate. Sequencing can allow investment in a rational way over time. This should replace budget investment in crisis times only and to share resources around prevention, early intervention, recovery, resilience as well as options for better evaluation and the touchy subject of permanent migration. There are 9 phases to be explored for each individual situation. I wrote a technical book, which was the basis for my international professional masterclasses and cross-faculty forums.	
Importance	• Good urban governance depends on good management information. • Without a framework, climate stories are haphazard and it is difficult for decision makers to address the problems in a long-term holistic way. • It is important to understand the situation as a 'whole' prior to investing in feasibility, skills, physical infrastructure or financing options.
Scope	• International, Commonwealth, South Pacific, Australia, SEQ • Basic text for climate studies across disciplines.
Institutions	CHEC, CAP, SDSD, Red Cross, Australian Catholic University, Society for Human Ecology (EU), International Sustainability Scientists (Japan), Engineers for Social Responsibility (NZ), Urban Design Alliance (Australia), Sustainability Commissioners (Canada), Integrated Design Commissioner (Australia).

Topics	1. Introduction 2. Scope and limitations 3. Approach 4. Model: Climate Policy and Practice Cycle (CPPC) a Define (scope, stakeholders, disciplines, responsibilities). b Research (baseline, Risk maps, UN cities, C40, CW, Australia, SEQ) c Plan (urban design and planning) d Act Early Intervention (prevent, protect vulnerable, land use, social cohesion) e Act Crisis Responsiveness (emergency management systems, health, resilience) f Recovery or climate refugee (resilience through cohesion, Ramphal report) g Lessons and enforcement (preferred behaviour incentives, enforce fisheries) h Evaluation (peer review, best practice standards, evaluative culture) i Redefine (redesign) 5. Completeness and lessons 6. Appendice 7. Glossary of terms 8. References.
My role	• Rapporteur, designer, drafter, researcher, reviewer, author, program auditor • Partner with other discipline leaders.
Techniques	1. Active listening 2. Empathy (and sometimes revisiting my first-hand experiences) 3. Respect for fundamental techniques for local empowerment as opposed to hopelessness and victim mentality 4. Being a big sponge absorbing so much information in a limited time, then taking proactive stance on future options

	5. Appreciation of different roles and disciplines from crisis perspectives and disaster recovery teams then integrating with social planning and resilience modelling 6. Appreciation of design thinking approaches to creating functional solutions 7. Targeted research with help from partners 8. Revisiting logic many times. Then, revisiting public policy models 9. Drafting, validating, testing 10. Redrafting. 11. Online publishing for our teams. 12. Debating, guest speaking. 13. Reviewing as necessary.
Expected Outcomes	An article or small publication to better describe 2011 raw model.
Actual Outcomes	• A full book for policy to practice and technical approaches to climate management, with case studies • CPPC ® • Draft Audit program for urban climate management • Partnerships with leading organisations and people who care.
Lessons	
Knowledge	Many lessons housed in one place.
Action	• Discipline for me to data dump then edit continuously for diverse users • This was not acceptable as part of my Doctorate because it did not demonstrate action learning well enough.
Evaluation/Innovation	• The more I got involved with practices, the more I became aware of additional uses • As I spoke with other people to test validity and reliability, further functions were debated and drafted • I need to get smarter with intellectual property.

Meta-analysis	
This project	Accidental serendipity on the day. I was so engaged with the subjects in our workshop that I could plot their recommendations on a policy cycle. My visuals were reported to Ministers within an hour, who endorsed the outcomes of our workshop.
So what?	This is the back bone for: • Urban climate governance (and my audit program) • Good green governance ® • Basic evaluation tools for investment in climate mitigation/adaptation.
Artefact	Book

Postscript: *After launching in the book in 2013, Routledge publishers interviewed me, with several set questions as listed in the conclusions chapter of this report. In late 2012, I was appointed to Asia Pacific Council for Planning and Human Settlements and conducted Master Classes for Urban Professionals in Asia and Europe (in English and with translations in Bahasa, Japanese, and German). This also resulted in a publication, Framework for Low Carbon Cities and Assessment Guidelines, designed for 36 Malaysian Local Authorities. The master class manual has its own ISBN and YouTube channel. In, 2016 it was planned for Coursera as a normal fee-paying course with some scholarships.*

6.3: Synthesis

The previous pages list lessons from projects in a comprehensive manner, but I had to stop documenting in 2013. Although all projects were useful, Project 6 (Retrofitting cities for climate change) bonded with me, strengthened by lessons from Project 7 (Design Shop), Project 11 (Integrity Inquiry), Project 14 (BCC city projects infrastructure) and Project 12 on Housing Vulnerability in SEQ. I could not have achieved clarity and commitment without learning from each of the projects singly and synthesising them.

During this process, Tina Corn, my office manager, reflected on my roles throughout this exercise and drew a basic diagram (Figure 10) that captured my roles and how I may have developed more in-depth understandings over time.

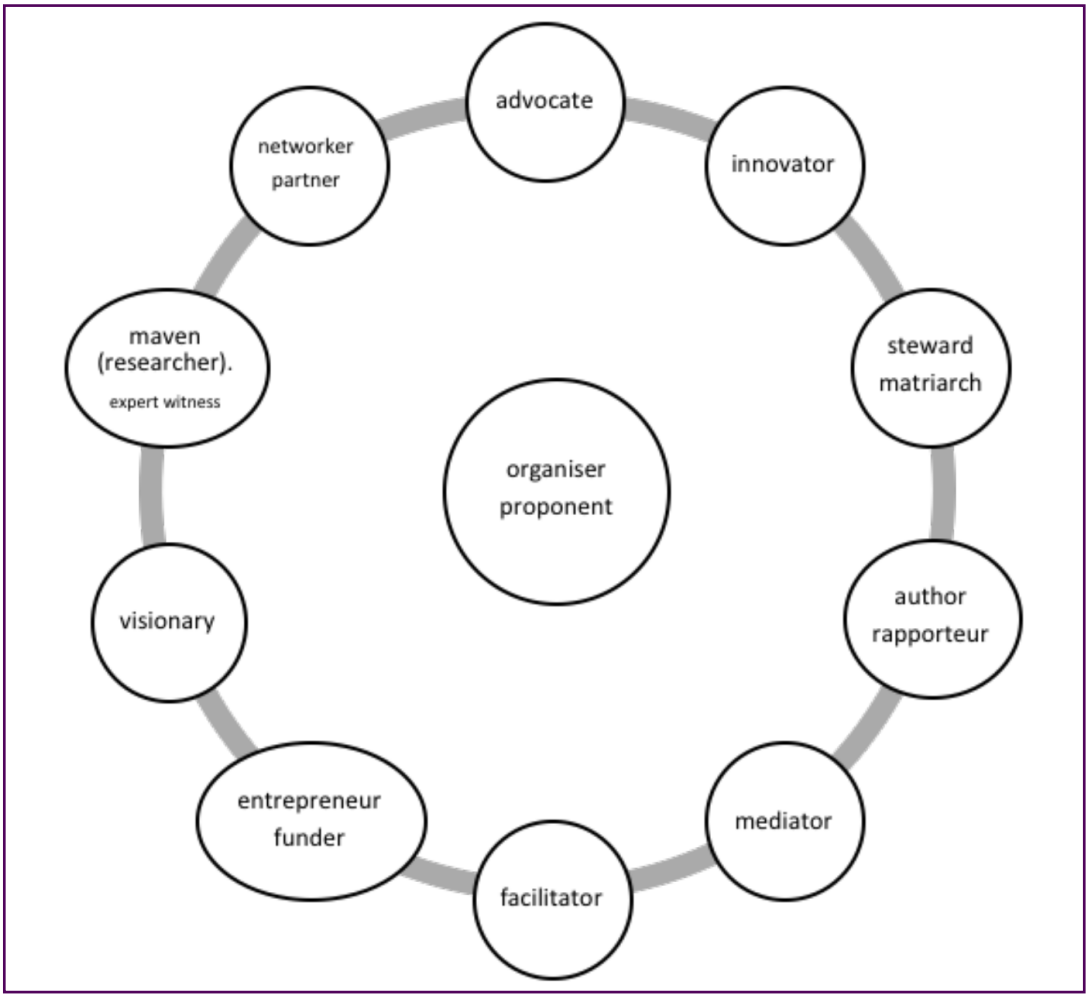


Figure 10: Roles and Responsibilities (Created by Tina Corn, Envirobusiness Office Manager)

She wanted to ensure that I realised the range of skills I had formally documented through my project analyses.

By acknowledging my roles undertaken, as seen by Tina, I ensured that my project narratives included a specific section outlining what functions I played during the projects. By reflecting on those functions and the skills I need to eventually transform into an effective Sustainability Commissioner, I was able to gather confidence to tackle more difficult contracts and propose far-reaching projects with conviction. The process of analytical review in this chapter, especially the meta-analysis was cathartic.

In conclusion, the projects have allowed me to gain greater insight on how best to apply my mind and energy in future. The precautionary principle suggests that I should not have to delve further into scientific content unless it is imperative to the precise interventions I wish to undertake. There is enough evidence to demand action now. The exact choice of action depends on timing, readiness of participants, resources, design, and which opportunities offer the greatest impact and the best intentions. Techniques for enhancing collaborative efforts are always a minefield so it is necessary to always learn or develop new ways. In governance, better systems can always be envisioned to facilitate more ethical decisions and behaviour. As a consequence, I epitomise the lifelong learner with an optimistic attitude that systems and people can always improve. This leads me to the next chapter on articulating the results and consequences of the action research undertaken.

Chapter 7: My Contributions to Learning for Climate Governance

7.1: Introduction
7.2: Research/Knowledge
- 7.2.1 Knowledge Contribution
- 7.2.2 Artefacts
  - 7.2.2.1 Selected Publications and Presentations
  - 7.2.2.2 Textbook – Climate Sensitive Cities
  - 7.2.2.3 Urban Climate Governance® Suite
  - 7.2.2.4 Climate Sensitive Cities Instruction/ University Curriculum
- 7.2.3 Implications

7.3: Action/Method
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7.5: Self-assessment
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7.6: Synthesis.

7.1: Introduction

For me this is the exciting chapter to write because it synthesises much diverse effort and thought, assimilates useful information, and forges special connections that establish accelerated learning for Climate-Sensitive-Cities®. This synthesis builds on my experiences over my entire working life, with particular focus on projects undertaken between 2011 and 2013, resulting in a disciplined application of practitioner reflection both during and at the end-stages of my research. This provides an opportunity to culminate my Learning Journey as well as providing a beacon for future action towards the long-term objective of this research.

I have chosen the conceptual framework suggested by Cherry to present this synthesis in terms of knowledge, action, and learning (Cherry, 2002b). In addition, I have included the following structure to these primary headings – contribution, artefacts, and implications. This work is supplemented by a review of my work using a framework established by Middlesex University and Centre for Organisational Research (Trafford & Lesham, 2002) into doctoral viva examination questions. I conclude self-assessment by profiling attributes required in a future career, as foreshadowed in my original Learning Plan.

I have been able to achieve this synthesis by reflecting on what other thought-leaders have considered over time, and by contrasting their methods and findings with mine. Subsequently, this reflection also strengthens my resolve. Although content might be different, some techniques of others blend with mine and provide a solid basis for my warrantable assertions (Dick, 1997). As a result of quiet reflection, a new cycle is emerging, with several impressive projects evolving, allowing me to continue to exercise new practice after this study is completed. A matrix captures my personal evolution.

In order to capture this synthesis, I provide an overview of the lessons

learned from studying through Participatory Action Research (Zuber-Skerritt, 2012) for accelerated learning, for living with climate change in cities. The consequences of having participated in those activities range from personal lessons, to new policies for professional bodies, to institutional changes, to technical book writing, to empowering community and professionals for arguing ethics in decision-making, to adapting to foreseeable future scenarios. Furthermore, this participation allows me to reflect on the skills, knowledge, and attributes required to effectively perform the role of a Sustainability Commissioner as an independent reviewer, and to then assess my capability against these. To share my reflections on Participatory Action Research, I classify lessons learned so that the analysis in the Research links with the analysis in the Projects, and directly correlates to the findings in the overview of Contributions. Therefore, lessons are classified accordingly in the body of this chapter as:

- Knowledge
- Method
- Evaluation
- Self-assessment.

By aligning these classifications, I bring the work of Action Research (Cherry, 2002a) and Participatory Action Learning (Zuber-Skerritt, 2012) to life. For me, the classifications focus on ways to analyse project findings and to build productively on those findings. In the process of crystallising outcomes, I am also reviewing my own competencies, including high-level cogitative, interpersonal wizardry, and the ability to accelerate construction of ethical frameworks for decision-making. This crystallising of competencies forms a whole segment later on in this chapter.

7.2: Research/Knowledge

Cherry describes knowledge as '...enriching our collective wisdom about how and why things and people work' (Cherry, 2002b). More recently, Mary Robinson suggests that Education is the 'transformative power for climate stewardship' (Robinson, 2012). Indeed, my contention is that education will win the race over catastrophe, as has been evidence throughout history where mankind has adapted and evolved out of adversity (McGee, 2010).

In revisiting the four research questions from my methodology, my work has answered those questions and posed even more.

1. Does society have enough technical capacity to respond effectively to climate and sustainable development challenges? Yes.
2. Can people learn fast enough to implement positive change through responsive institutions? Probably.
3. Can people accelerate learning across disciplines and cultures to maintain momentum to prevent backwards steps? Yes.
4. Do Sustainability Commissioners accelerate learning, inspire joint innovative solutions, and maintain vigil? How? Yes, see my suite of examples.

As a result of reflecting on the previous stance on passion and philosophy, I was better able to review the broad scope of research that encompasses Chapter Three's broad exploration of 'Three Spheres of Enquiry'. This broader scope enabled an informed appreciation of the wicked problems that intersect climate change, governance and learning. These relationships are described as:

1. Accelerated learning for Climate-Sensitive-Cities® (learning & climate)
2. Interdisciplinary review for transformative

stewardship (learning & governance)

3. Long-term climate-sensitive policy, practice, and evaluation with just and sustainable principles (climate and governance)
4. Nexus: Complex Climate Change Challenges for Cities (L4CG).

A better understanding can be gained by considering Figure 11 below, which highlights the intersections of the spheres where I need to operate.

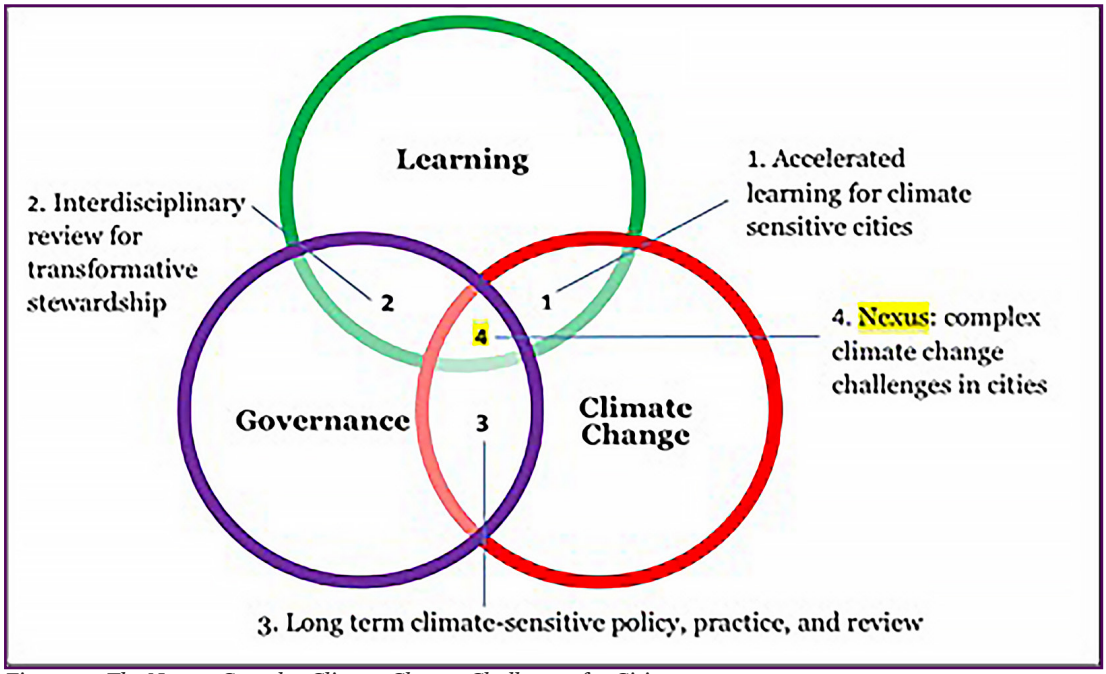


Figure 11: The Nexus: Complex Climate Change Challenges for Cities

Figure 11 illustrates the overlapping interests which focus research within those wicked problems, and have been valuable for project design, facilitation, and review. This understanding continues to be useful in ongoing practice for me.

The pioneering research contained in this thesis has been directed towards responding to one overarching problem:

> **How can we in human settlements prevent and respond to the severe implications of climate change in a timely and effective way?**

We must accelerate learning so as to develop cities that are resilient to climate change. While there are many different perspectives on the

meaning of climate change and how we, as humans should respond to it, my multifaceted research in seventeen different cases has lead me to conclude that Humanity needs to:

- Rapidly acquire knowledge and apply human endeavour to education and learning, climate change issues and impacts, and governance.
- Catapult from the common denominator to synthesise cutting-edge joint innovation.
- Empower key individuals to blend knowledges and apply innovation systematically.
- Apply to the urban context to all of the above, urgently.

The major problems of climate change will have their greatest impacts on urbanised populations. Without capacity to direct city governance towards appropriate solutions, the technical knowledge that science, town planning, and social wellbeing brings will not sufficiently influence our actions to address critical climate impacts for the vast majority of human populations who live in cities. The knowledge contribution for this thesis arises from multiple projects undertaken between 2011 and 2013, and is informed by an extensive literature review of learning, climate change, and governance. In the end, my approach is a synthesis that builds on the work of environmental and social policy advocates, who have postulated a range of related solutions over the past decades. Furthermore, my new directions for frameworks, ethics, and governance allow me to explore many countries' moral compasses.

My work, which is a meta-analysis of findings from leaders of diverse professions, is unique among approaches because it applies understandings across disciplines, and applies ethical assessments from different reference points onto local projects. This produces a rich result with multiple benefits.

It scopes a hopeful future because it catapults from broad cutting-edge and evidenced-based multidisciplinary policy to a shared pathway for innovation through peacekeeping techniques. Furthermore, it encourages more ethical behaviour. I articulate evolutionary thinking and practices that can be absorbed by other disciplines in other countries. In 2014, this type of thinking allowed me to design and deliver accredited professional development across fourteen countries, with invitations for my return.

7.2.1: Knowledge Contribution

My research seeks to make the following prescriptions:

- Science, urban design, social planning, and information delivery on their own are unlikely to be sufficient to change behaviour (Three Spheres).
- Contemporary economics and the free market do not address the uncertainty of Mother Nature's wrath, help displaced peoples, or contribute to long-term planetary wellbeing (economics and ethics).
- Urban climate governance must be designed with resilient, inclusive infrastructure that caters for the most vulnerable peoples and sound stewardship of scarce resources. I argue for regenerative cities (governance for safer futures).
- Solutions must encompass multidisciplinary perspectives that deal with the realities of economics and politics in both the developed and developing worlds. Nations with low Gross Domestic Product need to leapfrog with technology rather than incrementally improve, because every dollar must make a difference (transformation through smarter, inclusive governance).
- Employing contemporary techniques and approaches to adult education and learning can accelerate uptake and can motivate further innovation for better local solutions that can be delivered locally in partnerships (fitness for purpose).
- We can't do everything at once, but we can sequence implementation of a suite of actions, proactively, responsively, and simultaneously (climate policy in practice cycle for efficient and effective transformation).
- Maintaining the old systems while introducing new ideas and technologies must be our approach to problem-solving and this must

manifest in education and learning too (just transitions).

- Shared governance means that leadership needs to be sourced from all sectors: community, academic, business and government (inclusive decision-making for desirable futures).
- Decision-making should be transparent, based on local facts and broad science. It must be measured for ethics, effectiveness, and efficiency (triple loop learning).

Dick (1997) refers to 'warrantable assertions' as being the primary knowledge contributions that arise from action-research informed enquiry. In essence, my primary warrantable assertion, in relation to the research problem, is that climate change is everyone's problem and everyone is able to act for positive change. My position is unique (within the literature) because I am inclusive of other researchers' mindsets, technical prescriptions, and practices. I appreciate perspectives from public policy, community leadership and eldership, science, and advocacy.

It is important to fully appreciate the level of concerted effort required to expand the application of my thesis, evidenced in the following lists. Comprehensive details are available upon request.

7.2.2: Artefacts

The following list summarises some of my artefacts, which give a flavour of what industries, governments, community, and academia have been seeking. Every time I was invited to speak, I gave a commitment to properly document the thinking at the time. I stopped writing weekly newsletters when I left Friends of South East Queensland so I could concentrate on my higher purposes.

7.2.2.1: Selected Publications and Presentations

1. ICAT Working Group Transformation Guidelines EU
2. Women's Leadership Roles in SDGs (resulting from international independent performance report OECD August 2018) and workbooks
3. CHOGM report on Civil Society Roles in SDGs – Published by CHEC
4. CHOGM report on Gunyaji Indigenous Lens and Pacific Interpretations of SDGs
5. CHOGM: Lessons from Commonwealth Women's Forum 2018
6. Australia's Joint Inquiry on Sustainable Development Goals UNAA 2018
7. Australia's SDG Joint submission with AIIA & TI – Framework for Transparency (long-term aid and development)
8. SDG Inquiry Joint Submission: South East Queensland's contribution to SDGs
9. Australia's SDG Inquiry Joint Submission: Role of Civil Society
10. Australia's SDG Inquiry Commission Joint Report on Indigenous Lens on SDGs (with Indigenous Elders)
11. Pacifica Talanoa – Partnerships for climate resilience and resettlement, 2018
12. Ethical Water Futures (seven trajectories peppered with essays from UN Young Professionals) 2018

13. Senate Inquiry into Climate and Infrastructure (Australia) 2017
14. Commonwealth Associations: 2017 joint editor/author Urban Ecology
15. Regenerative Cities, Biophilia and Biomimicry – what's the difference?
16. Complex climate change challenges in cities: what the world needs now is understanding and compassion (2017)
17. Ethics in Urban Design: Easy as 3-4-5 (QUT 2017)
18. *Climate Sensitive Cities – A Technical Handbook* ISBN: 978-0-9752266-3-6 (Davis, 2013b)
19. Climate Policy in Practice Cycle (Davis, 2012; Commonwealth Investment Guide, 2012)
20. UDAL Retrofitting cities for climate change (Davis, 2011b)
21. Why accelerated learning is an effective response to climate change in cities. (Published in UK, 2013)
22. DT x BM = RC (Design thinking by biomimicry equals regenerative cities) Singapore, 2015
23. Building Better Biomes: pathway to resilient cities through healthy foundations, 2016
24. The Race between Education and Catastrophe in the Asia Pacific Region (Davis, 2014)
25. EAROPH Climate Sensitive Infrastructure Evaluations & Inclusive Infrastructure Impacts (Japan, 2015)
26. Master Class – Climate-Sensitive-Cities® Training manual (Davis, 2014)
27. Safer Cities: impacts of climate on human settlements (Germany, 2014)
28. Regional Benchmarking – SEQ and Netherlands (Davis & Van Haaften, 2003)
29. C40 governance executive summary (Davis, 2013a)
30. The Business of Greenhouse (Davis, 2001, revisited 2015)

31. Director Sustainability Toolkits (Davis, Lowe, & Maher, 2004, revisited 2015)
32. SEQ Baseline Sustainability Report Card (Davis, 2003, revisited 2008, 2013, 2017)
33. Ethical Water Futures (Davis, 2011c) 2016
34. Vulnerable Australian Cities. Paper and Presentation to the European Association for Environmental Economics – Commonwealth and EU audience (Davis, 2011a)
35. Reviewing Sustainability Reviewers (Davis, 2002, 2008, 2012 longitudinal study)
36. Community input to Rio+20 (Davis, 2012a)
37. Rio+20 Discussion paper (Davis, 2012c)
38. Vulnerable Housing Review SEQ Parliamentary Committee (Davis, 2012b)
39. Boiling Frogs in Greenhouse Soup – Malaysia (Davis, 2014)
40. Women's roles in safer cities, water futures, climate resilience, pro-feminist urban design (Presentation and Conference papers, UNODC, Vienna, 2014)
41. Urban Design Ethics (Chandler, Davis, Horton, Stalker, & Keller, 2015)
42. Pacific Women's Climate Projects (Davis, 2013c; Bunari, Davis, Kamauti, & Vakata, 2013)
43. Australia Engaging with UN (Davis, Pecci, Platzer, 2008) 2016
44. Joint expert witness report (Davis & Losee, 2012)
45. Climate Infrastructure Guidelines (Davis, 2012)
46. Interdisciplinary Innovation (Malaysia and Singapore) 2014
47. Closing Statement UNH Governing Council (Davis & NGOs, 2009)
48. Transition to Viable Society (Davis & Transform Australia Team, 2010)
49. National Greenhouse Strategy Chapter 5.14 (Davis published under Maritime Directorate, 1999, revisited 2015).

7.2.2.2: Climate-Sensitive-Cities® (Textbook)

A time-consuming, but cathartic, exercise was writing a technical book. Routledge Publishing asked the following Author Interview Questions: (1) Why did this book need to be written? (2) How is it different? (3) What made you interested in writing this book? (4) What are the current trends in this field? (5) What are you personally most passionate about? (6) Why is it important now? (7) Who should read this?

7.2.2.3: Urban Climate Governance® Suite

My registered Urban Climate Governance® suite includes the following: (1) Climate-Sensitive-Cities ® accredited training (CPD) customized for policy & audience – approved by engineers, planners, urban designers, landscape architects, surveyors, auditors, accountants, public works and infrastructure professionals, as required, (2) International Master Class (in partnerships), (3) Climate Vulnerability Rapid Assessment, (4) CPPC evaluation model for COAG and funding public policy, (5) City Climate Management Benchmarking C40 + 100, (6) interdisciplinary policy & strategy development, (7) in-house interdisciplinary professional development program evaluation, (8) toys (games), (9) tools and techniques, and (10) doctoral publications.

These tools have been used in the following places:

- 2016 – Surabaya, Indonesia
- 2015 – Malaysia, Japan (Fukuoka, Ureshino, Beppu), Korea, Malta, Italy, Pacific Islands, Melbourne
- 2014 – virtual programs in Australia, personal delivery in New Zealand, Japan, Germany, UK, Singapore, Malaysian intensive programs: One City, Port Dickson, Putrajaya, Langkawi, Subangjaya.

7.2.2.4: Climate-Sensitive-Cities® Instruction/University Curriculum

The curriculum is customised for each university to fit their specific requirements and includes:

- Twelve-week core learning semester
- Twelve x three-hour interactive sessions, lectures, videos, handouts, caucus debates
- Tutorials, mini Enquiry by Design sessions, and city ambassadors' games
- Residential Schools programs for three- or four-day duration (depending on prayer times).

7.2.3: Implications

Having just considered an overview of results, I summarise the journey of gaining knowledge, focussing on local indigenous wisdom and the relevant reports and published articles available from leading thinkers as articulated in public events and interviews in recent times. In addition, I have learned much about learning and advancing knowledge from the participation of professionals and community leaders working in the fields within the projects I have either conducted or been intricately involved with during this study period. This knowledge accumulation about 'how to learn' is so valuable, especially when applying lessons that enable us to advance at a greater pace in addressing climate change in cities. Figure 12 is a concise, but comprehensive assessment tool, which addresses this.

Rapid Assessment Questions (Guba and Stufflebeam Method)

What is?	Climate change exacerbation in cities is impacting vulnerable people and places.
What should be?	Good governance should ethically manage the impacts of climate change with urgency.
Why is it so?	The Government: • has never been required to make such decisions before: • not been reviewed for benchmarking of successful climate strategies • not previously received such public outcry • not been accountable or sued for inaction before.
Consequence of doing nothing?	Worsening by inactivity, exacerbating causes, ignoring indicators, ignoring prevention strategies, and blaming others for adverse impacts
Conclusions	1. Determine vulnerability components (natural, people, economic). 2. Prioritise eight phases of proactive and responsive strategies. 3. Review essential infrastructure investment. 4. Empower community leadership and good local governance through joint local accelerated learning. 5. Strengthen social vulnerability, through sharing good news stories, innovative urban design and techniques.

Figure 12: Rapid Assessment Questions

Learning about climate change at a pace to be useful for positive intervention, requires knowledge. Such knowledge includes:

- Scientific facts
- Global policy and principles
- Ethical decision-making
- Futures Thinking models and frameworks
- Other practices such as benchmarking cities that share stories of success
- Practices that promote working together effectively
- How to accelerate impetus for transformative action.

My doctoral study required a range of approaches and spheres of enquiry to enable a reasonable base of research knowledge on which to build a solid argument for future action.

My learning journey reflected on my understandings from the 1970s to 2007, which allowed me to question them, and unlearn those that may not work in today's economic and social situations (Uldrich, 2011). They must be applicable in today's world, which includes a green economy (UNEP, 2012b; Huberty, Gao, Mandell, & Zysman, 2011), shared governance (Ansell, 2013a; Abbott, 2013; Vob & Bornemann, 2011), empowerment through focussed community education (Berman, Quinn, & Paavola, 2012; World Resources Institute, 2009), constellation models for groups and organisations to work together (Surmon, 2009), and innovative Design Thinking in 2016. The effects of small successes are cumulative, and can multiply like an epidemic, resulting in better outcomes than a single grand, yet cumbersome, solution.

7.3: Action/Method

I narrowed my research to concentrate on understanding cities, extreme climate change, and slow-burn impacts, accelerated learning, interdisciplinary innovation, good governance through stewardship of 'four capitals' (Meadows, 1972), benchmarking climate governance, ethical policy and strategy development, and climate program evaluation. In all good research approaches, there is a hierarchy in which to introduce new understandings. In my case, the top-down approach, which moves from international to regional to local findings was most appropriate for researching governance and climate topics. For the area of learning, however, the opposite was required – a 'bottom-up' approach that moved from basic levels of skill or knowledge of the individual to more sophisticated and nuanced collaborations. This provides logic for better acquisition of particular knowledge. Accordingly, my research navigates the Three Spheres of Enquiry in a way that focusses on understanding the intersections of the spheres before approaching the nexus of my study.

In reviewing research, a common thread became evident in the parallels between personal and professional values, climate ethics, and decision-making integrity for city governance. This recurrence of ethics and values underscores the importance of independent review. Ethics in independent review is an area where triple loop learning is also highly important, as it enables questioning of the principles upon which decisions are being made (Argyris, 2011). When considering principles for decision-making, the concepts of 'just' and 'sustainable' are introduced into the mix, reflecting the Earth Charter as an ethical framework (UN, 1972). My work could only scratch the surface, so I am keen to see further research by others into deeper levels of eco-ethics, climate governance, climate migration options, green criminology, and futures thinking. Ethics research is expansive, so

my research was limited to climate decisions cognisant of impacts and the fiduciary duty and care by government for all its peoples.

In further deliberating ethics, I argue that most people depend on their personal moral compass in order to act ethically. Most community people and professionals want to do the 'right' thing, but are dependent on their circumstances and training (Preston, 2001). Professional bodies teach codes of conduct and professional ethics, which when explored in the research generally mean 'do no harm', and 'assist those who are vulnerable and devoid of specialist skills' (Gardiner, 2006). However, each discipline has its own approach to professional decision-making, which is why learning gaps appear in organisations that do not entertain inclusive interdisciplinary debate.

Interdisciplinary debate has been fundamental to my projects. Although there is always a high risk of disagreement, there is also an opportunity for colourful arguments, rich debate, and creative conflict, which leads to sound justifications for certain perspectives. There is value in this conflict because it accumulates as a collective learning journey, and can produce innovation if facilitated well. Opportunities for collective learning are explained in greater detail in the next section, which describes my action with project design and findings.

7.3.1: Action Contribution

In academic settings the way of doing things (taking action), and the seeking out and obtaining of knowledge (epistemologies) is influenced by broad and strikingly divergent research philosophies (ontologies). The related methodologies and techniques employed underpin the validity and reliability of the research from an academic perspective. Different methodologies and techniques are employed to respond to divergent disciplinary enquiries. In essence, how you see the problem and how you describe and understand the problem are inextricably connected with how you respond and attempt to solve the problem. This interconnectedness may be the key to overall effectiveness.

In business, the way of doing things is often influenced by the need to achieve a result that is consistent with a 'business case'. This may require a particular return on investment or dividend expressed in non-monetary terms, or short-term performance indicators. Unlike academic settings, business focus seeks measures that will underpin the investment. Accordingly, business often employs styles of ‘research’ that incorporate methods such as process benchmarking, project management, performance evaluation, and financial analysis to satisfy owners and shareholders about the results of a project decision. The ‘business’ way of doing things is mechanistic, which contrasts starkly with the ‘community’ way of doing things.

In community engagement and mobilisation, it is important to appreciate diversity, understand the problem at hand, build trust (which supports rigorous and inclusive debate), and promote enthusiasm (the catalysing spark for getting the desired results). Engagement can be complex given the different cultures, personalities, and ways of thinking that might be exercised in achieving an agreement. Once in action, the ‘community way’ can be extremely powerful, but can usually only maintain this energy for a limited

time. Social movements alone can only achieve so much.

Hence, there is also a need for a 'government way' that provides informed leadership of a regulatory nature. Governance, which includes fiduciary duty with ethical parameters for decision-making, is needed for strength of purpose and certainty for the longer term. In the case of climate change to cities, the strongest level of government is the local authority, despite overriding policies coloured by state, regional, national, and international jurisdictions (UN Habitat, 2009). The 'local government' way of doing things is a complex, dizzying maze of community expectations, industrial lobbying, fiscal instability, political egos, differing levels of professionalism, organisational culture, and changing statutory obligations. If the onus for fiduciary duty is not in place for local decisions, then business and community success in making meaningful changes will be limited. My work needs to be cognisant of, and incorporate, these sensitivities.

7.3.2: Action Artefacts

Contemporary academic development in Action Research, Practitioner research, and Work-based Learning has meant that practitioners like myself are employing approaches that traverse academic, business, government, and community arenas. Consequently, in this study I have had to build approaches that satisfy not only academic but also business and community expectations. The way that practitioner-researchers undertake their research projects requires substantial intellectual and operational effort and care, and as a result have been accepted as a legitimate contributors to the academic field. This is particularly important and relevant for me given the number and diversity of projects that have been deployed as part of this thesis.

7.3.2.1: Transformative Trajectory

My contribution is highly relevant because it builds onto the body of practice that assists professional consultants like me in operating both efficiently and effectively. With the aim of accelerating learning for diverse practitioners and thinkers, I must use my intrinsic interpersonal skills and credible research to communicate effectively. I am guided by individual groups on their required depth of understanding, and directions that need to be nurtured further. Therefore, my contributions include techniques for accelerated learning that deal with group dynamics, which sounds esoteric but actually becomes quite mechanical after many years of research and practice in 'getting the best from people'. In order to accelerate learnings, I must plot a trajectory that traces from passive bystanding (ambivalent learners) to transformative action (for action-oriented, motivated practitioners).

Figure 13 illustrates my example of a Learning Journey from Bystanding to Transformative Action. The X axis plots processes as they mature towards desirable reforms, while the Y axis plots the impacts of the participation.

Impact	**Accelerated Learning Trajectory from Bystanding to Transformative Action (Davis, 2012).**								Coping with reform success
								Tipping point	
							Rich campaign		
						advocacy			
					Interdisciplinary innovation				
				Critical paths	Collaborative creative communities (adapted 2012)				
			Engagement (stimuli)						
		participation							
	Bystanding								
	Involvement by participants as learning accelerates towards transformative action								
	References Transform Australia	Peter Senge (Senge, Smith, Kruschwitz, Laur, & Schley, 2010)	Colin Rose (Rose & Nicholl, 1998)	(Walker & Kelley, 1989)	Johan Galtung (Schülke & Bauer, 1981) Thompson Klein, J. (1990)	Alan AtKisson (AtKisson, 2010)	ACF (Lowe, 2011)	Malcolm Gladwell (Gladwell, 2000)	Sara Parkin (Parkin, 2010)
	Refs: (Grin, Rotmans, Schot, Geels, & Loorbach, 2010); (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010; Berman, et al., 2012)								

Figure 13: Accelerated Learning Trajectory

This model illustrates some of the topics I cover in my Trajectory for Accelerated Learning. The model aims to advance participants from dormant bystanding to transformative action, and is underpinned by decades of research and action-learning from various disciplines, both locally and internationally, each with a philosophy to share. This basis provides rigour for group dynamics and a plan for longer-term engagement.

In order to illustrate transformative action, I blend concepts behind *Evolution's Edge* (Taylor, 2008), BEST Futures, ACF (Lowe, 2011), *The Journey of the Amoeba* (AtKisson, 2010), *The Future of Leadership* (Senge, et al., 2010), *Transition Towns* (Anderson, 2012), Foresight Project (UNEP, 2012a), and *The Necessary Transition* (McIntosh (Ed.) 2012), so a rich palette is available to colour collective thinking. The overall principles are the same but the visualisation of models and arguments come from different perspectives. This is what interdisciplinary learning and innovation is all about! Once the basic learning is in place, a group can make its own magic design models so that project ownership is enhanced through collective artefacts. This trajectory enables plotting and overlaying of climate moral compass across jurisdictions. This then leads us towards techniques for longer-term planning, so my next contribution is an analysis of tools for Futures Thinking for Urban Climate Management.

7.3.2.2: Urban Climate Futures Thinking

The most useful kits are the Future Thinking tools, shown in Figure 14, which strengthen and direct facilitation for public policy, urban design, and business positioning. I can navigate through a range of models if necessary to ensure participants are contributing and feel safe to explore other options.

Review of Urban Futures Thinking Tools – for Climate Sensitivity		
Tools	Concerns	**Comments**
Roadmap	Linear, short term tactical	Presumes an end point
River Metaphor	Linear but allows for change	Indigenous design thinking
Impact Wheels	Circular – positive & negative	E.g. Soil degradation
Future Wheels	Circular – nodes & connections	Captures many thoughts
Scenario Planning	Linear – alternative end points	Not one vision – just direction
Least Cost Planning	Linear – same end point	Good for long term contracts
Back-casting	Reverse engineer undesirables	Defensive not innovate grandly
Win–Win scenarios	Debates better for all	Subjective but good start
Eco-services Trading	Trust, values innate & nature	Process cost > outcome
Bio-regional planning	Many tools, climate changes zones and functions	Easiest to visualise, basis of Canada land planning systems
Integrated Design Steps	Myriad of decision trees	Better scope and direction
Smart Mode	Constant re-evaluation	Dynamic, Net positive benefits
Carrying Capacity	Reductionist, quantitative	Easy to map & understand
Urban Future Charter	Principle based	Principles conflict in practice
Design Shop (NASA)	Expansive and overwhelming	Effective if facilitated well
Enquiry By Design	Inclusive and intensive	Effective if facilitated well
BEST (Taylor)	Biodiversity systemic	Too narrow. Incomplete
Sohail's meta-future	Insufficient information form opinion	
Human-centred Futures	Inspiration ideation fast, action slow/disorganised	Easy to apply and review by all diverse parties
Eco-centric (earth) futures	Not readily adopted by corporates	Encourages inclusive arguments and biomimicry
Ancient Futures	Respect for first nations histories	Indigenous wisdom and biomimicry.

Figure 14: Urban Futures Thinking Tools (adapted progressively from various sources by Davis)

With such a toolkit, there is scope for flexibility to consider options and hybrids to address dynamic group diversity. These are powerful techniques to facilitate innovation and optimism.

7.3.3: Action Implications

The impact of these practical lessons about facilitation techniques includes (1) Confidence for facilitators, (2) Multiplication of empathy and conducive thought for participants, (3) Rigour for the outcomes of workshops, and (4) Ownership of the outcomes, thereby providing energy for those taking action in their respective roles.

In addition, dynamics with multiple-disciplined groups include dispute resolution and creative conflict concepts, which build trust and bridge the diversities of egos, status, philosophies, and cultures. By including all the thought patterns, the action that results from shepherding diversity to a common desirable outcome can be so innovative and robust in the face of external scrutiny.

My Demonstration Projects and work undertaken since are a solid foundation for me to make a safe space for discussing wicked problems. The more conversation, the less fear for participants.

Therefore, the contribution to action that I can now offer accelerates the uptake of learning which is further demonstrated in the following section of Learning through Evaluation.

7.4: Learning/Evaluation

I commence by analysing my results from Learning and Evaluation. For me, this comprises:

- Passion and philosophy
- Research review and enhancement
- Project design and findings
- Participatory techniques
- Overall learning – my philosophy, new definitions, integrated tools and techniques, focussing effort for greatest return, understanding urgency.

Expanding Chapter One, I provide results that plot from the PALAR approach to the projects, to the findings, to the emerging ventures. I am keen to prove results through the relationships between these levels of study by showing specific linkages that build to an holistic approach to urban climate governance through accelerated learning techniques.

In order to consider this, I wish to revisit Chapter Four, which considers a philosophy with an action research method, researching wicked problems focussing on Three Spheres of Enquiry, to design projects that result in demonstrated actions that contribute to greater learning about climate sensitive cities. As a consequence, Figure 15 on the following page conveys the phases with interconnectedness to ensure that the study respects the desired relationships and produces justifiable results, so that I can make some warrantable assertions.

This overview illustrates interconnectedness within a Review of Creating Climate-Sensitive-Cities®, with feedback loops for phases of the study that acknowledge relationships within the review process. In order to prove a review process by triple loop learning, the single loop process asks ‘Are we doing things right?’, emphasising micro-efficiency of processes. The double

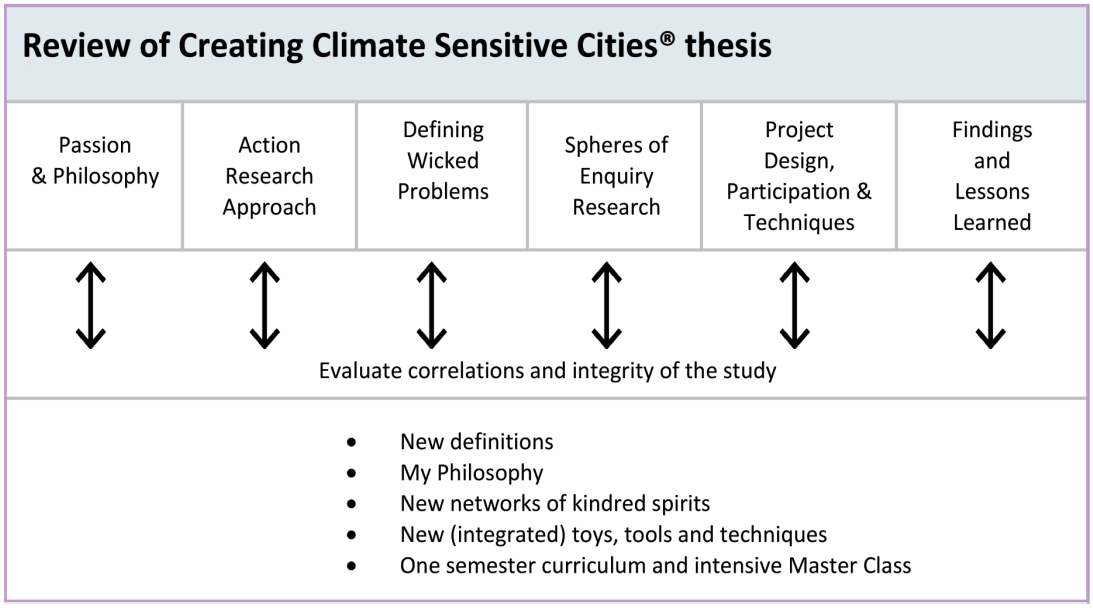


Figure 15: Review of Creating Climate-Sensitive-Cities® Thesis

loop learning asks, 'Are we doing the right things?', and emphasises effectiveness in achieving desired outcomes. In my case this necessitates questioning how to achieve the fundamental understandings for learning for better climate governance in cities. Finally, the third loop asks 'Are we doing these things for the right reasons?' I argue that my study is as important as it is urgent, because sound ethical principles must apply to decision-making to achieve accelerated learning for climate sensitive cities as the desired outcome.

I have articulated the desired outcome of this study, but there is significant merit in tracing the evolution of lessons from the original learning plan. The extra research, the selection of projects, the facilitation techniques, and the analysis of findings from projects have resulted in a package of emerging thinking and practice. Tracing my evolution, I revisit the original Learning Plan, both during the study and currently with my emerging ventures. This pathway is summarised in Figure 16, which traces the Action Research models considered at the beginning of the Learning Plan (2011) and during the projects, and, finally, upon reflection of the development and sophistication gained during this study period. The right column lists some of

Evolution Towards Practice Models		
Learning plan (before)	**During**	**After**
Action Research from Learning Plan	Application & result of recent research applied to projects	My new tools and techniques for emerging practice
Action research (Cherry, 2002b)	Participatory Action Learning and Action Research (Zuber-Skerritt, 2012)	Capacity building toolkit for CSC Master Class © 2014
(Project Management Solutions Australia, 1998)	LogFrame (World Bank) (Aid Delivery Methods Helpdesk, 2004)	Essential infrastructure investment evaluation 2013©
Policy cycle (Schneider, 1992)	Public Policy Evaluation (Australasian Evaluation Society)	Climate Policy in Practice Cycle ® 2013
Interdisciplinary techniques (Thompson Klein, 1990)	Interdisciplinary Pertinence for Healthy Cities (Lawrence, 2013) Innovation (Schülke & Bauer, 1981)	Interdisciplinary innovation models © 2013
Team Creativity for Problem Solving (Henderson, 2007)	Collaborating for creativity (Shankar & Brown, 2012) Regional planning collaboration (Abbott, 2013)	Collaborative Creative Communities ® 2013
Infrastructure feasibility (CBA 1997)	Disaster Management: rebuilding handbook (Blakely & Carbonell, 2012) AECOM blue book (Davis-Langdon, 2013)	Climate essential infrastructure investment evaluation tools® 2013
Good Green Governance (Davis, 2001)	Review of climate cities (ARUP, 2011)	Urban Climate Governance ® 2013 ICAT Transparency 2016
Ethical decision-making for refugees (Ramphal Commission, 2011) Ethical Frameworks (Reputation Index 2006)	7 ethical approaches for climate migration (Mackey, Maloney & Steele: Wild Law, 2012) Green Criminology (White & Heckenberg, 2014); Flannery, 2012; Herpen, 2012)	Self-assessment questionnaire for CSC master class for ethical decision-making © 2014

Figure 16: Evolution Towards Practice Models

my unique, legally registered tools and techniques that under pin my International Climate-Sensitive-Cities® Masterclasses. This pathway plots the evolution during this study.

The pathway illustrated in this figure gives a taste of what is evolving for my future practice. Furthermore, the pathway traces from basic knowledge and methods, through the recent published research and practices, through to my emerging practices as a result of this study. The left column lists the approaches from my original Learning Plan, while the middle column reflects

the additional research I sought to strengthen my approaches. The right column lists my tools and techniques that I am now deploying in workshops. Having followed this pathway, I am able to crystallise the valuable lessons arising from this study.

7.4.1: Learning Contributions

A great number of learning opportunities arose from passion, philosophy, and directed research, but I was obliged to reduce the number of projects to those that reflect the Nexus of the Three Spheres of Enquiry, namely Climate Change, Governance, and Learning. Although I work in these arenas and some of the project outcomes were expected, other results were refreshingly surprising. I was able to test new facilitation techniques with a different cross-section of participants for projects.

During this study, I have convened, facilitated, or actively participated in group work, as often as three times a week, with cohorts numbering between 20 and 100. Although actively facilitating or teaching for the past seventeen years, I was fulfilling that role before this without realising it. Since 2006, I have increased my focus on facilitation for specific transformative action, rather than simply coordinating continuing professional development for industry bodies and community groups. In 2010, I became part of Transform Australia, where I was exposed to new techniques from diverse professions that built upon my formal HRD degree, lecturing styles, and Enquiry-by-Design work. I then took the concepts further by embracing difference, especially with cultural diversity in international work, and with multiple professional disciplines for urban design and for scenario planning.

Differences can bring disagreement and is often viewed negatively, but instead of fearing conflict, I learned to encourage it and use it creatively. As a result I am comfortable with projects that question boundaries; I recognise conflict and encourage participants to think differently.

Because I was limited to the projects that strongly related to the intersections of the Three Sphere of Enquiry, I wanted to test participants from different disciplines with the effectiveness of my accelerated learning techniques for Climate and Governance for cities. Therefore, in the design of my projects I include a project description, importance, scope, topics, my role, institutions (cohorts), techniques, expected outcomes, actual outcomes, lessons for knowledge/actions/evaluation & innovation, and a statement on meta-analysis for the project and the 'grand scheme of things', with an artefact to illustrate the project results.

My summary of results includes: mutual respect, appreciation of other practices, desire for local democracy and global mandates, the need for informed communication and debate, the need for professional bodies and community to influence government decision-making, appreciation that some cities (Small Islands States) are in a moral dilemma, and good green governance (for climate management). These are socially and economically sensible and are everybody's responsibility.

Participatory techniques were guided by Thompson-Klein's Interdisciplinarity model (Thompson-Klein, 1990). These processes included:

- Always in partnerships
- Always looking for mutually beneficial outcomes
- Strengthening ideas and kindred spirits for common goal
- Empowering language
- Interdisciplinary techniques suite
- Interactive reflection
- Synthesis
- Joint agreement
- Ways forward
- Innovation

- Transformative actions
- Accelerated learning trajectory.

Learning is not linear, in fact an experiment shows every person's idea of how their brain works is entertaining. That is why Galtung's peacemaking model (with diagrams of thinking patterns) is so useful even though it is quite dated.

I have embedded this emerging learning in my philosophy statement which empowers my energy to go bravely where others generally don't dare to go.

> *What the world needs now is understanding and compassion. Understanding of climate change based on scientific evidence, informed interdisciplinary debate, innovative solutions for complex local and global problems, and an ethical framework for governance for a safer future for all, are the essence of my doctorate. Such understanding requires accelerated learning by people of diverse perspectives and disciplines to address the urgency of education over catastrophe. Compassion is required to recognise the ethics, within the sea of scientific evidence and technical practices as decisions impact people and the planet. Ethical decision-making and practice are the keys to good governance, but there needs to be frameworks that are principled, transparent, and culturally acceptable. In order to find long-term resilient solutions, my study seeks to link the right reasons for actions with the suite of right actions in the right situations.*
>
> *Because the greatest reported climate catastrophes are experienced by humans, my focus is climate change in burgeoning cities as that is home for more than half the world's population. I investigate decision-making for resilient cities with cyclical policy approaches addressing vulnerabilities for people and ecosystems, and consider climate justice with ethical*

responsibilities for the casualties who well outnumber those as victims of terrorism. The faceless perpetrator, climate change, penetrates lives in many ways so future actions need to be considered accordingly.

Therefore, I argue that triple loop learning is effective for community leaders and multiple-disciplined professionals to accelerate the capability for implementing innovative suites of solutions for complex climate change challenges in cities.

7.4.2: Learning Artefacts

Until recently, my artefacts – my toys, techniques, and tools – were registered intellectual property. In the past, I registered every individual piece of work to protect its integrity. However, there is little respect for intellectual property in Asia, and the cost of registration ($1000 for each artefact) was proven not to protect me from blatant breaches. Therefore, these days I choose to share freely, without legal restrictions. It is better that my work is used. My consolation is that I learn quicker than they do so I am always many steps ahead of my old published work.

My artefacts include learning through play, climate policy in practice cycle facilitation as a basis for Enquiry by Design, three-day (or four-day for Muslim countries) masterclass program, prescription for regenerative cities (DT x BM = RC), and a toolkit (mosaic of techniques) for Urban Futures Thinking.

7.4.2.1 Learning Through Play

These toys are particularly valuable for early adopters of fundamental understandings:

- Board games (play chess with climate)
- Interactive video games (like sim-city, sim-transport, sim-climate)
- App for mobile phones

- Hackathon for ethical futures.

Play often accelerates learning in a subtle way that multiples with the positive reinforcement of having fun while feeling a sense of achievement.

7.4.2.2: Climate Policy in Practice Cycle ®

Figure 17 illustrates a simplified version of the Climate Policy and Practice Cycle developed by me interactively with CFP participants and reviewed by the CHOGM Foreign Ministers following the Commonwealth Peoples Forum on Climate in 2011 in Perth (Australia).

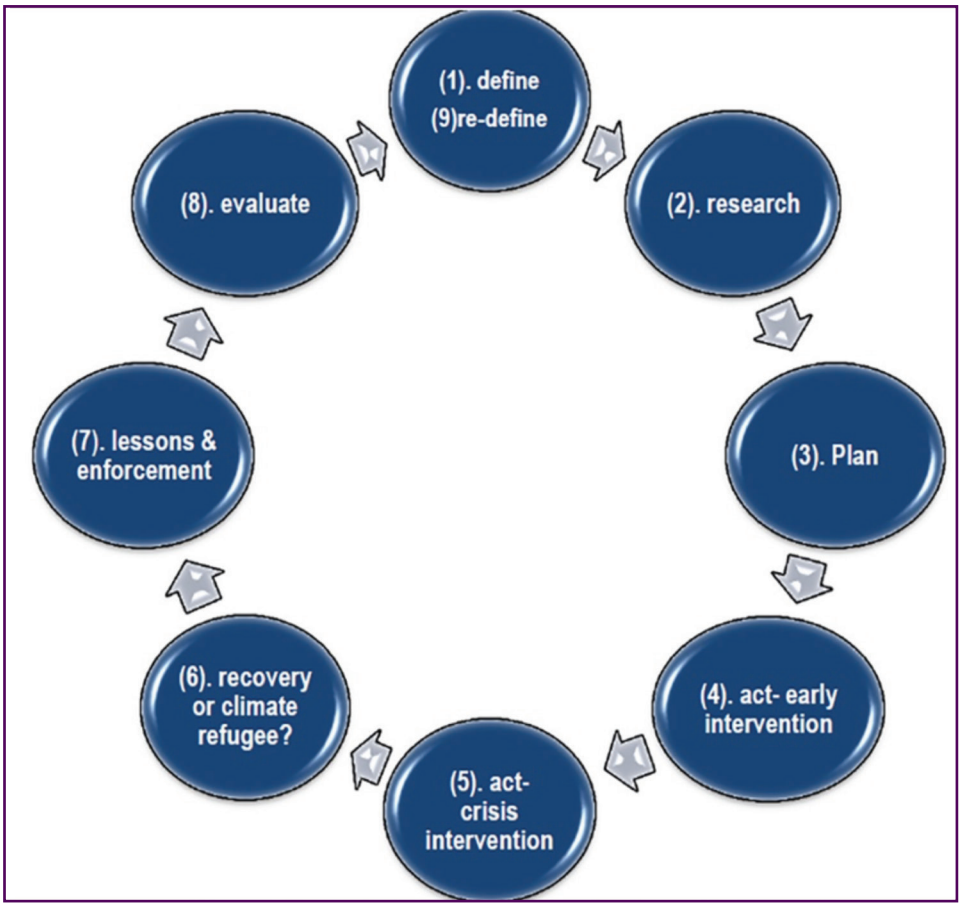


Figure 17: Model of Climate Policy and Practice Cycle (CPPC)

Each of the steps in the cycle comprises research, assessments, and actions at particular chronological periods within a climate event, which lends functionality that is transferable to any country. In the case above, the model is transferable to 53 countries that are Small Island States with the highest risk of adverse climate impacts. Figure 18 further elaborates.

Define	Scope, Stakeholders, Disciplines, responsibilities
Research	Baseline, Risk maps, UN cities, C40, CW, Australia, SEQ
Plan	Urban design and planning low carbon future
Act Early Intervention	Prevent, protect vulnerable, land use, social cohesion
Act Crisis Responsiveness	Emergency management systems, health, resilience
Recovery or climate refugee	Resilience through cohesion, Ramphal report
Lessons and enforcement	Preferred behaviour incentives, enforce fisheries
Evaluation	Peer review, best practice standards, evaluative culture
Redefine	Redesign

Figure 18: Simplified Version of Climate Policy and Practice Cycle (CPPC)

These phases require many disciplines to plan and implement. The following section is a masterclass, which is based on the specifics of each phase.

7.4.2.3: Masterclass with Professional Accreditation

To collaborate with professional bodies as a facilitator, it is wise to work within their established systems. Figure 19 is a Masterclass Outline.

Outline: DGH Conference Master Class in Sommerhausen Germany May 2014.

Purpose	To accelerate learning for individuals as multiple-disciplined community leaders and professionals, within organisations, who care about climate impacts on human settlements and wish to take net-positive actions. The Master Class CSC covers a 12-week core university curriculum in an intensive 3 long days or 4 shorter days (before or after DGH conference).
Scope	International lessons, vulnerability assessment, policy in practice review, case studies, benchmarking successful practices, comparing good governance systems and evaluating ethics in decision making.
Authorities	**Institutions:** United Nations Habitat, United Nations Development Programme, World Bank Institute, UNFCCC, UNEP Foresight, UNEP Finance, Climate Commission, Habitat Professionals Forum, and their Regional Programmes, OECD **Professionals:** Urban Design Alliance, Planners, Engineers, Economists, Landscape Architects, Social Planners, Essential Infrastructure Managers, Disasters Managers, Health Practitioners, Community leaders, Local Government representatives, policy makers, evaluation society, community education specialists. Accreditation for continuing professional development points/ hours may be possible.
Cohorts	Maximum 35 per master class. A broad range of disciplines and experience is encouraged. Each attendee must prepare a one page summary on a burning issue and apply learning to a local project during the class.
Content	1. Introductions, expectations and understandings. 2. Latest international research findings about climate sensitive cities. 3. 8 policy phases of climate management in urban contexts to systematically assess the value of proactive and responsive approaches 4. Cities Benchmarking and monitoring performance over time 5. Essential infrastructure investment tools (built, social, environmental, cultural) 6. Local issues group work to evaluate techniques appropriate to individual circumstances. Test CPPC locally. 7. Urban Climate Governance – generally and explicitly 8. Policy and strategy development with investment arguments 9. Self-assessments and ethics evaluation models 10. Reflect on individual lessons and joint achievements.
Method	Action research through participatory research and action learning. Whole group sessions, small group sessions, caucus sessions, individual self-assessment and ethics evaluations. On-going mentoring is not provided by facilitator(s), however, local support can be considered through professional bodies or Society for Human Ecology.
Outcomes	Individuals have better understanding the current state of play by sharing research on assessing vulnerability, models of policy and practice, implementable benchmarking systems, tools for consideration in local situations, and evaluation toolkits, and by networking with other professionals who participate in the learning journey.
Investment	Facilitators costs and out of pocket expenses (i.e. training manuals) should be covered by the impost of a fee for 35 attendees. Discounts can be negotiated for SHE members; however, a breakeven point must be achieved.

Figure 19: Masterclass Outline

Masterclasses are custom-designed.

7.4.2.4: H3 for SEQ – Future Region Network

As a result of the UN Habitat Urban Professional Forum and Habitat 3 resolutions for the New Urban Agenda to 2035, South-East Queensland professionals and community leaders planned a preferred future for six cities, 47 urban centres, and 137 towns in Queensland. This was under the umbrella of the United Nations Association of Australia, and implementation report cards are assessed in January every year, for the first five years, to ensure we are tracking in the right direction.

The concepts of hope and fear are also being explored along with practical measurements of societal and environmental wellbeing. This regional governance model is being benchmarked and my method was adopted in Belgium with the European Union. 'We the Peoples of SEQ Declaration for the New Urban Agenda' was endorsed by 79 participants on 29 January, 2017.

7.4.3: Learning Implications

Cherry suggests that 'personal and professional learning' are legitimate areas of contribution (Cherry, 2002). This is a particularly important element in this thesis because specific findings from my research focus on solutions such as better governance systems for leadership in climate change in cities.
To some degree my research is a response to 'be the change you wish to see in the world' (Edberg, 2006). I have sought through this study to assess and develop my personal and professional skills and improve my effectiveness as an agent for accelerated learning. Independent review roles as detailed in the next section fulfil that ambition.

7.5: Self-assessment

1. What is my unique contribution?
2. Doctoral Viva Process Results
3. Philosophies and new definitions
4. Conclusion

7.5.1: My Unique Contributions

My unique contributions lie across research, action, and learning. I reach towards a new academic discipline that combines philosophy and practice for climate governance. Throughout my learning journey, I have developed new definitions, unique language, and alternative models of thinking that synthesise valuable interdisciplinary contributions. My accelerated learning models are for adult decision-makers for climate-sensitive cities – professionals, community leaders, business trailblazers, and government representatives.

My definition of Accelerated Learning is:

> *Accelerated learning is the rapid acquisition of knowledge and skills by building on existing experiences, deploying senses, and appreciating different perspectives to achieve a richer understanding. It (AL) is a process of strengthening capability in order to convert a novice to an expert, from a state of passive bystanding to facilitating transformational action. My attention is drawn to personal responsibility to act in order to create change.*

My definition for a Climate-Sensitive-City® (CSC) is:

> *A CSC is an urban system of shared governance that embraces the complexity of the impacts of extreme events and the ubiquitous slow burn of climate variability on its people, its economy and its natural systems on which healthy life depends. A climate sensitive city works by being both proactive and responsive through designing and retrofitting human settlements to live with nature, enhancing coping capability, and strengthening resilience for adaptive ethical urban futures.*

Learning Journeys always require extensive reading and thinking in order to shape the research-practitioner's philosophy. This ensures effective approaches that are appropriate for contemporary circumstances. My learning journey began thirty years ago when I connected the climate change crisis with overly rapid urban development, and human response to change. Over the decades, my concern, desire for knowledge, and passion for positive action increased, eventually resulting in this Doctorate.

In 2012, I discovered Participative Action Learning and Action Research (PALAR), a methodology that dovetailed with my immense curiosity and concern. In participating in PALAR, I felt compelled to argue my passion for continuing study and for conducting my programs. But true reflection digs deeper. During the digging, I ask myself why, if it was not my passion to do so, I bothered to be scrutinised by so many people, and to face heavy expectations to always deliver the goods, and to mediate between diverse groups of single-minded people who were reluctant to apply their knowledge and skills for a better future. 'Why would I enter the lion's den of ethical decision-making for climate governance in cities?' This is a question that

resonates, and the answer echoes in a French saying: 'If not you (my child), who would save the world'; in the Earth Charter's 'taking personal responsibility' (UN, 2002); and in Gandhi: 'Be the change you wish to see in the world' (Edberg, 2006). My passion is strengthened by these thoughts and the positive feedback from my colleagues.

My passion is for enabling the effective resilience to climate change. I wanted to apply my efforts to the wicked problem of anthropogenic climate change. The biggest impact with the least input was to tackle the cities under greatest threat. Intensive human settlements in the most vulnerable ecozones may have the least capacity to be resilient – socially, environmentally, and economically. Previously, this climate issue in human settlements was largely viewed as an issue of comfort or economic wellbeing, rather than that of fundamental human survival. It was hidden under the guise of 'sustainable cities'. Despite being hidden, climate change is 'the greatest moral dilemma of our time' (Gardiner, 2006), so my aim is to take the mystery out of science, communicate resilience successes, continuously learn from diverse players, and to empower communities and professionals to take positive action. Our mindset must change from combatting climate change to living resiliently with its consequences. As a result of articulating this aim, my passion is no longer applied to addressing one wicked problem (Churchman, 1967), but grows in complexity to a series of interrelated obstacles which form part of other wicked problems (Hatfield-Dodds, 2013). This complexity is further exacerbated by the urgency to take action addressing the whole scope of climate change. HG Wells reiterated urgency when he stated that 'history is a race between education and catastrophe' (Gurría, 2013). I fear we are 'in the race' right now and urgency is underscored by the global carbon budget (IPCC, 2013), multiplying populations, and more intensive extreme climate events impacting everywhere on the globe. Given the summary statement

on my passion, which has expanded to address complexity and urgency, I now wish to introduce you to my efforts to meet 'L8 assessment criteria' for Middlesex University.

My Philosophy is

that the wicked problem of climate change in cities
can be addressed by an inclusive, positive approach
of having individuals within networks
continuously participating
in rich interdisciplinary interaction
for policy and practice and coaching,
through accelerated learning.

My philosophy quest began as an adoption of several wise sages' stories: 'learning to think' by Socrates, 'learning to be scientific, objective and rigorous' by Machiavelli, and 'learning about human creativity as an extension of nature's creativity' by Schelling (McGee, 2010). I care about nurturing creativity in people I encounter, especially if they think differently from each other, so group facilitation with mediation is a natural fit for me. I adopted thinking patterns and 'peacekeeping methods for different cultures', which logically led to innovation techniques (Schülke & Bauer, 1981). From the innovation scholarship that I was awarded, I learned about more recent innovation techniques. Although I prefer the term 'accelerated learning for interdisciplinary innovation', similar concepts are argued as 'converting a novice to an expert' (Gladwell, 2000), 'evolutionary learning' (Ansell, 2011), 'the compass' (AtKisson, 2010), 'creative collaboration' (Shankar & Brown, 2012), 'communication as positive energy' (Nelder, 2013), 'changing from passive bystanding to taking transformational action' (Lowe, 2013), and 'the transformative power of education for climate stewardship' (Mary Robinson

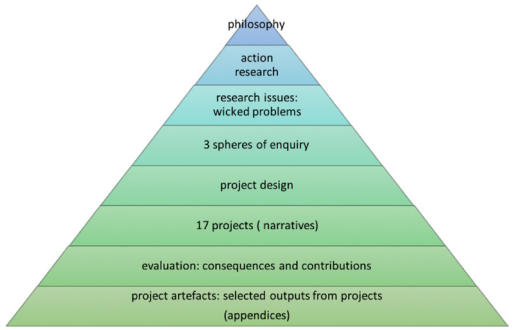
Foundation, 2011).

My personal philosophy deepened as a result of cross-fertilising the fundamental ideas of the above theorists, with my evolving skills in working constructively with people who previously had fixed opinions. With my optimistic attitude, every participant has some unique knowledge to share for a jointly owned richer 'understanding' towards a more democratic resolution. This optimism is shared by Sarah Parkin who calls this 'positive deviance' (Parkin, 2010), and Janis Birkeland with 'net-positive development' (Birkeland, 2008) whom I have been fortunate enough to work with during the past decade, even though we now live in different countries. However, optimism can be shattered by ill-informed decisions and compounded by lack of public policy debate, thinking in silos, and short-term vision. These compounding factors cause me concern about other related wicked problems and their unintended cumulative consequences. Therefore, in this study I investigated those wicked problems involving the convergence of climate change, good governance, and learning – my Three Spheres of Enquiry.

7.5.2: Doctoral Viva Process Results

Examiners critique – review for Doctoral Viva process.

Questions	Where to Find My Answers	Further Information
Why did I choose this topic?	I care. I have background experience, I want to connect the dots, and I want to address this usefully and quickly. I want to leave a legacy that makes a difference. Every single person can make a difference through their individual strengths and mindful intent towards a higher purpose. Chapter One – introduction and rationale Chapter Two – portfolio Chapter Three – introducing wicked problems Chapter Six – project narratives Final – conclusion.	
How did I arrive at your conceptual framework?	See: Methodology, Chapter Four 1. Analyse my concerns. 2. Analyse my own values. 3. Analyse how to tackle wicked problems (Three Spheres- climate, governance and learning). 4. Define scope and limitations. 5. Analyse what latest knowledge I need (method and content).	

Questions	Where to Find My Answers	Further Information
	6. Identify opportunities to facilitate positive change. 7. Redefine limitations and scoping for each project. 8. Design projects (within work environment). 9. Make sure this aligns with supervisor expectations WBL/AR. 10. Consider artefacts to demonstrate achievements in research, action and learning. 11. Review continuously for validity. 12. Refine clarity regularly What other theories? Philosophical guidance from (1) Socrates: '… teaching people how to learn', (2) Machiavelli: '…study objectively with a scientific attitude…to politics and government', and (3) Schelling: 'man as part of nature…'	
How did I visualise this Doctorate and explain my intent?	Originally I planned a book but this study approach was more about practice. This suited me too, but I had to leave my original thoughts on the backburner, in order to develop a different model of operating so I could honour the program. I was able to acknowledge my experience and review my previous careers to advance my future prospects.	

Questions	Where to Find My Answers	Further Information
How did I arrive at my research design?	When I participated in Society of Doctorates for Sustainable Development (March 2012 scholarship in NY), people agonised over this. I came away with four questions on which to base my work. I focussed on effectiveness and efficiency to make a difference: 1. Does society have enough technical capacity to respond effectively to climate and sustainable development challenges? 2. Can people learn fast enough to implement positive change through responsive institutions/society? 3. Can people accelerate learning across disciplines and cultures, and maintain momentum to prevent backward steps? 4. Do Sustainability Commissioners accelerate learning, inspire joint innovative solutions, and maintain vigil? How?	• Question One reflects on technical information as a credible base. • Question Two contemplates accelerated learning through institutions and society. • Question Three considers interdisciplinary advancement particularly as it relates to governance. • Question Four examines the role of independent reviewers (Sustainability Commissioners) in relation to the findings of the previous questions.
Justify choice of methodology	• WBL Program for DPST • Action research • Participatory Action Learning and Action Research (PALAR) • Fits my 'policy to practice' mantra. • I like to turn concepts into concrete (or at the least creativity) • Methodology chapter explains this. • Chapter Seven articulates new thinking models.	• Cherry picking the brightest minds and most effective actions was a joy. • In each of project I give a meta-analysis that anchors intent.

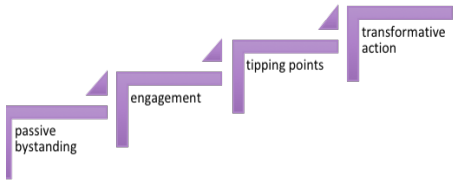
Questions	Where to Find My Answers	Further Information
Extra: The link between choice of methodology, approach, design, and **How to defend**	• Models for research – philosophy, values, approach, questions, design, and project narratives with conclusions evaluated from three perspectives. • Work-Based Learning requires action research approach. I tend towards participatory action learning and action research. • Chapter Seven considers consequences & conclusions. Alternative contemporary methods include Cherry, Zuber-Skerritt, Bob Dick, Shankar, Mark Williams, Sandra Alber. • Previous methods used include Guba & Stufflebeam, Anne Schneider, Peter Wiley, IPAA.	• Triple loop learning • Mixed methodologies • Interdisciplinarity • Everybody is responsible for their own impacts on our planet and their prevention of harm to self, others and the earth. See insurance story. • A universal opportunity should be available to make a positive difference for personal, community and urban safety.
Why did I use special instruments?	• I wanted to review my previous practices as well as improve policy and practice overall in the hope of inventing new techniques and tools especially related to climate governance. • Planning, Actions, Review • Policy Cycles (1992 and thereafter) • Urban Climate policy review and strategic Audit(s) new • Accelerated Learning Techniques (basic 1969–2013) • Interdisciplinarity for rich understanding (1990–2013) Design baselines and standards from multiple professions Creativity/ Innovative techniques/problem solving • (City) Futures Thinking Techniques (1970s to now) • Ethical Frameworks (1972–now) • Integrity in decision-making/governance/transparency.	Plotting the changes from before, during, and after.

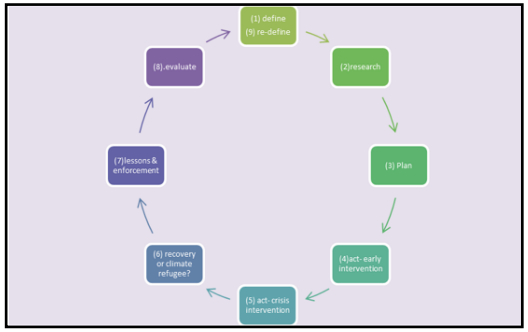
Questions	Where to Find My Answers	Further Information
How did I choose participants for workshops?	Most voluntarily chose to participate giving up their weekends and precious time. In other cases, they were country representatives, or NGO reps, or community leaders, or professionals, or scientists, or politicians. In Enquiry By Design the session was by invitation only (professionals and community).	
How did I choose techniques within the workshops?	Program logic, effective processes (suite), desired outcomes, and contingencies. Trust building is important. Mediating conflicting opinions in a respectful way reassures all that the richness of the debate is more important than the loudest voice.	
Sampling	Research boundaries 1. I limited my research to Cities, Climate, Governance and Learning, and then refined further to only issues that fit in the nexus of those. 2. Cities were limited to 40 global cities exposed to climate impacts, with greater focus on those cities I have worked and lived in. 3. Climate was limited to effects, not putting bandaids on the symptoms. Future projections were important to mysocial, environmental and economic resilience. The fiduciary duty to care for the commons (including the atmosphere) is considered but not fully developed. This is worthy of more research.	

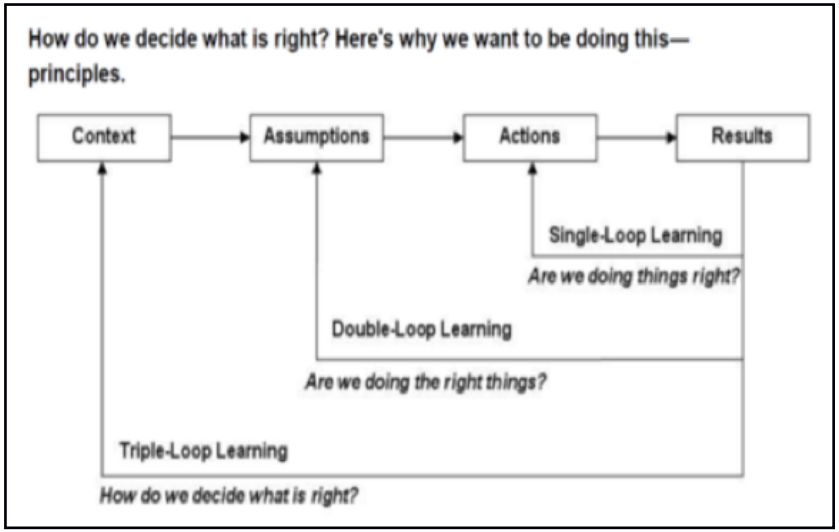
Questions	Where to Find My Answers	Further Information
	4. Learning is limited to adult learning (Andragogy), Accelerated Learning towards interdisciplinary innovations, with transformative actions for professionals and community, working with climate change. 5. Advanced learning considers ethical decision-making for sustainable futures. The moral dilemma for humans and living things, forced to migrate or die in an already crowded planet, is worthy of greater attention in future work. However, every predicament has its own set of parameters and only a general set of themes and principles might guide ethical decision-making.	
Conceptual conclusions	**Differentiating between factual, practice and conceptual conclusions** In project reviews, I articulate lessons by knowledge (factual), action (practice) and evaluation (conceptual). I go further to link the project to the body of knowledge accumulating within the Doctorate. **Was I disappointed?** On a few occasions, yes, but especially the Commonwealth Cities Review project. The people who participate want to be there and want to make a difference so are keen to get outcomes by working together.	Aren't I lucky to deal with good people (most of the time) who are bigger than their individual egos!

Questions	Where to Find My Answers	Further Information
Fundamentals	**Can I generalise my findings? And why?** Yes. My projects give examples of a greater, widespread trend of slow-to-act leaders who exacerbate climate impacts, and the breakdown of democracy where professional bodies and communities are prevented from participating in shaping policy and its implementation. By taking different scales – international, commonwealth, regional and national and local, I can view a range of perspectives. But the trends may be exactly the same!	Scope Scales
	Am I subjective or objective? Mostly I am objective due to my efforts to be an expert witness having to justify any grand conclusions I make. However, when dealing in immeasurable behaviours I need to be subjective and show the traits that tend to indicate certain inappropriate actions, or alternatively the desired behaviours. In the absence of documented standards, then a professional judgement must be made, which might appear to be subjective.	Credibility

Questions	Where to Find My Answers	Further Information
Contribution	**How important are my findings?** • Research summaries: They are relevant, with case studies of avant-garde strategies. • Practice: testing new techniques is evidenced and now registered for intellectual property • Evaluation: consolidation for a specific purpose, rolling into a suite of packages for implementation, where appropriate. I am better informed to make a more effective Sustainability Commissioner. • Lessons are applicable everywhere, not just SEQ or Australia. See results in 14 countries.	Safe spaces for sensitive debates Recognition of the value of the independent review.
	Why is my work different from Climate scientists? Or Lawyers or Educators? Or other Independent Reviewers? My broad approach and rich input from multiple disciplines work in an interdisciplinary way with innovative thinking, and allows transformation that might not happen from a single discipline or community of practice.	

Questions	Where to Find My Answers	Further Information
	Why do I think that independent review (Sustainability Commissioner) helps governance for cities for climate? What else would help? • If Judges from Planning and Environment Court were more empowered, it would already be too late to retrofit legislation and policy. However, they can use precedent. • Proactive policy needs pilot project testing before broad endorsement (Productivity Commission, Integrated Urban Design Commissioner). • International benchmarking can be a proxy for a pilot program but might be culturally inappropriate (C40, UNEP, INTOSAI).	
What is my contribution to Knowledge?	• Latest research all in one place • Technical book with case studies for Climate Sensitive Cities • Arguing futures-thinking models for appropriateness • Learning trajectory from bystanding to taking transformative action.	

Questions	Where to Find My Answers	Further Information
What is my contribution to practice?	• New techniques (some revisited but with kit bag of contingencies) • New ways of coping with difficult people – mediating for the greater good • Facilitating rich debate for the purpose of creating practical solutions for the right sort of outcome. • Climate-Sensitive-Cities® • CPPC • Inclusive Infrastructure Investment	
What is my contribution to accelerated learning and evaluation?	• Urban Policy Review(s) • Climate Policy reviews • Urban Climate Governance audit program(s) • Baseline design and draft professional standard making • Empowering professionals across disciplines (EbD) • Empowering community • Reviewing the skills required of a Sustainability Commissioner for the future.	

Questions	Where to Find My Answers	Further Information
Critique my work		• Am I doing things right? – tick a box • Am I doing right things – depends how well I can argue my approach, design, and desired outcomes. • How do I know it is right in principle? This is a 64 million dollar question, but I try to answer that. • Ethics – justice, migration, sovereignty, professionalism • Contexts – duty of care, sustainability • Democratic techniques for decision-making • Cultural – ancient wisdom.
Return to the Beginning	What I am a going to do with my life armed with my new Doctorate? • There are six possible immediate placements over the next few years. • Grooming for Sustainability Commissioner or whatever emerging independent review role that captures my skills. • Only nine years to do something useful because I will then be too old for the United Nations placements.	Chapter Two – employing to a higher purpose.

Questions	Where to Find My Answers	Further Information
What else about this thesis?	• I cannot measure the impact of my work directly on others over time. • I wish to explore migration ethics in more detail • I wish to practice more Futures Thinking with climate professionals. • I wish to implement more green design. • I wish to publish more on accelerated learning for communities and professional bodies	I cannot do these through this avenue of study because the scope is limited. I have the rest of my life to explore those things.

7.5.3: The Role of Sustainability Commissioner

I refer back to the learning plan about honourable outcomes from completing this Doctorate. I have made advancements in skills, knowledge, and attributes required of a Sustainability Commissioner, and this ranks me strongly for attaining a position in the future.

General attributes required for a Sustainability Commissioner are listed below:

- Excellent interpersonal skills including active listening, sensitivity analysis, negotiation, mediation, reflection, public reporting, media management, diplomacy, cultural sensitivity, compassion, innovation, and integrity
- Credibility with community and Parliament, and respect across levels of government and Westminster arms of government
- Robust networks internationally, among peers, and with non-government organisations including professional bodies, public policy activists, and civil society
- Solid understanding of emerging Sustainability issues with technical knowledge, evidence-based experience, and ability to rapidly acquire and apply new thinking
- Understanding of complexity and a broad world view with continuous professional development at Commonwealth and International levels. (Ombudsmen, Commissioners, Auditors-General, Planning and Environment and Land Court Judges, Independent Reviewers), Membership of INTOSAI
- Ability to nurture the potential of others
- Ability to operate within restrictive legislation, budgets, skill shortages and deadlines
- Ability to co-opt partnerships, where appropriate.

7.6: Synthesis

> There is no choice: exist in harmony or perish in dissent…
>
> *(Ancient Buddhist saying)*

This doctoral study considered the Race between Education and Catastrophe. My better informed opinion is that Education will win the Race but some countries are losing everything in a slow painful Catastrophe.

Well-informed, empowered communities in cities might thrive, but vulnerable, less-educated people will lose their homes, land, culture, and probably their lives. Opportunities for improvement arise through ethical application of sensible policy research, strengthening governance systems, and engaging with community, business, professional bodies, and academia.

As a result of better governance, recommendations from Independent Reviewers are the strongest motivators for positive impact. In implementing those recommendations, the ability to work together to design a common future is paramount for learning rapidly across disciplines for innovative practical solutions.

Systemic reform is required everywhere, with some countries already leading the way through accelerated learning for better climate governance, with a focus on fit-for-purpose practices for Climate-Sensitive-Cities®.

My strengths have multiplied in the attainment of this Professional Doctorate. I now wish to sow the seeds of systemic reform through accelerated learning for better climate policy and practice throughout the world. I submit this work as my unique contribution towards a safer, fairer, and sustainable future.

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Appendix One: Research Summaries

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Research Summary 1: Planet Under Pressure

Title: Planet Under Pressure – Declaration 2012	
Authority	UNESCO, World Bank, IPCC, Rockstrom TED.
Scope	Global
References	UNESCO et al., 2012; New scientist; Potsdam Institute for Climate Impact Research and Climate Analytics et al., 2012; IPCC: 2013 http://www.ted.com/talks/johan_rockstrom_let_the_environment_guide_our_development.html
Meta-analysis	• The planet's future is everybody's business. • We are living beyond our means at accelerated rates, polluting and hastening catastrophic collapse of civilisation as we know it. • Longer-0term view is required for all decision makers. • Better science and open communications are fundamental. • Interdisciplinary sharing needs communities engaging for integrated action. • 4 degrees warming spells disasters and irreversible tipping points for flora, fauna, and poor people. • In 2013, the IPCC reported on global carbon budgets with 93% of GHG absorption by oceans causing imbalance, and the residual air temperature side effects that impact directly on humans.

Findings

The Global Environmental Change Programs with the International Council for Science convened the 'Planet under Pressure: New Knowledge towards Solutions' conference to assess the state of the planet and explore solutions to impending global crises. The conference brought together nearly 3000

leading experts and decision-makers to discuss global challenges and offer new solutions. At least 3000 people across the world participated in the conference online (UNESCO et al., 2012).

- Humanity has taken a huge leap and become a planetary-scale force. Significant changes have occurred since the 1950s, and the rate of change is accelerating. Researchers observe unsafe levels of pollution, ecological change and resource demand, with potentially catastrophic consequences for our global civilisation.
- The past decade has seen the emergence of important areas of new scientific understanding by which to define what we are witnessing:
- **A1.** Humanity's impact on the Earth system has become comparable to planetary-scale geological processes such as ice ages. Consensus is growing that we have driven the planet into a new epoch, the Anthropocene, in which many Earth-system processes and the living fabric of ecosystems are now dominated by human activities. That the Earth has experienced large-scale, abrupt changes in the past indicates that it could experience similar changes in the future. This recognition has led researchers to take the first step to identify planetary and regional thresholds and boundaries that, if crossed, could generate unacceptable environmental and social change.
- **A2.** The Earth system is a complex, interconnected system that includes the global economy and society, which are 'themselves', **highly interconnected and interdependent**. Such systems can confer remarkable stability and facilitate rapid innovation. But they are also susceptible to abrupt and rapid changes and crises, such as global financial meltdowns or the volatility of the global food system.
- **A3.** Assessments of current mechanisms for **governing global environmental change** show why existing international arrangements are not dealing quickly enough with current global challenges such as

climate change and biodiversity loss. There is growing evidence that diverse partnerships amongst local, national and regional governments as well as business and civil society provide essential safety nets should singular global policies fail – a polycentric approach for planetary stewardship.

These insights from recent research demand a new perception of responsibilities and accountabilities of nation states to support planetary stewardship. This requires goals aimed at global sustainability in order to achieve universal sustainable development.

A crucial transformation is to move away from income as the key constituent of well-being and to develop new indicators that measure actual improvements in well-being at all scales. Equity in opportunities to improve well-being and eradication of poverty at the individual level will also play pivotal roles in the transition towards planetary stewardship.

Students' Promise to UN Secretary General (extracts)

Where solutions for environmental, economic, and societal problems conflict, we commit to finding better solutions. To start, we propose the following:

- Replace GDP with a metric that also incorporates environment and social equity.
- Remove barriers for developing countries to have more voice and decision-making power in international dialogues.
- Reform market mechanisms to allow participation in decision-making from stakeholders at all scales.
- Offer financial incentives to young eco-social entrepreneurs and social and environmental researchers, especially in developing countries
- Regulate open access to knowledge in all arenas of business, policy, and science.
- Transition from short-term projects to long-term programs for education

and sustainability-oriented decision-making.

- Make the sustainable development activities of business and government more accountable to citizens.

We promise to:

- Make science more accessible and translatable across sectors and interests so that it can be used for policy making and long-term business decisions that will ultimately drive a sustainable society.
- Expand trans-disciplinary research and engage with user communities in efforts to develop integrative solutions for sustainability.

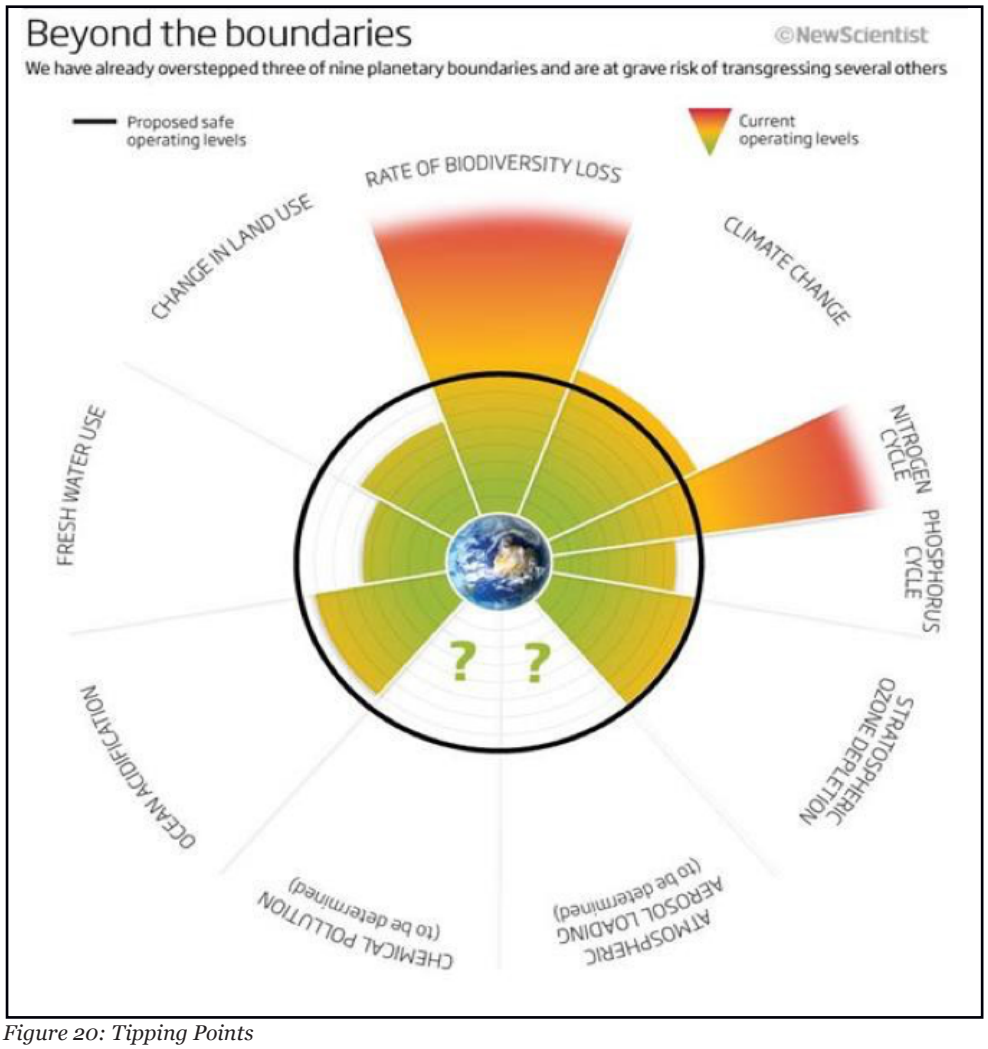


Figure 20: Tipping Points

Figure 20 outlines the tipping points for ten factors relating to the earth's well-being. Thresholds already crossed are biodiversity loss, the nitrogen cycle where waterborne life is suffocated with nitrogen instead of renewed

with oxygen, and climate change. This was a surprising finding when presented in this format to mainstream citizens, even though scientists had known these trends for decades.

In late 2012, updated models show actual outcomes at the extreme end of the conservative models previously provided (Potsdam Institute for Climate Impact Research and Climate Analytics et al., 2012). In Figure 21 below, adjustments to former reports illustrate 2070 predictions of climate impacts across a range of ecosystems, where highest urban populations dwell. The last two globes describe change in temperature, where the highest ecozones are impacted most by climate change. By 2013, several sources warn that four degrees spells extinction of flora and fauna and poor people (UNESCO et al., 2012).

In Australia, the story is similar with the Climate Commission 2013 Report (summarising the International Panel for Climate Change 5th report) that shifted from government obligation to community with a privately funded reporting service for public education after the September 2013 election. The following shows changes at a glance in Australia's climate:

Evolution of understanding climate (adapted from report & infographics).	
1965	Leading scientists point out chaotic nature of climate system with sudden shifts.
1971	Scientists report danger resulting from rapid and serious change. More research is required.
1982	Global systemic warming sustained from 1970 to 1981.
1990	IPCC first report – heatwaves. Australia longer summers and severe heat.
2013	• Over the past decade, professional and citizen understandings have grown significantly. Oceans and air temperatures are rising, mass from glaciers and ice sheets is being lost, so sea levels are rising. • Scientists are more concerned than ever about global temperatures since 1950 being caused primarily by human activities.

	• A warming climate is increasing the frequency and severity of extreme weather events and changing rainfall patterns, risking human wellbeing, the economy and the environment. • Stabilising the climate system will require substantial and sustained reductions of carbon dioxide (CO_2) emissions. We have to decarbonise the economy.

The report continues to simplify findings of the IPCC reports and relate them to everyday life of Australians. But climate is not just a local phenomenon as it impacts interrelated systems globally.

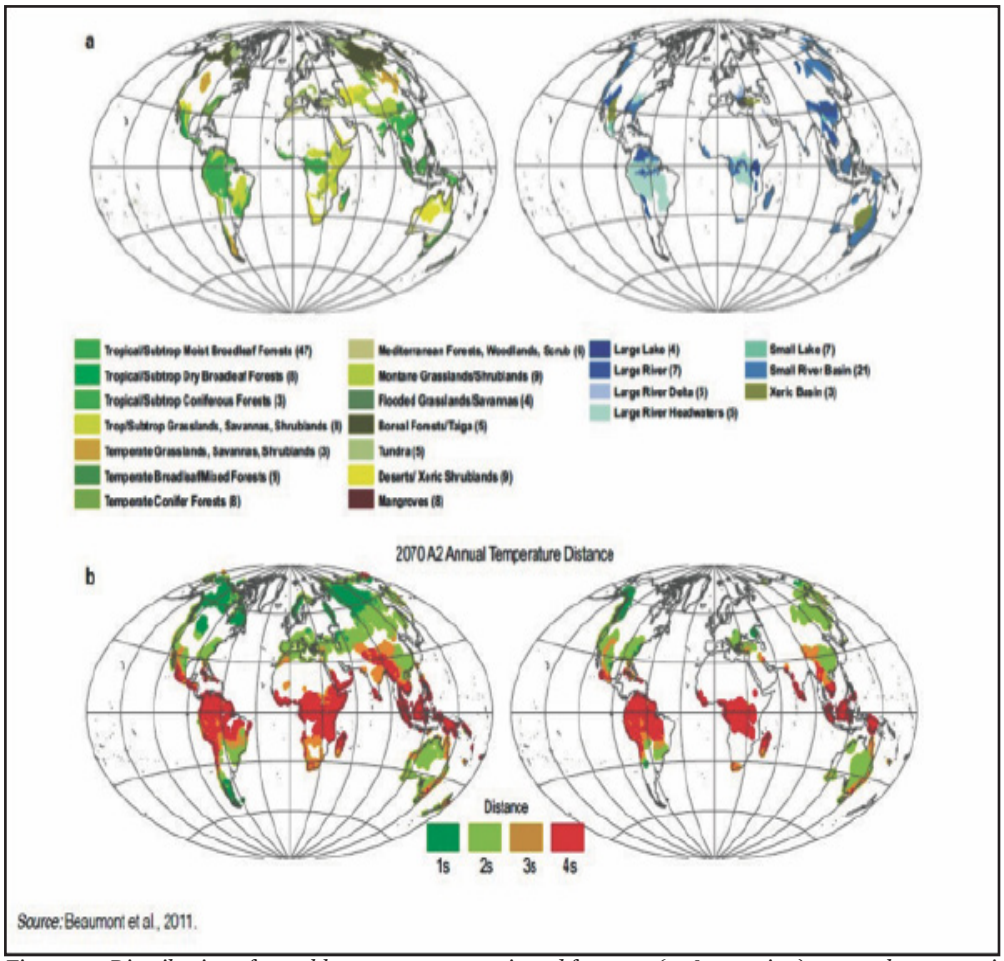


Figure 21: Distribution of monthly temperature projected for 2070 (2.9° warming) across the terrestrial and freshwater components of WWF's Global 200.

Figure 21 spells out projections for each of the ecosystems across the globe based on the best information at the time. A refers to the distribution of 132 terrestrial and 53 freshwater ecosystems, grouped by biomes. B states the average distance (measured in number of standard deviations from the

mean) of 21st century monthly temperatures from that of the baseline period (1961–1990).

The relevance of these projected scenarios is the impact that would be expected on human habitation and food systems. This is the basis for my concerns for human habitation in cities with the need for security of food sources reliant upon overall ecosystems wellbeing, thresholds and resilience capacities. This sets the scene for further arguments in this thesis.

Outcomes

- The planet's future is everybody's business.
- We are living beyond our means at accelerated rates, polluting and hastening catastrophic collapse of civilisation as we know it.
- Longer term view is required for all decision-makers.
- Better science and open communications are fundamental.
- Interdisciplinary sharing needs communities engaging for integrated action.
- 4 degrees of warming spells disasters and tipping points for flora, fauna and disadvantaged people.
- IPCC reports urge action to stabilise the climate system.

Research Summary 2: World Resource Audit

Title: World Resources Audit 2011	
Authority	UNEP & UNDP et al.
Scope	Global
References	UNDP et al., 2011; UNEP, 2011.
Meta- analysis	• Early warnings attempt to improve understanding to change behaviour. • The cost of doing nothing is unacceptable and immoral. • Any investment in the right direction mitigates some adverse impacts. • A comprehensive set of strategies can accelerate improvements towards resilience.

Findings

The comprehensive global audit commissioned by UNEP Early Warning Systems Team, is well respected and timely as long-term decisions are being formed by almost all countries. The 'snap shot' findings are summarised in bullet points so scanning can quickly provide relevant details to form a richer context:

- In November 2011, the world's population was seven billion. More than half live in cities with the number of megacities doubling in two decades. (UNEP, 2011). This represents a lesser proportion of vulnerable disadvantaged people in cities but more in numbers overall. Life expectancy is increasing all over the world, while human development indices are higher. More natural resources are being consumed overall, but food production systems illustrate smarter ways for the future.
- Due to world development, 80% of Greenhouse Gas emissions are sourced from nineteen countries. Fossil Fuel use is still rising but production energy is much more efficient. 60% of carbon emissions are from three uses – energy supply (electricity), industry, and deforestation. Oceans,

forests, and soils are carbon sinks for greenhouse gases. The Montreal Agreement was successful when it banned ozone depleting substances. Although the hole in the ozone layer has stopped growing, it has not recovered. Directed interventions are working.

- 'Carbonisation' of the atmosphere has increased by 9% since 1992. As a result, the ten hottest years on record have all occurred since 1998. Oceans are warming with sea level rise continuing. Oceans are more acidic with adverse impacts on all known marine ecosystems. Since 1992 mountain glaciers have been melting rapidly and sea ice is in steady decline. Change is ubiquitously evident.
- Forests currently cover 30% of the earth's surface, but interventions see deliberate gains in some regions and net losses overall (> size of Argentina with 300 million hectares). Only 10% of forests are under certified sustainable management. Carbons sinks, lifelines to humans, are shrinking.
- Drinking water access has improved but sanitation not as much. The Living Planet Index lost 12% but even more in the tropics with 30%. Every year 52 animal (vertebrates) are listed as heading towards extinction. Protected areas include 13% world's land, 7% of coastal waters and 1.4% of oceans.
- Death and economic damages from natural disasters trend upwards as there is increased exposure to floods and cyclones. However, managing the risks and vulnerability is improving through effective planning and learning lessons internationally.
- Numerous agreements and signatories have been recorded in two decades since 1992. Private sector exponentially adopts and implements environmental management standards in the last decade. Trading in CO2 has a variable record but only accounts for ⅕00 of global GDP. Environmental aid trends are less than half of foreign aid. Environmental

governance and energy receives almost all environmental aid.

- Chemicals and waste reports include significantly less tanker spills and less severity in two decades. Plastics production is still multiplying, despite non-biodegradability.
- Food management has become smarter over the decades, but the future is not secure with water and fertiliser shortages against population demands. Palm oil, soybeans and sugar cane is replacing forest in the humid tropics. Grazing animals are increasing in numbers on degraded grasslands. Fish stocks are depleted and exploited as over 500 million people completely depend on a diminishing wild catch. Tuna is on the edge of extinction. Aquaculture is led by China, but poor environmental management affects food quality (protein). Saudi Arabia uses non-renewable aquifers for agricultural production, but wheat costs US$500/tonne. Food security is high priority.
- Energy use in developed countries is twelve times higher than developing neighbours, however, first world nations have become smarter users per capita since 2002. About 20% of the world cooked with biomass or waste in 2010. Only 13% of global energy supply is renewable (including biomass), with wind and solar at 0.3%.
- Biofuels are taking off, but pose environmental and social problems. 437 nuclear plants (plus 60 in construction) are under review following Japan's nuclear disaster in March, 2011. Canada's oil (tar sands) in Alberta boreal forest is under world scrutiny. Smarter energies strategies are sought.
- Population growth multiplies demand for building with non-renewable materials. Air transport has doubled since 1992, with international tourism almost doubling. The 'global village' has grown exponentially as mobile phones and internet use increase by 29,000% since 1992 (UNEP, 2011).

There are a range of tools for planning and policy making in a changing climate which are categorised as: (1) Integrating into existing tools, like economic analyses and environmental assessments, (2) Analysing risks and vulnerable populations, like customised maps, integrated assessment models, vulnerability assessments, impact models, and economic models, (3) Policy options tools, like decision route maps, predictive tools, scenario planning, multi-criteria analysis (and in my case multiple objective decision support systems – MODSS).

Outcomes

- Early warnings attempt to improve understanding and to change behaviour.
- The cost of doing nothing is unacceptable and immoral.
- Any investment in the right direction mitigates some adverse impacts.
- A comprehensive set of strategies can accelerate improvements towards resilience.

Research Summary 3: World Risk Index

Title: World Risk Report (WRR).	
Authority	United Nations Universities
Scope	Global
References	UNU, 2011; Berman, Quinn, & Paavola, 2012.
Meta- analysis	• WRR is a well-considered approach for assigning priorities for action because of its circumspect understandings of the impacts and recovery capability. • Exposure as an uncontrollable factor can be the most reliable determinant of the index, as human intervention is not required. For example, in Asia or the South Pacific, exposure is clear but the overall results vary in direct correlation to the capacity for human resilience. Australia ranks 119. • Almost all Australian cities are in the coastal zone, and therefore risks multiply. Although there is significant exposure, our capacity for resilience is high and our vulnerability is diminished accordingly.

Findings

The UN University (UNU), Institute for Environment and Human Security (UNUEHS), and the Bündnis Entwicklung Hilft (Alliance Development Works) published the World Risk Report 2011, evaluating the interactions between exposure to natural hazards and climate change, and factors of social vulnerability, including levels of poverty, education, food security, and governance. The capacity of people and institutions to respond effectively to change makes this World Risk Index most balanced in its approach to

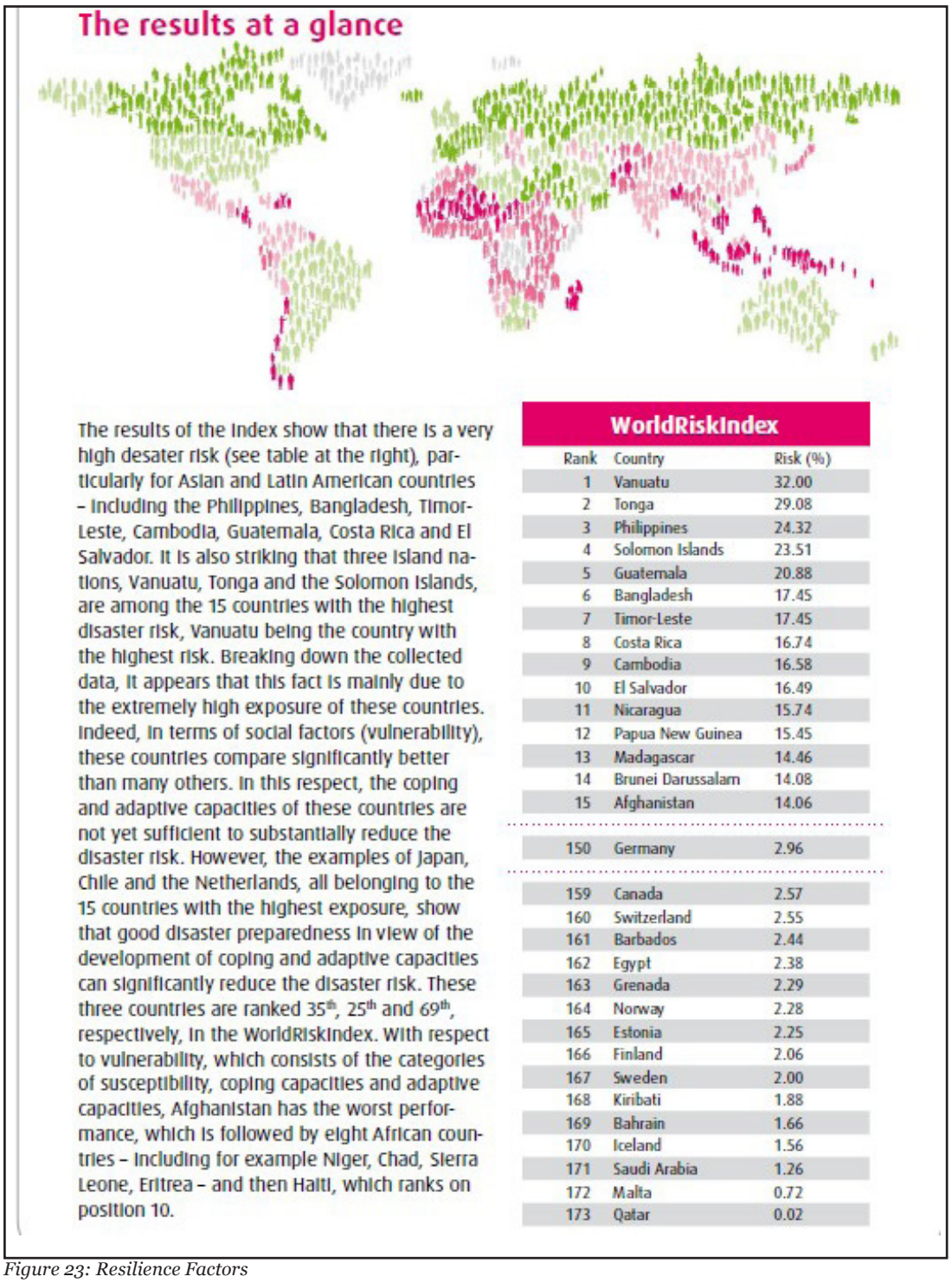
prioritising global action.

Figure 22 summarizes components for global risk assessment. World risk components have colour coding for risk respective ratings, where hot pink shows high risk and bright green shows lowest risk. The natural hazard component is isolated from the societal component.

Figure 22: World Risk Components

By analysing risks, as illustrated in this figure, a more inclusive approach can be entertained for climate change. The index is comprehensive. Australia rates as 119. The index comprises: (1) **exposure** to natural hazards such as earthquakes, storms, floods, droughts, and sea level rise, (2) **susceptibility** with understanding of the quantum vulnerable populations most likely to be harmed as a function of public infrastructure, housing conditions, nutrition, and the general economic framework, (3) **coping capacities with social responsibilities** as a function of governance, disaster preparedness and early warning, medical services, social and economic security, and (4) **adaptive capacities** to future natural events and climate change usually facilitated by local authorities, provincial law and national urban policy (This reflects extent of good governance). When these aspects are calculated, the global picture looks different from simple traditional scientific maps of hazards and population centres. Figure 23 illustrates this vulnerability lens, and a greater appreciation is gained of the impacts and resilience factors for respective countries.

Figure 23 is a more mature view of global vulnerability and resilience.



The results at a glance

The results of the Index show that there is a very high desater risk (see table at the right), particularly for Asian and Latin American countries – including the Philippines, Bangladesh, Timor-Leste, Cambodia, Guatemala, Costa Rica and El Salvador. It is also striking that three island nations, Vanuatu, Tonga and the Solomon Islands, are among the 15 countries with the highest disaster risk, Vanuatu being the country with the highest risk. Breaking down the collected data, it appears that this fact is mainly due to the extremely high exposure of these countries. Indeed, in terms of social factors (vulnerability), these countries compare significantly better than many others. In this respect, the coping and adaptive capacities of these countries are not yet sufficient to substantially reduce the disaster risk. However, the examples of Japan, Chile and the Netherlands, all belonging to the 15 countries with the highest exposure, show that good disaster preparedness in view of the development of coping and adaptive capacities can significantly reduce the disaster risk. These three countries are ranked 35th, 25th and 69th, respectively, in the WorldRiskIndex. With respect to vulnerability, which consists of the categories of susceptibility, coping capacities and adaptive capacities, Afghanistan has the worst performance, which is followed by eight African countries – including for example Niger, Chad, Sierra Leone, Eritrea – and then Haiti, which ranks on position 10.

WorldRiskIndex

Rank	Country	Risk (%)
1	Vanuatu	32.00
2	Tonga	29.08
3	Philippines	24.32
4	Solomon Islands	23.51
5	Guatemala	20.88
6	Bangladesh	17.45
7	Timor-Leste	17.45
8	Costa Rica	16.74
9	Cambodia	16.58
10	El Salvador	16.49
11	Nicaragua	15.74
12	Papua New Guinea	15.45
13	Madagascar	14.46
14	Brunei Darussalam	14.08
15	Afghanistan	14.06
150	Germany	2.96
159	Canada	2.57
160	Switzerland	2.55
161	Barbados	2.44
162	Egypt	2.38
163	Grenada	2.29
164	Norway	2.28
165	Estonia	2.25
166	Finland	2.06
167	Sweden	2.00
168	Kiribati	1.88
169	Bahrain	1.66
170	Iceland	1.56
171	Saudi Arabia	1.26
172	Malta	0.72
173	Qatar	0.02

Figure 23: Resilience Factors

Outcomes:

- WRR is a well-considered approach for assigning priorities for action because of its circumspect understandings of the impacts and recovery capability.
- Exposure as an uncontrollable factor can be most reliable determinant of

the index, as human intervention is not required. For example, in Asia or the South Pacific, exposure is clear but the overall results vary in direct correlation to the capacity for human resilience. Australia ranks 119.

- Almost all Australian cities are in the coastal zone, and therefore risks multiply. Although there is significant exposure, our capacity for resilience is high and our vulnerability is diminished accordingly.

Research Summary 4: Global Cities & Climate Change

Title	Cities and Climate Change
Authority	UN Habitat
Scope	Global
References	UN Habitat, 2011a; UN Habitat, 2011b; Forum, 2012.
Meta-analysis	• People's use of resources causes accelerated climate change. People who live in cities cause greater concentrations of greenhouse gas that exacerbates climate change. City people are most vulnerable in times of crisis. The poorest of these people are the most at risk. • Cities in most vulnerable ecozones are the worst impacted. City managers need to decide on a suite of strategies including retrofitting for safety or migration for its vulnerable peoples. • There is no magic formula, but there are common themes and a set of principles that could apply for ethical and well-considered interventions. • The OECD recognises a range of governance modes for cities to implement climate policy (low carbon futures action).

Findings

I now limit the scope to cities that publicly report their responses to climate change. The most useful work is collaboratively developed through UN Habitat partners in the global observatory, who provide significant data and impact mapping in 40 highest risk cities and 100 other leading cities that voluntarily submit structured reports. This UN report investigates the challenges and the framework but clearly articulates: (1) The Contribution of Urban Areas to Climate Change, (2) The Impacts of Climate Change on Urban Areas, (3) Climate Change Mitigation Responses in Urban Areas, and (4)

Climate Change Adaptation Responses in Urban Areas. In summary, there is no magic formula for cities to combat climate change but there are common themes and a set of principles to guide decisions.

Below, Figure 24 illustrates the size of cities impacted by ranges of severity of climate change across the world. Firstly, risk is determined by many factors and plotted in red for high risk to orange to yellow to white as risks decrease.

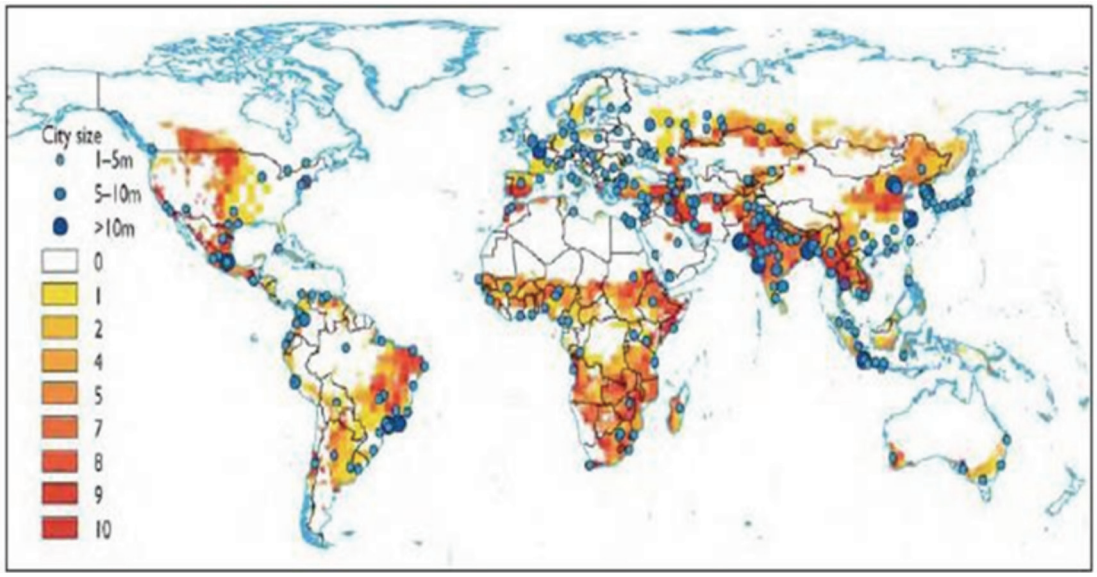


Figure 24: Cities in relation to current climate-related hazards

Secondly, the human impact of corresponding climate change is measured by city size illustrated in variable sized blue dots. These cities are considered 'pressure cooker' cities.

In explanation of Figure 24, the megacities in Asia, India, South America and Mexico indicate the largest groups of people impacted by the high risk of climate change. This indicates that displaced people/climate refugees are to be expected from those cities and those regions. In Australia, Perth is identified as a local major risk.

The UN Habitat report argues that urban dwellers are a major cause of climate change because their consumption patterns show their single-use of energy (fossil fuels), and their pollution is generated at a greater rate than can be sequestered by nature (through oceans and forests).

An important finding of the Report is that the proportion of human-induced

(anthropogenic) greenhouse gas (GHG) emissions resulting from cities could be between 40 and 70 per cent, using production-based figures. This is in comparison with 60 to 70% if a consumption-based method is used with urban residents, irrespective of the geographic location of the production. The main sources of GHG emissions from urban areas are related to the consumption of fossil fuels. They include energy supply for electricity generation (mainly from coal, gas and oil), transportation, energy use in commercial and residential buildings for lighting, cooking, space heating, and cooling, industrial production, and waste.

Some cities manage GHG better than others, despite the differential in measurement periods. In those cases where desirable improvements are made, the lessons learned are valuable for resident, professional, reviewer, financial players, and city governance officials. New York City and Barcelona Mayors are often cited as leaders in their regions, but their lessons about consumption and sequestration matters are considered in concert in city design, planning and management.

It would be inappropriate to take such human-induced climate information at face value alone, as ecozone location is a fundamental determinant to a city's capacity to respond to diverse climate events. The impacts of climate change will be particularly severe in low-elevation and coastal zones, where many of the world's largest cities are located. This is only 2% of the world's total land area, but 13% of the world's urban population lives in these at-risk zones, with Asia having a higher concentration.

Figure 25 shows the percentage of the population living in ecozones across each UN region in 2000, with projections to 2025. Each UN Region is shown with the percentage of urban population then and in the future. The ecozones describe the geographical topography location from coastal to mountain that underpins the risk multiplier for city climate mitigation planning.

Ecozone	Year	Share of urban population (%)						
		Africa	Asia	Europe	North America	Oceania	South America	World
Coastal	2000	62	59	83	85	87	86	65
	2025	73	70	87	89	90	92	74
Low-elevation coastal zone	2000	60	56	80	82	79	82	61
	2025	71	68	85	86	83	90	71
Cultivated	2000	38	42	70	75	67	67	48
	2025	48	55	75	81	72	80	59
Dryland	2000	40	40	66	78	49	61	45
	2025	51	51	70	84	60	75	55
Forested	2000	21	28	53	64	36	53	37
	2025	31	41	59	72	40	68	47
Inland water	2000	51	47	78	84	77	71	55
	2025	62	58	82	88	80	83	64
Mountain	2000	21	27	46	50	11	54	32
	2025	30	40	53	60	13	67	43
Continent average	2000	36	42	69	74	66	66	49
	2025	47	55	75	80	70	78	59

Source: Balk et al, 2009

Figure 25: Urban Populations for ecozones across UN regions

The diversity of locational risks represented in Figure 25 and the increasing trends in population provide new tiles of understanding in the mosaic of global risks for cities. The anthropological and the topographical aspects are fundamental, but there are more factors to consider in determining risk and resilience, as seen in the previous World Risk Report. While local climate-change risks, vulnerabilities and adaptive capacity vary across cities, evidence suggests common themes. Given the broad range of variances, what are these common themes for cities and climate change?

- Climate change impacts may have ripple effects across many sectors of city life.
- Climate change does not impact everyone within a city in the same way: gender, age, race, and wealth have implications for the vulnerability of individuals and groups.
- In terms of urban planning, failure to adjust zoning and building codes and standards with an eye to the future may limit the prospects of infrastructure adaptation, putting lives and assets at risk.
- Climate-change impacts can be long-lasting and can spread worldwide.
- Since there are no magic formulae for tackling the suite of factors, then

a set of principles become a shared starting point. Factors include: anthropogenic causes, resilience of nature to absorb pollution, mitigation of locational climate impacts, capability of the people to take responsive actions, housing and infrastructure capacity to cope with long-term change, resilience of people to see the issues as everybody's responsibility and to seek innovative ways forward, responsive governance systems to aid early intervention, crisis management and recovery, and recognition that climate impacts cross national boundaries.

In summary, several principles are fundamental to climate change policy and practice at the urban level as a result of the work undertaken by UN Habitat:

- No single mitigation or adaptation policy is equally well-suited to all cities.
- It is beneficial to take an opportunity/risk management approach in a sustainable development perspective, considering not only emissions, but also risks that are present in a range of possible climate and socioeconomic futures.
- Policies should emphasize, encourage, and reward 'synergies' and 'co-benefits' (policies can achieve both developmental and climate change response goals).
- Climate-change policies should address both short- and long-term issues and needs.
- Policies should include new approaches that support multi-scale and multi-sector action, rooted in the different expectations of a wide range of partners.

In continuing the better understanding of responsive governance, the OECD reported on local authority models, depicted in Figure 26. In each country all these models can be seen, however, in major cities around the world, each of these models can be demonstrated. So many factors influence the style, including national politics, community education, poverty, and trust.

Self-governing	Governing through enabling	Governing by provision	Governing by regulation
		Energy	
Energy efficiency schemes and use of combined heat and power (CHP) within municipal buildings (*e.g.*, schools) Procurement of energy-efficient appliances Purchasing of green energy Eco-house and renewable energy demonstration projects	Campaigns for energy efficiency Advice on energy efficiency to businesses and citizens Promotion of the use of renewable energy	Clean energy service provision Energy service companies Provision of incentives and grants for energy-efficiency measures	Strategic energy planning to enhance energy conservation Ordinances on the mandatory use of renewable energy Energy efficiency requirements in zoning ordinances
		Transport	
Mobility management for employees Green fleets	Education campaigns Green travel plans Quality partnerships with public transport providers	Provision of public transport Provision of infrastructure for alternative forms of transport Logistics centres for freight transport	Transport planning to limit car use and provide walking and cycling infrastructure Workplace levies and road-user charges
		Waste	
Waste prevention, recycling, and reuse within the local authority Procurement of recycled goods	Campaigns for reducing, reusing and recycling waste Promotion of the use of recycled products	Waste service provision Installations for recycling, composting and "waste to energy" facilities Recycling, composting and reuse schemes	Regulations on methane combustion from landfill sites
		Urban planning and land use	
High energy-efficiency standards and use of CHP in new public buildings Demonstration projects – whether at the residential or neighbourhood level	Guidance for architects and developers on energy efficiency and renewables		Strategic land-use planning to enhance energy efficiency and the utilisation of renewables Planning of sites for renewable installations Strategic land-use planning to enhance public transport

Source: Based on Bulkeley, H. and K. Kern (2006), "Local Government and the Governing of Climate Change in Germany and the UK", *Urban Studies*, Vol. 43, No. 12, p. 2243.

Figure 26: Modes of Climate Governance

Figure 26 cites United Kingdom and Germany across the four low-carbon future policy areas.

In the following section, policies within each local authority can be seen to be enacted in alternative styles, depending on local conditions and idiosyncrasies.

Outcomes:

- People's use of resources causes accelerated climate change. People who live in cities cause greater concentrations of greenhouse gas, which exacerbates climate change. City people are most vulnerable in times of crisis, and the poorest of these people are the most at risk.
- Cities in most vulnerable ecozones are the worst impacted. City managers need to decide on a suite of strategies including retrofitting for safety or migration for its vulnerable peoples.
- There is no magic formula, but there are common themes and a set of principles that could apply for ethical and well-considered interventions.
- The OECD recognises a range of governance modes for cities to implement climate policy (low carbon futures action).

Research Summary 5: Global Benchmarking C40 Cities

Title: C40 Cities: climate leadership group	
Authority	UN Habitat – ARUP – World Mayors Council
Scope	Global cities
References	ARUP, 2011; Davis, 2013a. Various other related publications
Meta-analysis	• This work is the crux of my master classes but does not go far enough. 40 cities with 300 million people is a base line to start. • All cause and effect factors contribute to understanding of climate impacts. • City Mayors already have enough power to make a significant positive difference. • These 4734 strategies are the ways forward to make cities resilient to climate-change by proactive early intervention and crisis recovery planning. • The ingredients are good science with proven techniques, strong leadership, ethical decision-making, interdisciplinary innovation for implementing coordinated multiple outcome initiatives, and community empowerment to take collaborative preparatory action. All it lacks: how to give mayors moral courage.

Findings

Having considered common principles and themes, it is timely to study climate-related actions by cities. In 2010–2011, ARUP developed the C40 report that surveyed and reviewed 40 cities and this is the most valuable piece of work for accelerating understanding of current best practice (ARUP, 2011). Those 40 cities, comprising 297 million residents, monitor 4734

actions to tackle climate change.

Some introductory meta-analyses from these cities include:

- Lower GDP cities outperformed higher GDP counterparts, through specific levers resulting in evident improvements with 71% for implementing projects, 22% for introducing regulation and 7% for financial incentives.
- Governance by Mayors and city officials is well documented and contributes to better understanding of stewardship for Sustainable Development Governance.
- Scope of audit: causes & effects (Transport, Existing Buildings, Waste Management, Water, Energy Supply, Outdoor Lighting, Planning and Urban Land Use, Food and Urban Agriculture, Information and Communication Technology, Finance and Economy, Climate Adaptation). Many lessons arise from this comprehensive work.

Firstly, the powers of mayors were considered across these 40 cities functions and scope of interventions by (1) owning or operating, (2) setting policies and enforcing regulations, (3) controlling budgets and levying charges, and (4) setting a grand vision. On the following page, Figure 27 summarises these findings for 30 cities.

This next section explores pro-active and preventative behaviour for adaption to climate change and mitigation of possible impacts. The following list is a simplified collection of six preventative actions:

1. Stop creating pollution, stop using fossil fuels, and start living smarter with renewables (prevention).
2. Employ innovative urban design and land-use planning (systematic prevention).
3. Educate the community with preparedness plans, capacity building for prevention from harm or minimising risk (mitigation).

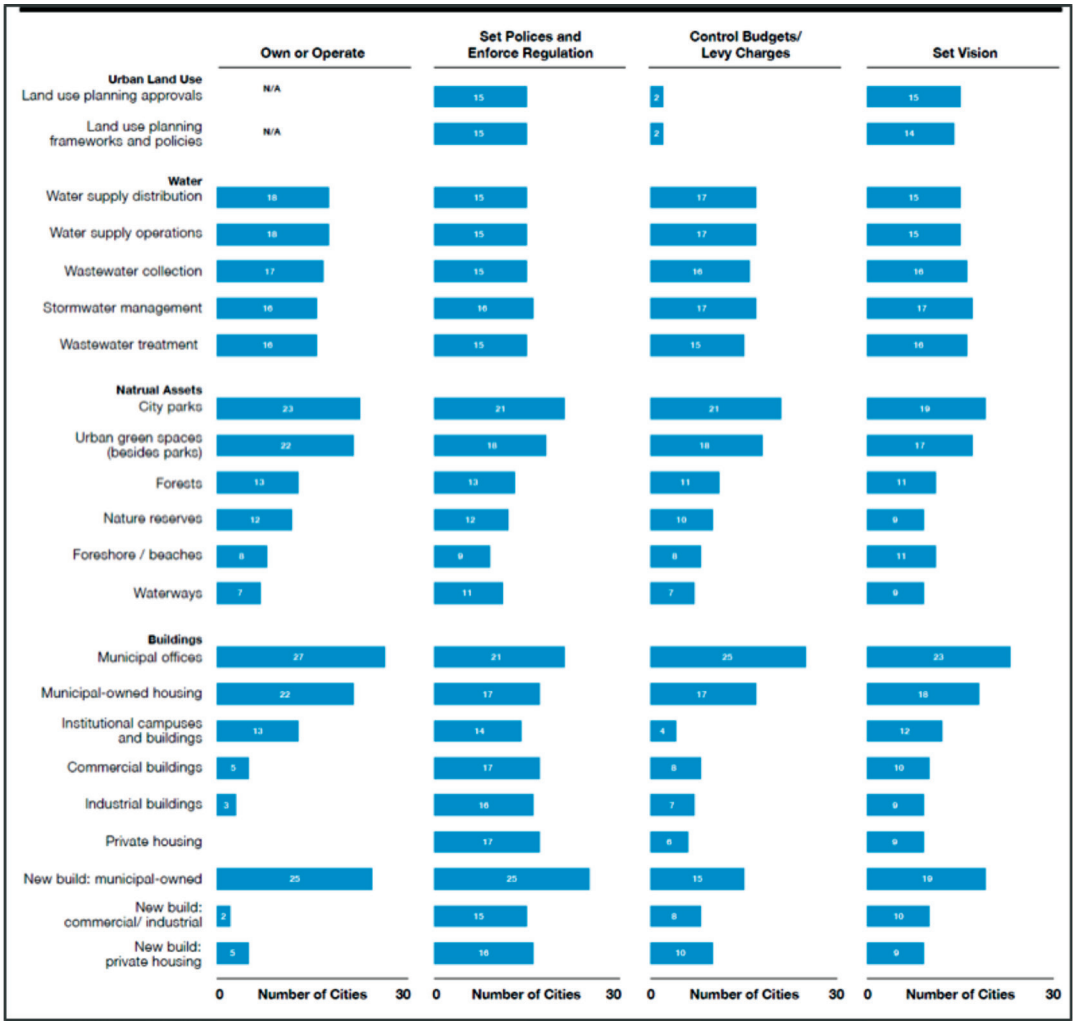


Figure 27: Mayors' Powers for Adaptation

4. Provide protection for vulnerable people and ecosystems (Dodson & Sipe, 2006).
5. Provide alternative illness-prevention measures (short- and long-term) for issues such as heatstroke, fire and ash respiratory problems, flood/ water diseases from soils, bacterial and viral diseases from inundation and unclean water sources, inundation risks with stranded animals (e.g. snakes), mosquito-borne diseases, 'gone troppo', and mental illness from persistent but unusual heat and humidity (systemic mitigation).
6. Have contingency planning for emergencies, evacuations, permanent migration, and community care (preparedness).

Stopping the cause of pollution and climate-change triggers is an important

first step. The Clean Energy Bill, passed in November 2011, has opportunity to impact positively on Australia (Parliamentary Counsel, 2011).

Land-use planning is an early action. Well-informed urban design accommodating for future contingencies is an effective long-term action. The C40 examples consider time frames for such planning from 10 years to 100 years (although Europeans traditionally built to last for centuries). C40 tackle this in 3 ways: (1) Urban Planning, (2) City Greening and Biodiversity, and (3) New Buildings/Precincts/Suburbs (ARUP, 2011). In Australia, with our average population growth above 2.2% whole towns are designed, not just buildings in isolation (Queensland Board for Urban Places, 2010). The themes tend towards compact cities for effective infrastructure and investment, low carbon city functioning, accommodating rural drift, and protecting and enhancing greenspace.

Figure 28 is a meta-analysis of 40 cities participating in climate actions surveys. This chart lists specific action clusters recognised as initiatives (i.e. Transport Oriented Development) that are assessed as transformative or significant or pilot projects.

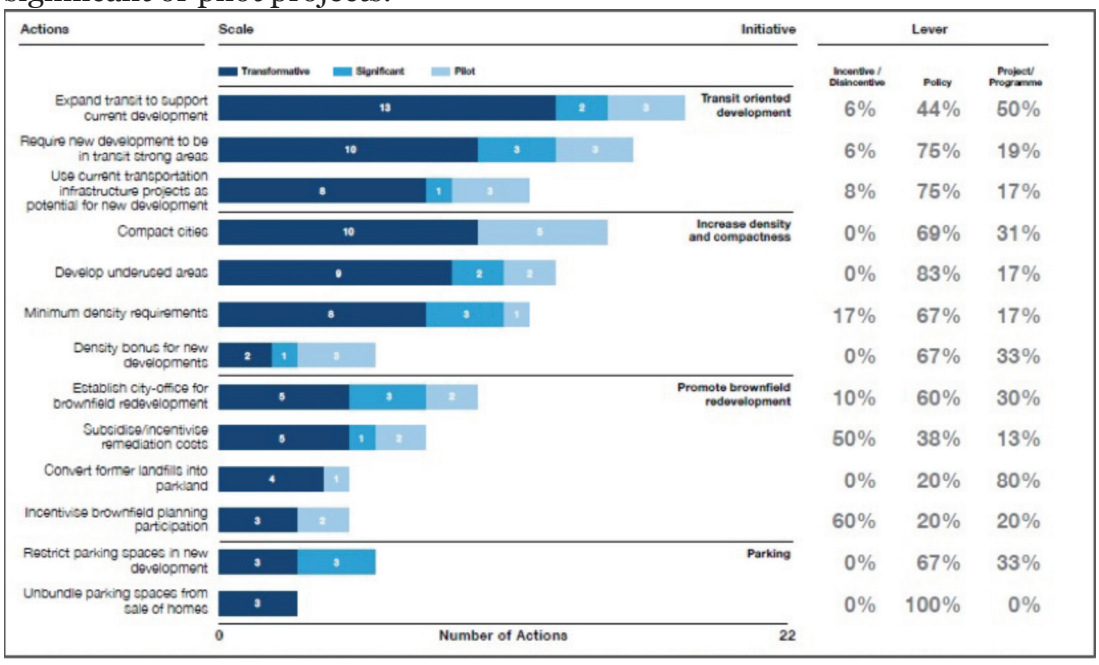


Figure 28: Action, Scales, and Levers: Urban Planning

The scale at which actions have been delivered is recorded on the left of the figure in three categories: whether the initiatives are broadly pilots, significant in scope, or comprehensive/transformative. On the right of the figure is an indication of the type of initiative: whether they are primarily incentives/disincentives, policies, or projects/programs. This overall view provides a framework in which to consider specific proactive climate interventions.

Figure 28 indicates positive incentive (carrots) and policy disincentives (sticks) and formal projects as governance instruments for desired city behaviour. Each of the initiatives dovetails into a suite of desirable behaviours that are (1) Transit-Oriented Development (fewer cars and more public and active transport), (2) increasing city density and compactness (density promotes efficient land use while compactness makes better use of existing infrastructure), (3) promoting brownfield development (re-uses industrial dormant land, quarries, and rubbish dumps within the city for remediated parkland, community space, and other city purposes), and (4) parking reforms that make it unattractive for cars in denser, new city developments.

However, other proactive initiatives include City Greening and Biodiversity in a bid to sequester greenhouse gases closer to the source. The value of greenspace cannot be overstated. It provides capacity to absorb climate stress through:

- Providing a range of ecosystems services for free – otherwise requires significant funding for engineering functions that replicate natural flood mitigation, prevention of landslides, drought and fire mitigation, air purification, water purification, temperature moderation across whole city, pollution mitigation, public access to parklands, waterways, infrastructure, buffer for noise and air pollution, haven for biodiversity

to survive and proliferate, and a psychological reserve that prevents and 'cures' human mental health issues arising in dense cities (Bertrand, 2012)

- Lowering ambient temperature (heat islands in cities arise from no shade trees, multiplying environmental stress and human health problems – heat stroke, illnesses, psychological stress, and 'gone troppo'. Homes with trees can achieve ten degrees lower temperatures in subtropical cities during summer (UDAL: 2008)
- Purifying the air quality through providing 'living lungs' to sequester carbon
- Providing safe haven for diverse ecologies that improve health resilience in ecosystems and humans. This is the best medical investment into short and long-term health as advocated by Doctors for the Environment 2011 (The Centre for Policy Development, 2010)
- Providing open space for recreational activities, thus providing a release from the 'pressure cooker' of dense city living. (The Deputy Premier and Minister for Regional Planning, 2009; The Productivity 2020 Team, 2008)
- In Singapore, mature trees in public spaces announce on plaques their contributions to ecosystem services that Nature provides for free so that the local and tourist communities can appreciate them (Ecosystem service: $22,000 per tree per annum) (Bertrand, 2012; Solgaard et al., 2012).

Figure 29 lists the specific action taken across 40 cities to address increased sequestration closer to the city by preservation of greenspace and biodiversity, protection of open and greenspace from development, and facilitating local food production recorded in the City Greening and Biodiversity.

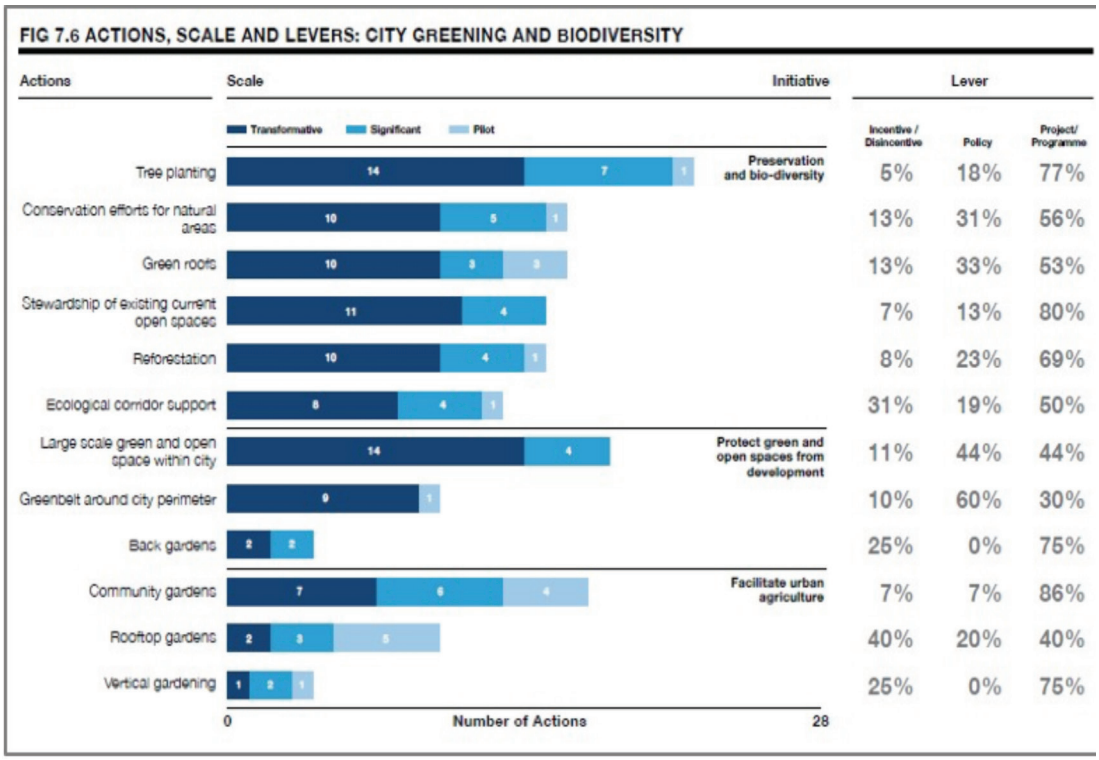


Figure 29: Action Scales and Levers: Increased Sequestration closer to cities by preservation of greenspace and biodiversity

Apart from sequestration as a driver for these sets of actions portrayed in this figure, the introduction of local food production in community gardens, rooftop gardens, and vertical gardens meets several of the sustainable city principles outlined by Peter Newman (Brisbane City Council, 2009; Cleary & Cotter, 2012). The effectiveness of levers is illustrated by the intervention type and the numbers of cities adopting actions.

'Building better cities for tomorrow' needs multiple disciplines, although traditionally it was left to architects (at building scale) and planners (with land-use management parameters). The narrow focus of design that might optimise water- and energy-use:

- May not be economically viable with long life design and materials
- Provide functionality with flexibility so the building can adapt over time to new trends and emerging demands
- Be aged-friendly and accessible
- Be aesthetic and healthy

- Blend with the existing and planned environment/precinct/suburb.

So many factors should influence quality urban design. For example, cyclone standards are imperative n tropical and subtropical zones. The incidence of earthquakes everywhere as a result of earth plates moving (exacerbated by mining and coal seam gas extraction through fracking) means that all future buildings in susceptible areas will need to withstand higher levels on the Richter scale. Building resilience is a major priority in New Zealand this year with its earthquakes and continuous tremors. Migrating permanently from Christchurch may be compared to that of land swaps in Grantham after the floods (Queensland Floods Commission, 2011).

In developed countries, building governance responsibilities could be improved for retrofitting old and designing for resilience in new structures. Historically European buildings were designed to last for centuries, but since 2010, Queensland Public Buildings are designed to last for 30 years (Urban Futures Board, 2010). Proactively, buildings can have lighter ecological footprint with excellent examples of Carlo Rati's approaches to external cladding to generate the building energy-needs with micro wind turbines. Second use of resources is encouraged in Japan where glass, fly-ash, and old rubber tyres are recycled into interior and exterior cladding, walls, floors, roads, and playgrounds.

Efforts to mitigate the impacts of nature at her nastiest are evident in better building standards (Kennedy, 2010). Buildings need to withstand acid sulphate soils, wind and flood damage, as well as drought impact. Current improvements to building standards include increased use of fire retardant, non-toxic materials in foundations, shells, and finishings. (Toxic building materials have adverse secondary impacts on humans and nature long after a fire or flood. In a fire, inhalation of fumes may be fatal or cause lasting respiratory disorders. In floods, poisons leach into waterways and soils.)

Additional actions for improvements to new and retrofitted buildings include:

- Tree planting
- Greenspace provision and expansion
- Green roofs
- Air quality initiatives
- Reducing water leakages
- Low flowing taps
- Promoting urban agriculture
- Adapting buildings for heat stress
- Disease prevention measures
- Community solar projects
- Xeriscapes (low water, landscaping design)
- Shading in public spaces and markets
- Increasing renewable energy mix
- Reflective roofing
- River abstraction protection
- Additional reservoirs and wells
- Cooling systems for critical infrastructure.

All these mechanisms need to be shared with the community in order to prevent fear of climate events and to build a capacity to be ready to prevent nasty impacts, to protect the most vulnerable people and places, to encourage others to take positive action, and to feel connected (White, 2011). Community cohesion 'happens at first fright' (Queensland Floods Commission of Inquiry, 2011).Climate impacts are non-discriminatory. 'Floods do not ask age, gender, religion and sexual persuasion. No one is immune from extreme weather events or impacts of long droughts and heatwaves, so everybody needs to have a plan to cope' (UNISDR Asia and Pacific, 2011). In low GDP countries, rich people live on the safe plains and

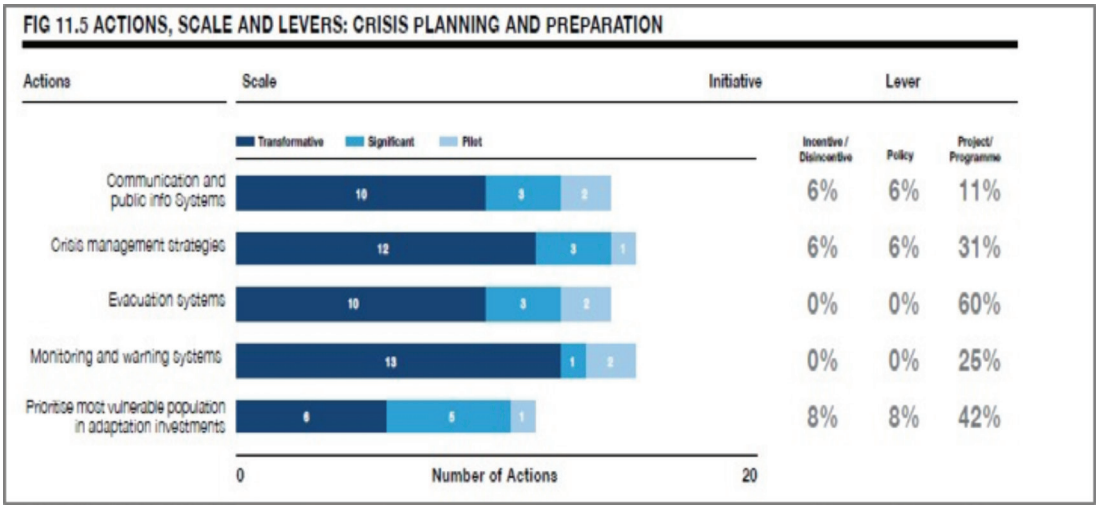


Figure 30:Actions, Scales, and Levers: Crisis Planning and Preparation Initiatives

poor people live on mountain tops that are at high risk of landslide, winds, and bad weather. In high GDP countries, rich people live in risky places and think it is grand (UNCSD, 2011).

Climate change adaptation as defined in C40 report (Figure 30 and Figure 31) focuses on crisis planning and preparation, reducing flood risk, and reducing vulnerability to climate stress. Figure 30 illustrates systems and strategies to prepare effective responses to crises, while Figure 31 lists all actions recorded in reducing the specific risk of flooding, teasing out preparedness and actions to mitigate its impact. The scale at which actions have been delivered is recorded on the left of the figure in three categories: whether the initiatives are broadly pilots, significant in scope, or comprehensive/transformative. On the right of the figure is an indication of the type of initiative: whether they are primarily/broadly pilots, significant in scope, or comprehensive/transformative.

Figure 30 illustrates excellent examples of preparedness. The last action for adaptation investment for vulnerable people is so obvious but not necessarily implemented in many places. This is where the commitment to social equity becomes evident.

Those actions listed in Figure 31 are especially important in the tropical

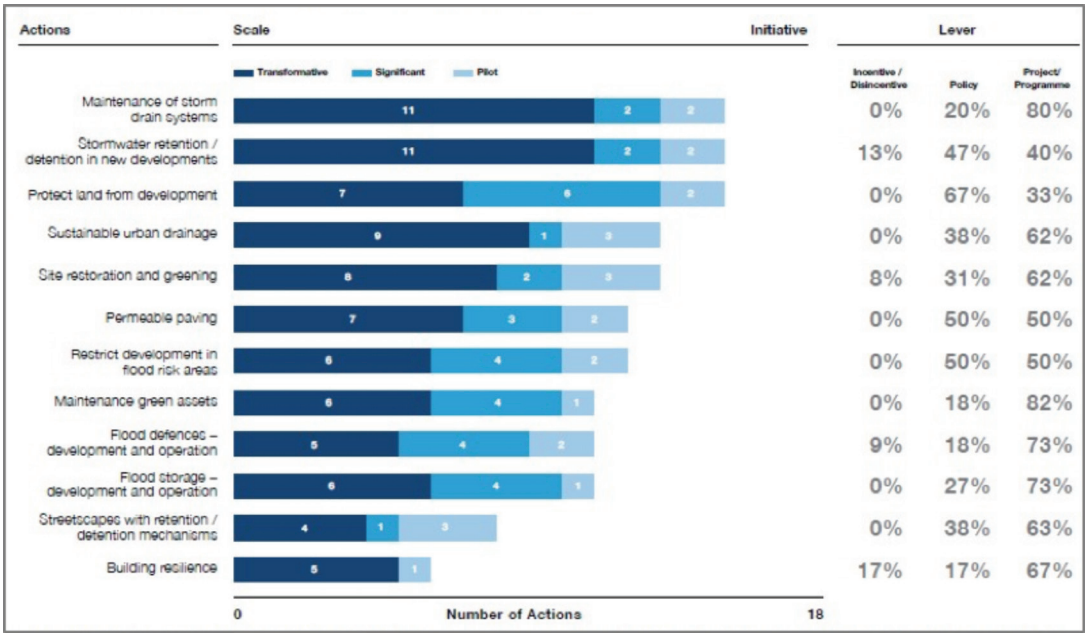


Figure 31: Action, Scales, and Levers: Flood Risk Reduction

regions, where flooding is a major concern. Traditionally there are two monsoon seasons a year where I work in Asia, but climate change has added the impact of more frequent and more devastating extreme climate events resulting from high rain bursts and cyclones outside of the monsoon seasons.

The tables illustrate proactive initiatives. The particular emphasis is on risk of (1) sea level rise which infiltrates drinking water and sanitation infrastructure, and floods homes, public buildings, roads, train tracks, ferry terminals, and airports. Furthermore, salt is infiltrated into agricultural land, making it unsuitable for food production unless intensively managed, (2) tropical cyclones, heavy rainfall events, and flooding with landslides, and (3) drought and fire, heatwave events, and urban heat islands due to poor planning in industrial areas and residential estates.

Outcomes

- All cause and effect factors contribute to understanding management of climate impacts.
- Mayors already have enough power to make a significant positive difference.

- These 4734 strategies are the ways forward to make cities sensitive to climate by proactive, early intervention and crisis recovery planning.
- The ingredients are (1) good science with proven techniques, (2) strong leadership with ethical decision-making, (3) interdisciplinary innovation for multiple coordinated outcome initiatives, and (4) community empowerment to take collaborative preparatory action.

Research Summary 6: Commonwealth Countries

Title	Commonwealth Countries Coping with Climate
Authority	Commonwealth Heads of Government Meeting (CHOGM)
Scope	53 countries
References	Eminent Persons Group, 2011b; Eminent Persons Group CHOGM, 2012. CHEC, CASTLE, CCGHS, CAP & PIA, 2011; Commonwealth Foundation, 2010; Davis, 2012; Gamlen, 2010.
Meta-analysis	• With 2.1 billion people, the Commonwealth is a microcosm of the world where initiatives are tested. • Rich and poor are impacted by climate, especially in cities, and especially young people. • 35 Small Islands States are worst impacted and the long-term viability of some countries is questionable. Ethical considerations are difficult when retrofitting cities or migrating people. • Climate migration for Commonwealth citizens is a challenge that needs to be addressed in an ethical framework in order to honour the values and obligations of the new CHOGM charter.

Findings

The Commonwealth comprises 53 countries (of which 35 are Small Island States), and 2.1 billion people, with half of them living in cities. Furthermore, over half the population is aged less than 25 years, both rich and poor, with enormous variability. Every continent and religion is represented. This is a microcosm of the rest of the world. In the Commonwealth, the glue is the Monarchy (Queen Elizabeth II), six objectives for democracy and common rule of law, an official language, and a new set of fourteen values. Heads of State meet every two years at CHOGM.

Climate has been on the agenda since 2001. The Commonwealth Consultative Committee on Human Settlements (CCGHS) includes Commonwealth Human Ecology Council (CHEC) when arguing cities and climate change. Since 2009, the State of the Commonwealth Cities formal reviews have included Climate. In the meantime, the environmental theme has been active in its representations. 35 Small Island States including countries in Pacific, Caribbean, and Indian Rim are identified as most at risk.

In 2011, urgent reform of CHOGM was needed to make it more relevant. The Eminent Persons Group (only proactive four times since 1947) presented a way forward, recommending a new charter, a Commissioner for Democracy, Rule of Law, Human Rights, and specific recommendations for climate intervention.

During 2011, the Commonwealth Association of Planners continued this reform and reporting, aligning themselves with United Nations Habitat agendas (CAP & PIA, 2011). The following meta-analyses were presented to CHOGM in October, 2011.

- Urbanisation throughout the Commonwealth is growing by 24 million people each year. Currently, 75% of GDP is produced in cities, leaving rural areas poorer.
- Projections show by 2015 there will be no net gain in rural jobs. Without planning, the rural poverty problem will be transferred to the urban environment with economic and social implications.
- Population in the cities of developing countries is expected to double to 4 billion by 2030. In 2000, built-up urban areas in the world consumed some 400,000 square kilometres or 0.3% of the total land area of countries.
- Our cities are growing by 2.2% per annum with city density growing by 3%. Among the concerns in managing this growth is

food security. Globally, every day, we lose two square kilometres of quality food-producing land to competing objectives through development (CAP & PIA, 2011).

- Sea level rise with salt water encroachment upon essential infrastructure impacts 35 Small Island States and low coastal areas of other Commonwealth countries as determined in the 'State of the Commonwealth Cities Report' (Commonwealth Foundation, 2010).

Climate migration is an enormous issue for the Commonwealth, with its agreements for priority humanitarian care. The Ramphal Commission wrote three reports about 'people on the move', which led to seven methods for ethical decision-making for climate migration and legal environmental refugees (Ramphal Commission, 2011; Gamlen, 2010; Lawrence, 2013; Wild Law 2012).

In 2012, I won one of four Commonwealth Foundation Grants to implement CHOGM recommendations. My joint responsibility for 3 years was the South Pacific Region community actions for climate projects with the Board of the Commonwealth Human Ecology Council, Envirobusiness, Sisters for Sustainability and NGO partners (including soroptimists, WILFP, and WAGGS). In the Pacific, New Zealand and Australia lead in education and support systems for twelve of the seventeen countries. Fiji was under military-rule so although the Fijian people of the Commonwealth remain within the fold, the non-democratic government is not allowed as a member state. This is where Non-Government Organisations (NGOs) and the South-Pacific University play such important roles. The South Pacific countries include Australia, New Zealand, Papua New Guinea, Solomon Islands, Nauru, Kiribati, Tuvalu, Samoa, Tonga, Fiji, and Vanuatu. (Australian External territories include Antarctic, Christmas Island, Coco Islands, Coral Sea Territory, Heard Island, Norfolk Island and Territory of Ashmore and Cartier

Islands). These are mostly Small Island States in the tropical zone with small overall populations, who also live in cities with limited economic options.

The environmental and social issues impacting on the South-Pacific are similar to the Indian Ocean Rim States and the Caribbean Islands, so information sharing is valued. Young people live in the towns and cities, but if they go away for education, they may not return. The populations may be shrinking for several reasons, but remaining older people cluster in capital cities and towns when their rural activities are curtailed.

As Commonwealth citizens, climate refugees must never be considered 'illegal immigrants'. In fact, the first response should be humanitarian aid. This is played out in 2013 movie drama 'Elysium'.

Figure 32: Climate Presenters at CPF (CHOGM)

Figure 32 shows Presenters at the CHOGM Commonwealth Peoples Forum's Climate Change workshops in Perth, October 2011 (I am seated front right). The diversity of disciplines and occupations included engineers, scientists, doctors, a mayor (lawyer), social workers, a Queen from Uganda, Ministers

from the UK and Seychelles, a West Australian Environment Minister, nurses, pathologists, military, emergency services, an energy specialist, human rights activists, an international relations person, a transport planner, a town planner, a Red Cross officer, plus others not in this photo.

In summary, the Commonwealth countries are a microcosm of the state of the world. This is why, over the years, the Commonwealth has trialled many interventions that were replicated in the Francophonie (Organisation Internationale de la Francophonie – OIF) and the Hispanophonia (representing 23 Spanish speaking countries comprising 423 million residents). The Commonwealth is always represented at United Nations Summits. The cultural differences of these worldwide organisations are embedded in their common law stances, and attitudes to human rights, and environmental care. All these organisations cross-pollinate their latest learning on climate-change impacts and resolutions.

Outcomes

- The Commonwealth is a microcosm of the world, where early initiatives are tested.
- Rich and poor are impacted by climate, especially in cities and especially the young people.
- 35 Small Islands States are worst impacted and the long-term viability of some countries is questionable. Ethical considerations are difficult for retrofitting cities or when people migrate.
- Climate migration for Commonwealth Citizens is a challenge that needs to be addressed in an ethical framework in order to honour the values and obligations of the new CHOGM charter.

Research Summary 7: South-Pacific Region

Title	Climate Crises in South-Pacific Region
Authority	United Nations Economic and Social Commission for Asia and the Pacific
Scope	Pacific Region
References	UNISDR Asia and Pacific, 2011; ARUP, 2011; Davis, 2013a; White, 2011; IPCC, 2013; Flannery, 2012; Herpen, 2012.
Meta-analysis	• Australia's nearest neighbours are very vulnerable, exposed to risk in the worst ecozone, and with limited systems for coping with disasters and recovery. • The medium/long-term view is pessimistic. • Efforts to retrofit cities may be outweighed by the need to migrate to safety. • Acidification of oceans spells the end of crustaceans, fish stocks, livelihoods and coral atoll island populations. The tipping point was reached in early 2013.

Findings

Effective interventions in a crisis mitigate the impacts on people and assets such as high value infrastructure and ecosystems. Accordingly, there is a hierarchy of policy and practice in regional organisations for UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific), Bureau of Meteorology, and Regional Integrated Multi-Hazard Early Warning System (RIMES). However, the correct action depends on the type of hazard. Even a drought is a disaster – a slow one that does not invite the same rapid attention as an intense cyclone.

Figure 33 locates the nations of the South-Pacific, which are the focus of this project. These areas are often devastated by extreme weather events and are currently experiencing inundation as a result of climate change.

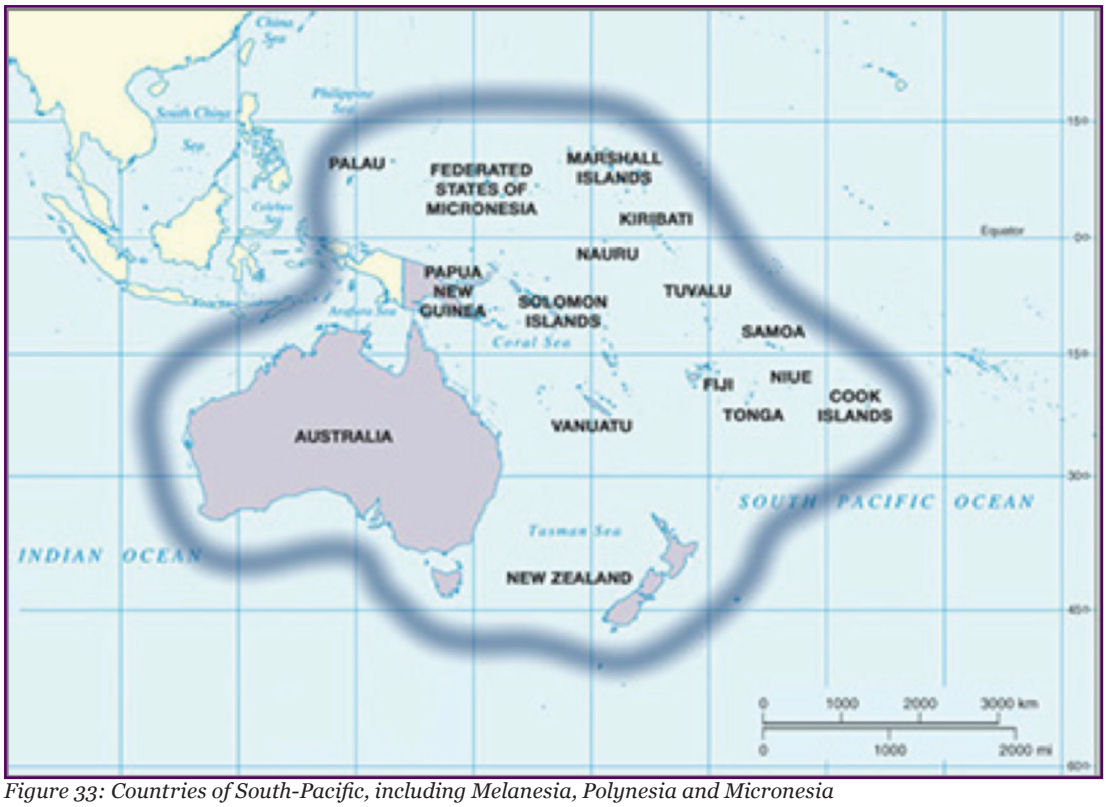


Figure 33: Countries of South-Pacific, including Melanesia, Polynesia and Micronesia

The figure contains the areas of Melanesia, Polynesia, and Micronesia, which are significant labels because the projects that use this terminology fit under the umbrella of United Nations climate funding, which provides for:

- Early warning systems
- Preparing for the worst – planning for 'no return'
- Trusted advice on when and how to evacuate
- Logistics for access to safe havens
- Emergency care (food, water, shelter, sanitation, sleep)
- Medical care for injury and disease prevention in temporary shelters
- Immediate trauma support.

In these areas, emergency management heroes perform their respective roles with military-like precision. Government emergency services and the Red Cross are often on the scene before the worst has struck (Commonwealth Foundation, 2007). International peacekeepers are ready to assist and Peace builders are also involved. Resources are deployed in an effective and efficient manner, as opposed to grant funding for recovery projects afterwards, which

is somewhat slower (Finucane & East West Centre, 2009).

> *The mission of Office for Coordination Humanity Affairs is to: (a) mobilize and coordinate humanitarian action in partnership with national and international actors in order to alleviate human suffering in disasters and emergencies, (b) advocate for the rights of people in need, (c) promote preparedness and prevention, and (d) facilitate sustainable solutions.*
>
> *(UNISDR Asia and Pacific, 2011)*

Figure 34 plots cyclones from 1969 to 2013 in the Pacific Countries (Small Island States), and is a stark visual reminder of the region's vulnerability and the urgent need for effective planning, preparation, and action.

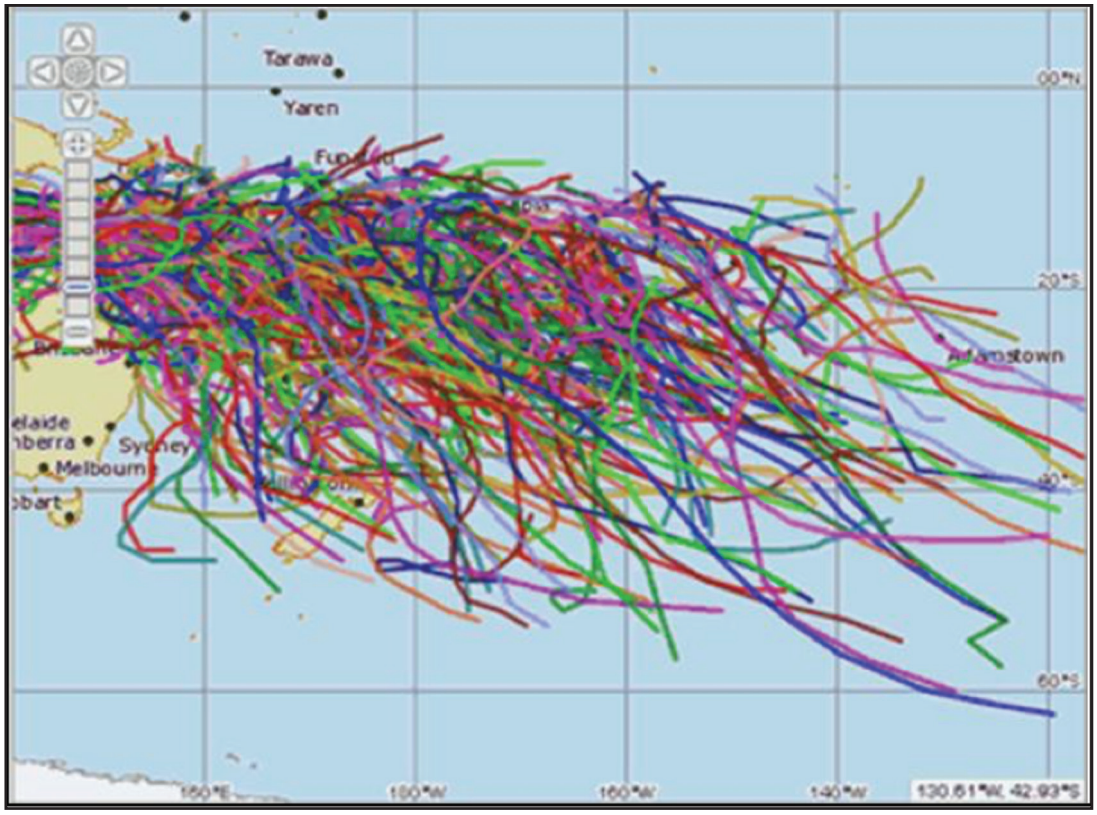


Figure 34: Cyclone Paths shown in different colours

These unprotected ecozones of the tropical South-Pacific experience the highest risk in terms of probability, impact of incidence, extreme multipliers of sea level rise and frequency, and the ready capacity to cope and recover from disaster. Since 2013, deaths have been increasing incrementally, which

indicates that there is comparatively less capacity to respond effectively to increasing risks (Bunari, Davis, Kamauti, & Vakata, 2013).

Apart from these extreme events, there is the slow burn of climate change. The stealthily growing accumulation of greenhouse emissions in the Pacific means the ocean is becoming acidic. Coral reefs are dissolving from alkaline limestone into acidic algae. The IPCC report of September 2013, advise that only 3% of global warming is absorbed by the air, with about 93% absorbed by the sea and the remaining absorbed by soil. The significance of 'hotter' oceans has not been properly understood: currents from the poles are changing their direction causing different weather patterns, and water is becoming acidic from greenhouse gas emissions (IPCC: 2013).

Coral reef change is a headline indicator for climate change. Figure 35, below, shows a coral reef operating in three different scenarios.

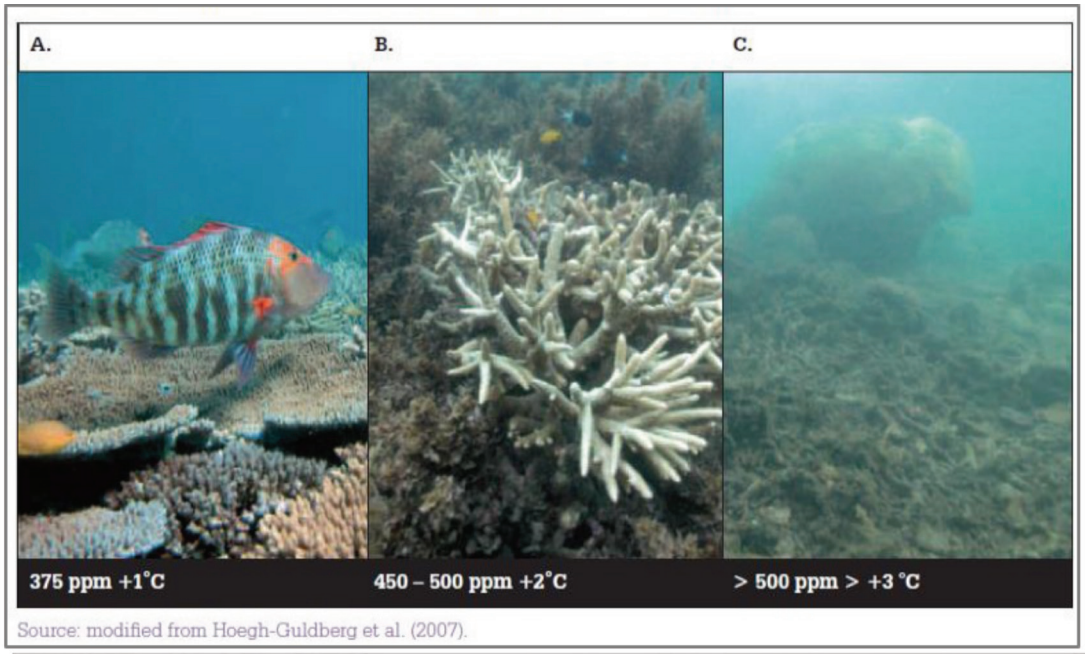


Figure 35: Coral Reef operating in three scenarios

Scenario A in is a healthy alkaline coral reef system with up to 375 parts per million (ppm) of greenhouse gas and with up to one degree Celsius hotter. Scenario B shows impacts of 450–500 (ppm) and two degrees hotter as more GHG causes acid build up in Oceans. Resilience capability is hard to

determine. Scenario C shows the acidic mass of algae that replaces alkaline coral reefs as the ocean becomes 500ppm greenhouse gas with 3 degrees hotter.

In January 2013 the first shell fish to become extinct as a result of acidification was formally recorded. In early 2013 the central Pacific recorded 400ppm for greenhouse gas emissions. This is another tipping point.

In the Pacific, fourteen Commonwealth Countries (Small Island Developing States) suffer varying degrees of climate-change impacts. Engineered sea walls have resulted in currents changing course around the islands, inadvertently causing erosion of coastal communities meant to be protected, inundation of cropping lands, and sea water encroachment of fresh water catchments. Furthermore, there is destruction of fish hatcheries, changing fishing migration routes, and decimation of traditional food supplies. The single-disciplinary fix may seem technically feasible, but the projects may have optimised all factors had they been developed with an interdisciplinary approach (Davis et al., 2013).

Island communities are a microcosm of all communities (cities) so lessons can be rapidly learned by understanding the interconnectedness of human wellbeing, ecological integrity, economic security, essential infrastructure, short-term emergency management, and longer-term 'learning to live with nature' or permanently escaping to safety. 'These are people, not fish!', echoed through an interdisciplinary workshop, where the inhumanity of the situation speared hearts (Butler, 2013). A paper called 'We Can't Walk on Water' was published through the Catholic Climate Coalition to share the concerns of small island states and human rights (Flannery, 2012).

Outcomes

Australia's nearest neighbours are very vulnerable, exposed to risk in the worst ecozone, and have limited systems for coping with disasters and

resilience.

The medium/long-term view is pessimistic. Future scenarios are explicit. Efforts to retrofit cities may be outweighed by the need to migrate to safety. Acidification of the oceans spells the end of crustaceans, fish stocks, livelihoods, and coral atoll island populations. Another tipping point was reached in early 2013.

Research Summary 8: Australia

Title: Climate Forecasts for Australia	
Authority	Climate Commission, Bushfire and Flood Inquiries
Scope	Australia
References	Climate Commission, 2013; White, 2011; Karoly, England, & Steffen, 2013; Flannery, Hueston, & Beale, 2013; Various related publications
Meta- analysis	91.2% of Australia's population live in somewhat vulnerable urban areas. Australia is in high exposure ecozones but has resilience mechanisms for self-sufficiency and recovery from cyclones, floods, droughts, fires. Many inquiries into disasters help guide future actions. Forecasts for extreme events and multiplier effects through sea level rise are explicit. Critical thresholds are articulated and mapped. Australian attitudes towards climate are changing with greater awareness. The economic institutions and the property council are overdue to take proper cognisance of climate risk. Insurance industries are leading reforms and partnering a matrix of policy responsibilities with government. The Rio+20 'Natural Capital Declaration' was voluntarily signed by some Australian Insurance companies (various from UNGA 2011).

Findings

Given the global view of the state of the world and climate risks on cities, the following research concentrates on Australia's vulnerability. Australia is the most urbanised country in the world with 91.2% of its population living in towns and cities where statistics are based on the drinking quality of town water supply as an agreed definition of 'urbanism' (UN Habitat,

2011a). Therefore, I need to have an urban perspective on any climate study but understand the strong relationships between cities and their surrounding region for reliance on food, water supply, clean air ecosystems, complementary industries, and importantly outdoor recreation as a pressure value for people living in dense cities. Vulnerability is studied in a range of ways and the culmination of this work was recognised by the establishment of a Climate Commission.

In July 2011, Australia established the Climate Commission with Chair Tim Flannery and launched 'The critical decade: Climate science, risks and responses', with a wealth of credible input. The key messages are:

> *There is no doubt that the climate is changing. The evidence is overwhelming and clear. The atmosphere is warming, the ocean is warming, ice is being lost from glaciers and ice caps and sea levels are rising. The biological world is changing in response to a warming world. Global surface temperature is rising fast; the last decade was the hottest on record. We are already seeing the social, economic and environmental impacts of a changing climate. With less than 1 degree of warming globally the impacts are already being felt in Australia. In the last 50 years the number of record hot days in Australia has more than doubled. This has increased the risk of heatwaves and associated deaths, as well as extreme bush fire weather in South-Eastern and South-Western Australia. Sea level has risen by 20cm globally since the late 1800s, impacting many coastal communities. Another 20 cm increase by 2050, which is feasible at current projections, would more than double the risk of coastal flooding. The Great Barrier Reef has suffered from nine bleaching events in the past 31 years. This iconic natural ecosystem, and the economy that*

> *depends upon it, face serious risks from climate change. Extreme events (floods and cyclones) are expected more frequently with more intensity.*
>
> *It is beyond reasonable doubt that human activities (the burning of fossil fuels and deforestation) are triggering the changes we are witnessing in the global climate. Natural factors, like changes in the Earth's orbit or solar activity, cannot explain the world-wide warming trend.*
>
> *This is the critical decade. Decisions we make from now to 2020 will determine the severity of climate change our children and grandchildren experience.*
>
> *(Climate Commission Secretariat, 2011)*

This comprehensive report was adopted by the governments of the day and COAG agreements were advanced to address Australia's vulnerable cities in concert with long-term water supplies, capacity for food production, and sustainability of genetically-sound natural assets fundamental to human health. Apart from monitoring, the report provided future scenarios based on well-argued headline performance indicators for resilience. Within this comprehensive work, cities are the focus for my research. Most major cities are in close proximity to the coast, so the ecozone risk is highest. Sea-level rise is the precursor to salt water encroachment and inundation of essential infrastructure for cities. Therefore, measuring sea-level rise is one valid base for defining vulnerability. In Figure 36 major cities in Australia are shown. This illustrates increases of the quantum of sea-level rise in millimetres per year over an eighteen-year period. It is noted that Perth and Darwin are worst impacted, however it is important to take into consideration the impact on all capital cities.

Sea encroachment means less habitable land mass, the devaluation of all low-lying coastal land, the incapacity of essential infrastructure to cope with

Figure 36: Sea- level rise measured in mm/year for major cities in Australia between 1990 and 2009

inundation, and the need to work with nature to ensure future investments are wiser.

However, sea-level rise is only part of the issue with climate change.

It is expected that there will be more frequent and more extremes of climate-related events, so the impacts of these events on top of sea-level rise brings about a multiplier effect. As shown in Figure 37, the climate commission adopted the scenario modelling of the conservative example of half a metre sea-level rise. Australian cities with a higher multiplier are identified by a large pink dot, and lower multipliers by a smaller pink dot.

The conservative foresight considers Australian cities are projected for sea-level rise with worst areas being Perth, Darwin, and Adelaide. But with a multiplier of frequency and intensity of impacts, the worst areas are Sydney,

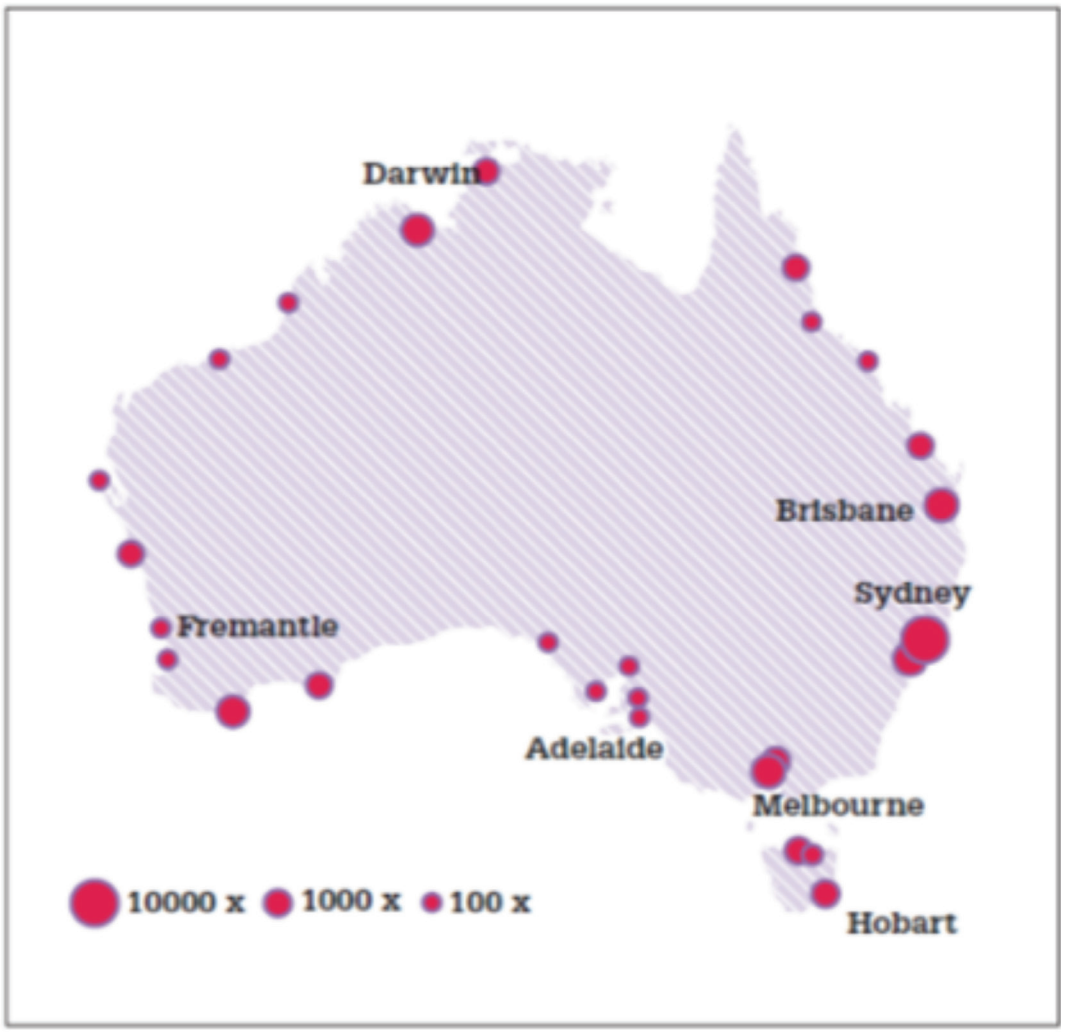


Figure 37: Extreme events frequency multiplier caused by 0.5 metre rise in sea-level (Source: ACE CRC 2008)

Brisbane, and Melbourne.

This means a one in one-hundred-year event becomes a once-a-year event (100x) or once nearly every month (1000 x) by the year 2100. Therefore, a cyclone in Melbourne might be a rare event today, but may become annual within this century. It is acknowledged that cities are economic engine-rooms, and a major cause of anthropological greenhouse emissions, but sustainable cities care about the balance of the economy, social equity, and ecological integrity that allows humans to live within healthy systems. Cities do not generally sequester enough of their greenhouse emissions locally through localised forests and greenspace. Therefore, the brunt of absorption is left to distant forests and oceans, and this is where impacts are borne

inequitably by others in regional proximity. (In other counties, emissions can be generated in one country and absorbed by a neighbouring country. These matters are referred to the International Criminal Court and the Environment Court in the Hague.) Adverse climate impacts disrupt all those balancing components.

There are significant implications for the economy in resilient urban design:(1) government buy-back of high-risk land, (2) government approval for future development, (3) the development industry considering long-term investments, (4) banking industry risk assessments, (5) insurance companies 'black-banning' whole suburbs and low-lying regions. GDP must no longer be the simple measuring instrument for investment, because disasters are economic stimulators that raise the GDP measures, but cost so much in social and environmental health, which is not measured in the GDP. Genuine Progress Indicators are more reliable (UN Habitat, 2011b). This matter was at the core of the Rio+20 Earth Summit in 2012.

What early lead indicators and measuring systems are being used? The Climate Critical Decade report warns of abrupt changes – impacts of tipping points – with thresholds beyond which there is no known resilience. Australia is now 'the worst per capita CO2 parts-per-million-emitter as a result of such unfettered behaviour towards sensitive systems. One headline indicator is marine integrity – as the ocean absorbs greenhouse gas it becomes warmer and more acidic. The marine assets change from alkaline coral to acidic algae, as more emissions are absorbed into the marine ecosystems. The change to the food chain has significant implications to Australia's food self-sufficiency, coastal industries, and the tourism industry.

In November 2011 Australia experienced 348ppm CO2 equivalents in the atmosphere (Ross Garnaut, 2011). Another headline indicator is terrestrial ecosystems change, but that is difficult to determine with accuracy as fauna

adapt instinctively by leaving less aligned landscapes for 'greener pastures' or by escaping floods early. Other changes arise from having urban development encroach upon endemic species' habitats. The true climate impact of Fisheries is difficult to determine because of competing variables such as: (1) overfishing, (2) urban development runoff where soils choke sea grass and fish hatcheries (called eutrophication) and (3) other general pollution impacts (such as endocrine-disrupting chemicals and plastic bags).

Ocean acidification results in coral reefs turning into algae, fish stocks starving, and islander people losing their food, livelihoods, and identities. This is relevant to the Great Barrier, Reef which is a headline indicator for Australia. In September 2013 joint professional bodies convened a mock trial set in 2020 where 'Earth-Centred Law and Governance' had been ratified, so the Great Barrier Reef (as a legal person) was suing the Queensland Government for the demise of the reef because of harmful acts, omissions, and emissions. The process was so controversial, enlightening, and inspiring.

This bundle of research looks at Australia's cities and the monitoring and measuring of key indicators that can guide directed action by our governments. Local authorities are bound by their administrative boundaries, and regional bodies often reflect bio-regional catchments or ecosystems. National governments must appreciate the bigger picture of city residents who enjoy the benefits, and others within natural systems who endure the costs of unbalanced approaches to urban governance (UNESCO et al., 2012).

If Australia wants to be a resilient, better society, it is important for us to recognise and understand risks, vulnerabilities, capacities to respond, and critical thresholds. Australia is exposed to risks, vulnerable due to most of its population living in low-lying coastal zones, but Australians are adept at coping, adapting, and responding to extreme events of bushfire, floods, cyclones, drought, sea level rise and salt water encroachment.

The key questions seem to be: 'Are we learning fast enough to be resilient?' 'Can we reverse trends before we reach critical thresholds?' 'Can we find the balance quickly enough in the governance of our cities?' My entire Doctorate deals with these questions.

In early 2013, *Angry Summer* was published by the Climate Council of Australia, illustrating the 123 weather records that were broken in just 90 days (Climate Commission, 2013). These adverse weather conditions included floods, cyclones, highest tides, bushfires, heatwaves, highest recorded temperatures, and highest number of reports by medical teams of natural disaster impacts on people (since such reporting began). *Angry Summer* affected all Australians, and contributed to a growing appreciation of climate change. This personal attack by Nature has strengthened support for public policy on carbon pricing and emissions trading schemes that penalise pollution-causing industries which raise temperatures and contribute to global climate-change, as well as inducing respiratory disease and other health issues in flora, fauna, and the dominant species – humans.

In 2013 the Climate Institute published a report on Australians' attitudes and concerns about climate change (Stefanova, 2013). The report surveyed public opinion on such things as who should be responsible for action, carbon pricing, preferred energy futures, and political initiatives, as well as more general environmental concerns. Key findings, outlined in Figure 38, show that a third of the population is very concerned about causes and effects of climate-change in Australia. The number of citizens 'not concerned' (or in denial) is minimal. Public attitudes, as seen in Figure 38, should underpin public policy. Likewise, the public's concerns should be reflected in all new public policy and good green governance in Australia.

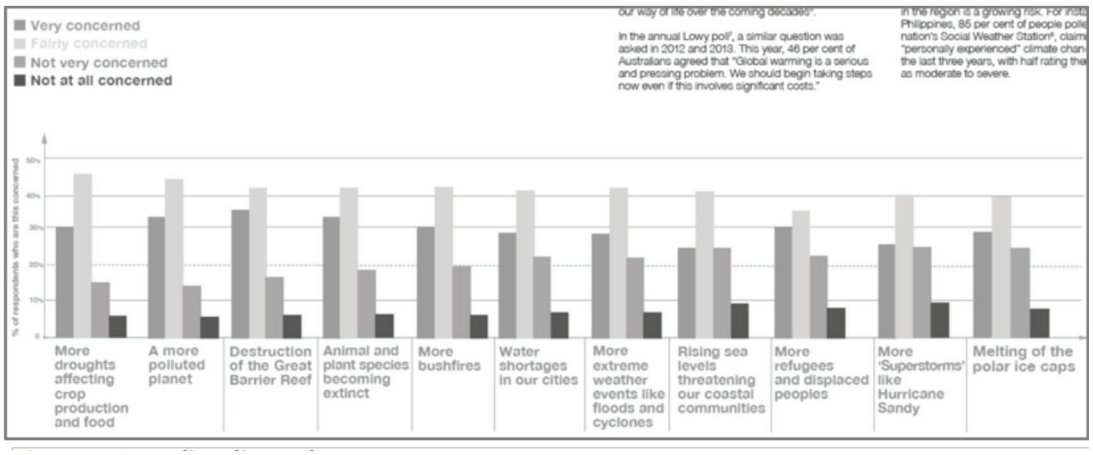


Figure 38: Australian Climate-Change Attitudes

Government Inquiries on floods, cyclones, and fires assist our better understanding and preferred responses, and demonstrate a duty of care and good governance. Insurance industries and governments must work together to provide a safer environment for residents. This relationship would then have impacts on risk assessment in the financial industries, resulting in stricter criteria for development assessment (new building in risky areas) and in approaches for precautionary mortgage and refinancing analysis for families. The financial impact of climate events is widespread and long-term. This is why the Gross Domestic Product (GDP) is an inappropriate tool to use to measure true progress. GDP recognises disasters as an economic stimulus, but in reality it is a financial, social, and environmental tragedy. The Genuine Progress Indicators have been a secondary measure since 2000 in several countries, but are not accepted by traditional decision-makers in Australia yet.

In 2012, at Rio+20, the green economy theme resulted in a Natural Capital Declaration that was voluntarily signed by 37 leading international banks and re-insurance companies. The Declaration proposed changed to criteria for investments in climate risk.

The 2013 book, *Social License to Operate*, by Leeora Black from the Australian Centre for Corporate Social Responsibility, explores 'Management

Frameworks for Complex Times' with particular focus on ISO 26000. This international standard relates to social responsibility, and discusses the unmentionables: (1) pervasive influences on people by the financial and insurance industries, utilities, pharmaceuticals, and Telcos, (2) the impact of mining, oil, and gas exploration and extraction, and construction, and (3) big employers such as mega-retailers and large-scale manufacturers. I now wish to review lessons learned from public inquiries especially how they relate to social responsibilities.

Crisis Inquiry – Victorian Bushfires

The best quality review at this time comes from the Victorian Fires in 2010 where 173 people died and many homes, forests, and farms were lost. Melbourne (Victoria) has seen impacts of water shortages, drought, dust storms, and ash drift (even from Chile's volcano, and the Black Saturday Fires).

Of the 173 people who died on Black Saturday:

- 24% seemed unaware that they were in a bushfire risk area and 38% did not seem to have a basic knowledge of what precautions needed to be taken to give themselves some degree of protection.
- 58% had made no preparations either for staying and defending or for leaving early;
- 32% lost their lives on properties whose 'defend ability' was questionable.
- 69% were classed as 'passively sheltering' inside a house or other building at the time of their death, as opposed to 'actively defending', although some of these people might have retreated inside (having tried to defend) when the fire front arrived.

(Davis, 2011a; White, 2011)

The lesson from 173 people burned in bushfires is in stark contrast to Cyclone Yasi in Queensland in 2011 where no lives were lost although 4 babies were born during the cyclone, leading to a net population increase. People were prepared and lifestyles are designed to expect such Pacific monsoonal weather (Flood) every year. The UN applauded Australia's response as a model for other countries to follow.

Insurance/Banks/Property Industry/Infrastructure/Investment

In determining who has responsibility in these climate event cases, I wish to explore the decision-making matrix, shown in Table 5 that underpins the current Australian way of thinking and acting.

Matrix for Government, Insurance Industry and Personal Risk Management (Flood).			
Situation	**Scope**	**Responsibility**	**Comment**
Critical Foundation Issues	Government mitigating to reduce flood legacy	Government (Don't build community infrastructure in the Q30 or Q100 flood zone).	Gov. funding insufficient to reduce community risk
	Government obligation disclosing risk to vulnerable people	Landowners unaware of their exposure	Low understanding despite policy obligation of government to warn
	Government stopping the risk from growing	Land use planning and management (Local Gov) Development controls	Duty of care for on-the-ground policy into practice
Isolated Focus	Insurance against residual risk	Private flood insurance potentially unaffordable. Useless if fundamental government obligations not honoured	Not climate aware, incremental not predictive, not preventative
Individual Risk	Land-owner precautionary land search prior to purchase	The landowner weighs the risk and the benefits of land usage. Adapting land use may be warranted	Buyers beware! Apply common sense based in research and predictive mapping.

Table 5: Matrix for Government, Insurance Industry, and Personal Risk Management

The Planning Institute of Australia (PIA) championed a review for coping with flooding. In particular, the presentation on 'How government policy and insurance industry (should) work together on mitigating flood risk in Australia' (PIA 2012) was valuable.

The relationship between risk, responsibility, fiduciary duty, obligations of care, and risk mitigation through insurance is a delicate one. A continuum below helps to understand this. This relationship analysis map can be applied to bushfire, cyclone, or slow drought. As the government withdraws from precautionary care, the costs shift to individuals, and as insurance industry premiums become unaffordable all risks and costs shift to the individual.

The Property Council of Australia representing larger developers reported that 160,000 homes in Queensland were vulnerable to climate-change, purely in terms of inundation from sea level rise (Property Council of Australia, 2011). Australia has the intellectual capacity to respond and has much to lose. What are we waiting for? Political will? We had that but only minor advances were evidenced during that short window. Let's not slide too far backward.

Outcomes:

- 91.2% of Australia's population live in vulnerable urban areas. Australia is in high exposure ecozones, but has resilience mechanisms for self-sufficiency and recovery from cyclones, floods, droughts, and fires. Many inquiries into disasters help guide future actions.
- This is the 'critical decade' to stop causes, to mitigate risk and to make sensible development decisions for future hard and soft infrastructure for urban people.
- Forecasts for extreme events and multiplier effects through sea level rise are explicit. Critical thresholds are articulated and mapped.
- Australian attitudes towards climate are changing with greater awareness.
- The economic institutions (and the property council) are overdue in taking proper cognisance of climate risk.
- Insurance industries are leading reforms and partnering a matrix of policy responsibilities with government. The Rio+20 *Natural Capital Declaration* was voluntarily signed by some Australian insurance companies (UNH, 2011).

Research Summary 9: South-East Queensland

Global	UN Habitat Professionals Forum, Earth Charter, UNFCCC, UNEP, UNESCO.
Commonwealth	CHOGM – CPF, CCGHS, State of Commonwealth Cities, Commonwealth Human Ecology Council, Commonwealth Association of Planners.
Australia ANZ	Urban Design Alliance, Design Protocols, BEP, AGIC, Australian Green Development Forum, UDIA enviro-development, ARIES, Sustainable Engineering Australia.
South East Queensland	6 cities: Bio-regional planning, Next Generation Planning, Subtropical design guidelines, climate management plans, ecosystems services mapping, vulnerable people mapping.
Title	South East Queensland (SEQ).
Authority	Queensland Government, SEQ Council of Mayors, Friends of SEQ.
Scope	Six cities within SEQ.
References	NRG4SD, 2002; Planning, 2008.
Meta-analysis	• Despite floods and climate pressures, fewer preferred practices are being implemented. There is little government investment in climate mitigation despite6 cities are covered by a regional plan that provided certainty about development and protected areas, and allows partnerships for regional resources and integrated transport systems. • There is now a general concern about a growing loss of democracy as participatory planning systems are being ignored in recent times. A trend towards short-term economic stimulus has replaced a theme of twelve (land owner taxes) for that purpose. The onus for care

	will rest with residents as long as the state and local government's fiduciary duty of care is not questioned. • Ecosystems Services provided free by nature are disappearing, as rapid development invades and carbon sinks (forests and greenspace commons) diminish. The mapping of ecosystem disruption in SEQ is not adopted by government for fear of finding 'negligence' in decision-making. 'Continuous urban development' in its current form, is exacerbating climate impact for the whole region. The research community acknowledges thresholds and tipping points. • A new approach to planning and design for climate is being developed by interdisciplinary professionals with community input, but it may take some time to embed in local government or enshrine in state legislation, despite motherhood protocols from the federal government. If there is sufficient push from the bottom and the top, then something useful may result in time.

In my field, credibility often comes from 'contributions in your own backyard'. So it important to share lessons from South-East Queensland, to know the research intimately, to speak from physical evidence, to appreciate a community setting, and to have local research validated globally. With the relevance of 'living the pain', professionals can appreciate other settings and be more effective when working with others at risk.

The SEQ region includes cities of Brisbane, Gold Coast, Ipswich, Toowoomba, Redlands, Logan, and Sunshine Coast with rural zones in between. SEQ is

similar in size of the whole to the Netherlands, so an ongoing benchmarking relationship was established. SEQ is benchmarked with other regions through the NRG4SD network (NRG4SD, 2002). SEQ does not have a pure bio-regional boundary, but is a fusion of statutory authority boundaries, catchments, and primary landmarks. However, bio-regional boundaries are changing everywhere across the world as climates shift and ecosystems adapt to increased desertification or flood inundation. So maybe the traditional statutory 'line on a map' is more reliable, especially where institutional responsibilities are required (Planning, 2008).

Regional Governance for six cities in SEQ has morphed. In 1987, the Savage Review introduced a regional approach to governance in Queensland. By 2000, the SEQ region comprised nineteen councils and included Tweed Council (because it just replicated what Gold Coast did anyway), until the Premier of NSW sacked the whole council for corruption and Tweed was placed 'under administration' for several years. SEQ Region of Councils (SEQROC) was effective with continuing professional development of councillors and key staff across the region. In 2002, I organised their first integrated conference with EIANZ called 'Another Million in SEQ', which canvassed eight streams and discussed controversial subjects. A different sort of regionalisation occurred in 2008 as councils amalgamated into ten city and regional councils under a new paradigm of urban management. This decision went against community wishes, because less physical access to fewer elected local representatives meant a backward step in democracy. In addition, the Local Government Act brought in changes so that no councillor could be part of a local community group, and family members' interests had to be declared in chambers. This disclosure was not necessarily required for developer interests (LGAQ: 2008).

In 2014, a de-amalgamation was planned for several councils, because

philosophies of amalgamated councils were conflicting in places like Noosa, Toowoomba, Mareeba, Livingstone, Townsville, and Port Douglas. The amalgamation had caused decision stalemates and major court cases where protected areas and rapid urban development clashed.

In some cases the argument for 'prosperity without growth' was chanted in the streets, while existing residents were called 'elitists' for not allowing new developments by professional mega-developers (Jackson, 2009).

Brisbane and Gold Coast are two of the 'big seventeen' Australian municipalities, according to the Australian Local Government Association. With about 1 million households in Brisbane (making it the largest area rate base in the Southern Hemisphere) and continuous intensive development along the Gold Coast, there is concern for keeping balance in this urban 'pressure cooker'. SEQ has been called the 200 km city akin to the Los Angeles and Miami's urban sprawl (Brisbane Institute: 2003). The difference is the regional approach to addressing resources and transport options, akin to Vancouver, Portland and Seattle as seen in the Cascadia Mayors Agreement Breakfast in Delta, Vancouver, BC, where I spoke in 2006 (WUF: 2006).

New City Planning schemes are underway following state government changes in Queensland impacting on planning laws and regional planning certainty. The statutory policy document, the SEQ Regional Plan that was originally adopted in 2005, was refined in 2009 giving certainty to developers and community alike (The Deputy Premier and Minister for Regional Planning, 2008). The legal battles reduced from 7000 (in 2007) to 707 (in 2012) in the Planning and Environment Court because certainty assisted development assessments while decision-making by subjective council processes was reduced. Investments were clearer. Protected areas were mapped and future development areas were specified. Other international

city regions seek advice on such systems (George [Rock] Pring & Catherine [Kitty] Pring, 2009).

However, in 2013 the new Brisbane draft city plan for consultation provides almost open slather for development with the onus on community to argue against it. Greenspace, otherwise called 'The Commons' and includes beaches, islands, and uninhabitable mountain sides and cliffs, is diminishing from 43% to 17% in 2018. Even school ovals were available to be sold for new development. This contravenes years of careful planning for 'wellbeing', liveable cities, green benchmarking, and climate sensitivity. Brisbane City Hall is not honouring its planning processes or its independent reference panel (2002–2012) recommendations, and is undermining a decade of participatory planning. Loss of democracy is compounded as twelve-hours of community representations with the Lord Mayor is compared with twelve-weeks of developer representation. The situation at the Gold Coast curls one's hair even more, as the new billionaire mayor proclaims he is 'helping council financially by personally buying back parcels of land from the council' for the purpose of intensive social housing in risky, high-climate-impact areas in Southport. I shudder to think about the fiduciary duty for these Mayors and what integrity review might ensue.

Post Script: *Six mayors were prosecuted in 2018, resulting in imprisonment or early resignation during legal proceedings. An Integrity Assessor was established in September 2018.*

What do people want?

People seek assurances for the future that encompass the themes of sustainability:

- Security (income, employment, housing for self and family, freedom from crime: relating to person and property)
- Confidence (education, physical and psychological health, trust,

opportunity, inspiration)

- Balance (healthy lifestyle, work, family, leisure)
- Choice (lifestyle, employment, housing, education, transport, etc)
- Sense of renewal (relationships, spirituality, community, open space, nature, recreation)
- Satisfaction (achievement, happy that they have 'enough')
- Future generations (legacy for as good or better than inherited capital: economic, natural, cultural).

What is Australia expected to deliver?

Apart from compliance with international institutional requirements, our country's sustainability reporting needs to be better coordinated than the issue/compliance-based fragmented approach. Environment Australia developed the Australian Headline Indicators (2001) to measure components of sustainability:

- To enhance individual and community wellbeing and welfare
- To follow a path of economic development that safeguards the welfare of future generations
- To provide equity within and between generations
- To protect biodiversity and maintain essential ecological and processes and life support systems.

These objectives are the preferred suite on which to base the Brisbane City Council strategic indicators. I was an author in this evaluation.

What roles does local government play in influencing these? May include:

- Influencing through community education, policy debate
- Monitoring benchmarking/obligations to report to higher jurisdictions/enforcement
- Stewardship governance of public funds, infrastructure, natural

assets, and social capital

- Coordination through regional action for growth management, and economic development
- Executing through services, implementing local initiatives/ enforcement action
- Regulating through by-laws to enhance quality of life leadership through action towards long-term themes/scenarios.

> *Grass roots government is expected to manage issues from minutia (dog registration) to macro policy (global warming). The challenge is to embrace the leadership role and establish long-term vision when it may be easier to focus on for day to day crises and short-term profits. How a local authority might integrate these roles depends on the leadership skills of councillors and senior officials, and organisational capacity.*
>
> *Methods for Measuring Progress towards Sustainability: Brisbane. (Davis, 2003)*

During the past decade, 200+ scientists, engineers and geographers voluntarily joined together to map the SEQ Ecosystems. The geographical information system project discovered 25 functions, and many ecosystems services provided to residents for free by nature. These multiple benefits could be valued in dollar terms if required. This work has been presented internationally and was awarded professional recognition in Barcelona and New York at different gatherings. Each of those ecosystems professionals uses that joint information for professional decision-making. Ownership is shared voluntarily, making this work even more powerful (SEQ Catchments, 2010). However, the state and local governments are not adopting these ecosystems maps because they are then not obliged to consider the highest risks in development assessment or decision-making. By not adopting they

are not deemed 'negligent in decision making'. This is most disappointing as it consequently perpetuates the need for communities to defend precious, high biodiversity areas against developers (van Leeuwen, Nijkamp, & de Noronha Vaz, 2010).

Populated urban areas scored the highest changes in ecosystems functional during that period, while the green unpopulated mountain ecosystems have been almost unchanged. Major determinants during that period are rapid development exacerbated by climate-change. All the coastal areas have been impacted and all the cities' ecosystems appear to be change functionality (i.e. from moderate to high on the sunshine coast). Although this is based on old data, the value is significant as more up-to-date mapping is integrated.

Well-informed decisions can ensure that highest-valued land, water catchments, forests, reefs, airsheds, marine systems, coastal systems, and flora and fauna can be managed better. At-risk areas can be mapped to assess different scenarios for future investment in essential infrastructure, with preventative interventions, adaption models and mitigation options (McDonald, 2011).

SEQ experienced the worst outcome of the 22-year drought resulting in major behaviour change in water usage in 2006 as dam levels fell below 15% capacity. Incentives shaped community behaviour to gather rainwater, and for governments to seek out 12 alternative water supplies with engineering options for SEQ. Mother Nature then changed cycles and by 2010 the severity of the drought had subsided. In 2011 major record flooding occurred. The damage was so significant to property and persons with the flood impact exacerbated because urban development had proliferated unabated between the 1974 floods and the 2011 floods. Institutions had relaxed the rules for building in flood plains and in vulnerable areas. Insurance companies that previously worried about drought and bushfires of El Niño were generally

unprepared for flooding from La Niña. Repeat performances of those floods were experienced in 2013.

Although I have been actively involved with SEQ community/government/ industry participation including matters of climate-change since 1997, I wish to provide a recent snapshot case study. The Gold Coast is at high risk with its artificial canals, beach groins, and generally low-lying residential development. Climate Risk Modelling was formalised in 1999, then improved flood and sea-level assessments were overlaid on development plans. There is still significant concern, even though the local authority has taken many steps to mitigate worst case scenarios (Davis, 2011a). In 2012 the Queensland Flood Inquiry handed down its final report in time for the next flood event. There was evidence that it did not go far enough (<Flood_newsletter 1_WEB[1].pdf>; Queensland Floods Commission, 2011). In 2013 Gold Coast scenarios were published for community and professional scrutiny with mixed reactions (Sahin & Mohamed, 2012). Spatial Temporal Decision (STD) framework included assessment coastal vulnerability and the adaptation alternatives to sea-level rise. The STD is based upon a combination of: (1) System Dynamics modelling, (2) Geographical Information Systems modelling, and (3) multi-criteria analyses of stakeholders' views using the Analytical Hierarchy Process. Vulnerability assessment over a 100-year simulation period found:

- 6% of the landscape in the study area will be gradually inundated over time, with 0.5 cm rise per year for Scenario One
- 34% for Scenario Two
- 56% for Scenario Three.

Well-armed with research findings, the reality test is to design and plan cities more closely attuned with nature, in order to optimise future expectations for urban populations.

Planning involves putting research into positive action that is culturally and geo-physically appropriate. This includes: urban design, town and regional planning, infrastructure and transport engineering, environmental impact assessment, social impact assessment, historical and indigenous respect, with public participation. Consultation for emerging matters like population growth, regional economic options, peak oil and climate changes, can be a big challenge.

Therefore, effective planning really starts with development visions shared with the community, with options for regular participation, and then sanctioned by community before a bulldozer arrives. However in highest growing cities, natural and cultural heritage can be demolished without notice. Slums erupt overnight without permission, without design, without basic human rights of adequate food, shelter, and security, and without foresight of future disasters. Vulnerable people are often impacted worst by climate change – even worse than animals that have an innate sense of survival and migrate to better land.

Governments tend to work in silos, within disciplines, within one sphere of government. However, the law and funding arrangements are multi-faceted. Some projects are on the drawing board for twenty years and are not adaptive to circumstances of the community (i.e. Energex in 2013). Some regional projects are highly significant but are left to just a handful of independently operating professionals (i.e. Transport and Main Roads in 2013). Some industry development has limited oversight (i.e. Bromelton and Narangba Industrial Estates). Given those institutional circumstances, what good governance can be expected for combatting climate change?

However, this chapter is dedicated to better practice and recognising planning systems that work in adapting to climate. In Queensland, the hierarchy for planning is more simplified since regionalisation of

local councils as one way for sharing principles, but this becomes more complicated as each level of governance imposes its own mosaic of legislation, regulation, policy, rules, and by-laws (Council of Mayors, 2011a). Figure 39 shows the scales of planning to be considered for climate-change management.

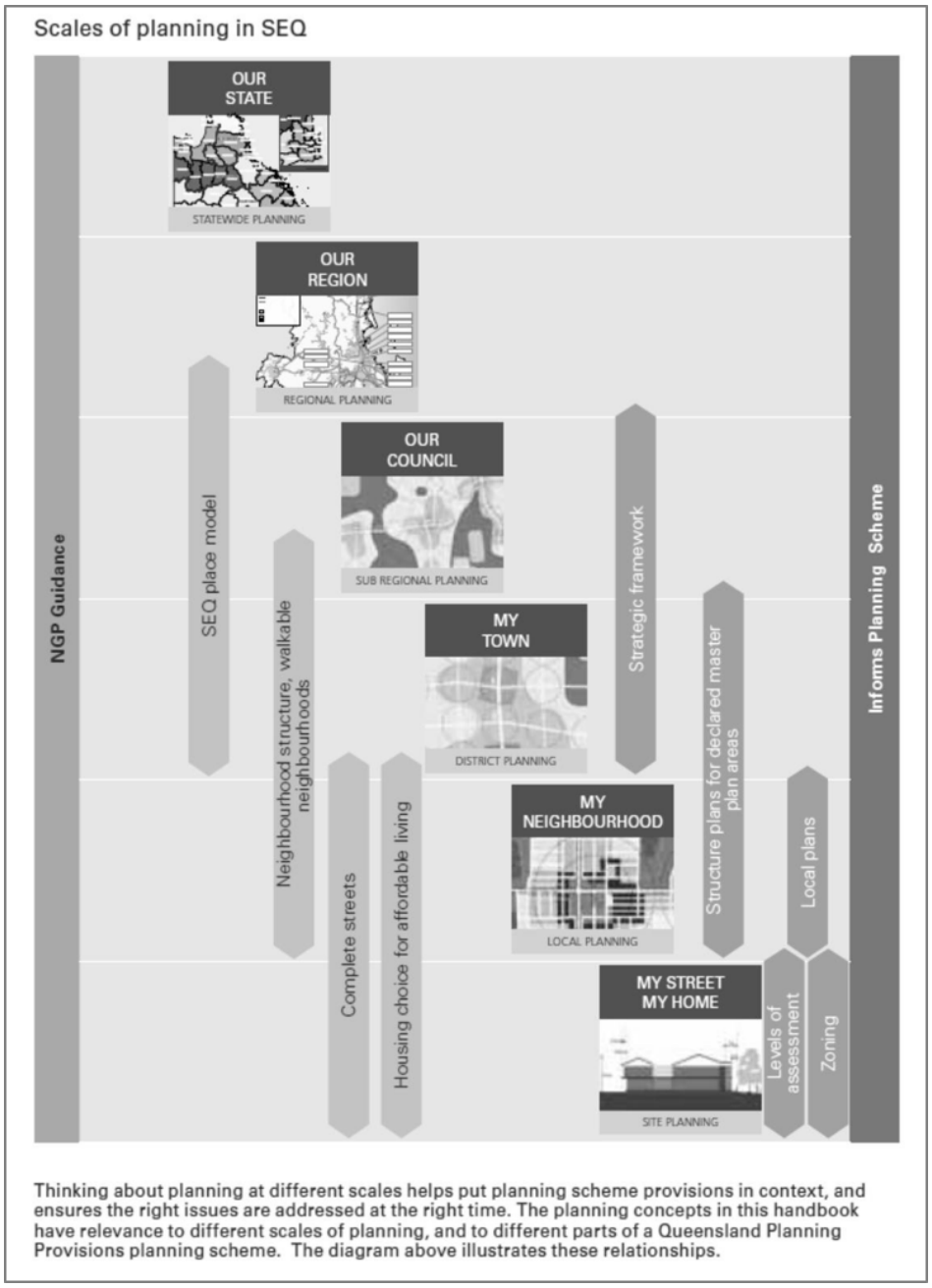


Figure 39: Scales of Planning to be considered for Climate-Change Management

In 2013, after the change in state government, and therefore its relationships with local governments, there were strong pressures to change planning law hierarchy, logic, and ability to be effectively implemented. This resulted in

difficulties for planning and environment courts in deciding the communities' best interests. Backward laws, without sustainability principles, were passed by Parliament without consultation.

Post script: *In 2018 The Planning and Environment Court was directed by the High Court to ensure that community interests take precedence over the words within the Planning Acts in Queensland, so the spirit of the law could be upheld.*

Despite the patchwork of planning regimes, those new processes appear to be retrograde steps, last seen in 1970s (Maher, 2007). In addition to the planning a framework containing rules, the work of the Australian Study of Peak Oil (ASPO) shares ways to design and plan communities that takes into account climate and economic risks associated with rising costs of fuel in Australian Cities. ASPO works closely with Universities, Urban Design Alliance, Australian Institute of Urban Studies, and the Urban Research Program to accelerate continuing professional development on climate and Peak Oil (ASPO).

Figure 40 illustrates ten principles for sustainable cities, describing a city as a network of villages. This models the city on ecosystems and provides people with a sense of place which is fundamental for social cohesion. Such urban design provides flexibility within each village and ecozone

Within each village, there is opportunity to optimise the natural assets, social infrastructure and economic development prospects. In Australia, village level assessment is called 'neighbourhood planning' (Australian New Urbanism Council, 2007). In South-East Queensland, the Next Generation Planning Handbook teases out optimisation of the circumstances to provide options for future sustainable development (Council of Mayors (SEQ), 2011a). However, the SEQ climate is described as Subtropical. A set of subtropical

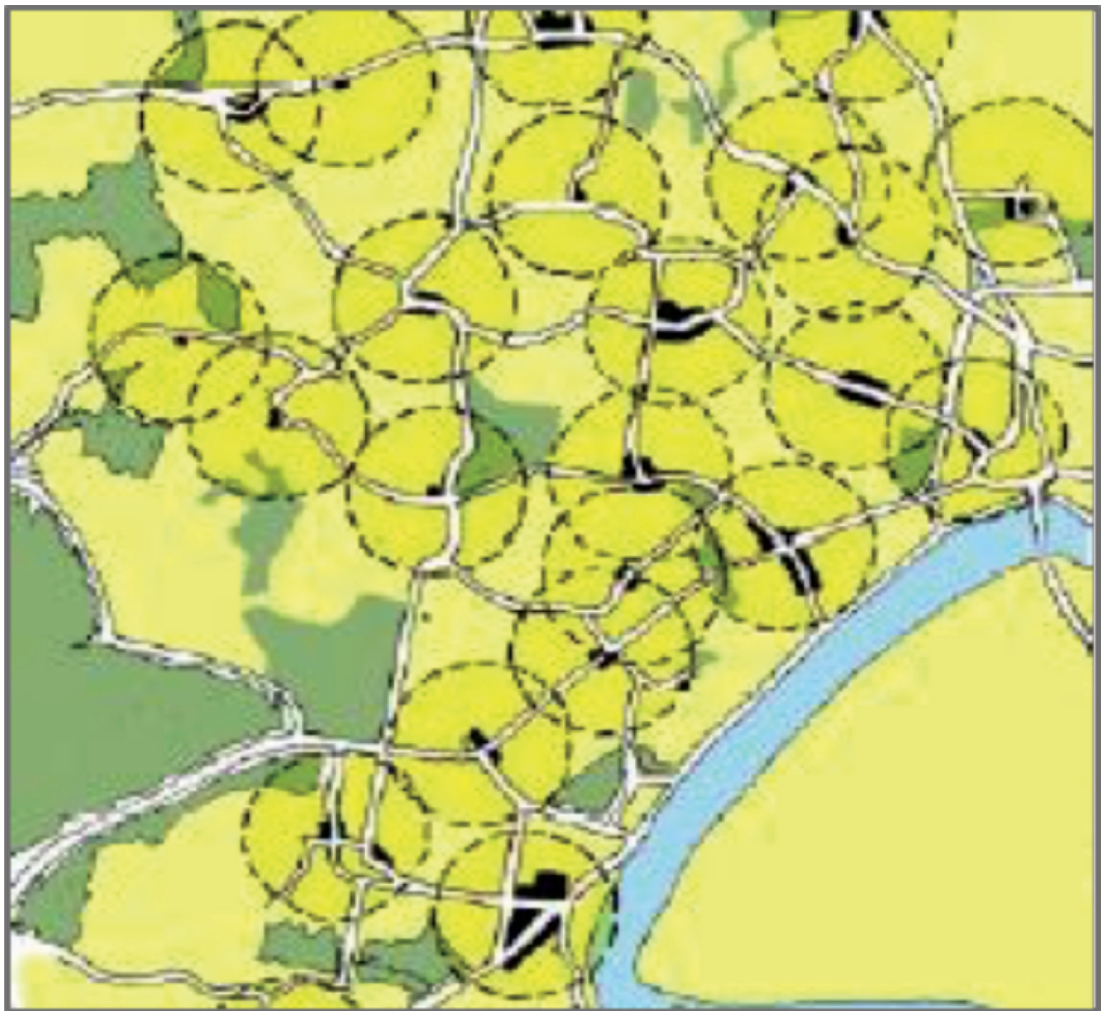


Figure 40: The City as a Network of Villages (Wright, W. 2011, ASPO)

guidelines provide city, township, village, precinct and a variety of house designs that optimise with actual climate, the future household trends and natural features (Kennedy, 2010).

Figure 41 illustrates a concept for a neighbourhood that works with nature, considering passive greenspace and residential development on higher ground within walking distance to shops, schools and parklands. This desirable concept mitigates the climate risk of floods and fire damage to business centres and residences, while considering a healthier lifestyle with less reliance on fuel hungry cars (ASPO: 2013; Wight, 2011).

Re-positioning infrastructure that was originally built in risky areas is costly. So the recommended process is to incrementally replace essential

Figure 41: Sustainable Neighbourhood – Each residence has a walkable distance from business and low-lying parklands (Wright, W. 2011, ASPO)

infrastructure into more appropriate locations with some long-term vision to make those public assets more an icon than an eyesore. In order to trigger plans into appropriate actions, having location-specific inquiry and exploration of future options is vital. My text book goes into greater detail on these topics.

Outcomes:

- Six cities, and many towns and rural zones form the basis for the SEQ Regional Plan(s) to protect areas of significant values.
- Infrastructure does not quite meet requirements for safe communities in cyclones, floods, drought, or bushfire, so what are the fiduciary duties of the governments?
- Nature provides healthy ecosystem services for free but thresholds

and tipping points are close by.

- Poor planning in the past and nonchalance of local, state and federal governments might indicate negligence.
- New systems for urban design and resource planning need to be adopted by communities and governments.

Research Summary 10: Formal Education Systems

Title	General Audit Findings: Formal Sustainability & Climate Education (extracts).
Authority	UNESCO, UNEP, UNFCCC
Scope	International, Australia. Schools, Professional Bodies, Community Education
References	UNESCO, 2007; Jimenez, 2012; UN, 1972; Wild Law; Longworth, 2012; Knowledge Management and Education Branch, 2007; Queensland Government, 2006; Boyd, 2012.
Meta-analysis	• Ancient wisdom guides international conventions (UNESCO) and consequently school curricula, continuing professional development and community education. Mother Earth, Greek Goddess Gaia, Pachamama, Roman Goddess Terra and Otukan principles explain the interconnectedness and delicate balance of humans, earth, and the greater 'Community of Life'. 177 countries recognise the rights of Mother Nature in different legal instruments. Only 17 do not, including Australia and USA. A movement for earth-centred governance is gaining strength. • In Australia, a Framework for the Decade for Sustainability Education 'Caring for the Future' has nine components that shape curricula in primary and junior high schools. The UN Earth Charter influences the values statements. • Despite the Earth Dialogues in 2006 and the ambitious Australian Vision 2020 in 2008, schools have now narrowed focus and reduced funding has restricted directed efforts. However, school teachers can apply those nine components inherently in classrooms.

	• In professional bodies, continuing professional development is variable, with the attention to climate change CPD independently assessed across four Urban Design professional bodies. There are opportunities for improvement throughout, although the last decade's achievements are generally commendable. A professional body is only as good as its relationship with members, debating partners, and industry leaders willing to embrace emerging issues. • The impact of Community Education should not be underestimated; in fact a healthy democracy depends on it.

I considered how to audit the scope of formal education for children and youth by avoiding university studies, selecting specific continuing professional development through professional accrediting bodies, and finally targeting community education. I explored the drivers for formal education, the curriculum guidelines, international influences, and the possible evidence that some fundamentals have been shared. I approached this by introducing international declarations for the Decade for Sustainability Education with the roles of UNESCO and UNEP (UNESCO, 2007). With the focus on cities, I rely on the work of UN Habitat. On climate matters, I review the efforts of United Nations Framework for the Convention for Climate Change (UNFCCC). But declarations only start an imperative to change. Interestingly, the Earth Charter (United Nations, 1972) was endorsed as the third pillar of the UN to provide an ethical framework for decision-making, having been honed from 1972 to 2002 by schools and churches worldwide in many languages. This resulted in hands-on tools like formal educational system values kits, teachers' resources from pre-school to university, practice kits

and assessment systems, and a support network. The Earth Charter espouses four themes and sixteen principles: Themes generally mean (1) respect for community of life, (2) respect for ecological integrity, (3) social justice and economic transparency and (4) peaceful democratic conflict resolution. 16 principles delve deeper. But each country is different in its implementation.

Each nation creates an education system within a conducive environment that is culturally appropriate for the local range of challenges. Norway and Netherlands have significantly different priorities from Australia and Egypt, even though the networks communicate together regularly. Netherlands is a leader because Queen Beatrix is responsible for bringing Maurice Strong (inaugural Executive Director of UNEP) and Mikhail Gorbechev (Green Cross International) together at the Peace Palace in Den Haag (The Hague). This meeting resulted in the Earth Charter being adopted as the ethical framework for conduct. This adoption carried into Parliamentary decision-making.

Ancient Wisdom

Indigenous teachings from Australia, Canada, China, Spain, and South America discuss the inextricable link between human wellbeing and the earth/landscape/oceans with sayings for Mother Earth. Thus 'making decisions that consider seven generations into the future' has a deep healthy symbiosis. Asia relates to Otukan, while the Europe's Roman Goddess Terra (Mater) relates to the earth or land. The following extract explains succinctly:

> *In ancient mythology, Gaia was the great mother of all: the primal Greek Mother Goddess: creator and giver of birth to the Earth and the entire Universe. The Gaia principle proposes that organisms interact with their inorganic surroundings on Earth to form a self-regulating, complex system that contributes to maintaining the conditions for life on the planet. The hypothesis was formulated by the scientist James Lovelock and co-developed*

> *by the microbiologist Lynn Margulis in the 1970s (Guy Lane, 2013). …Gaia says that earth's living systems (the biosphere) behave like a controlling 'super-organism' that tweaks the chemistry of the ocean and the atmosphere to keep conditions suited to its requirements. Gaia is why we are still here, after 3 billion years of life on Earth. Meanwhile, the biosphere is being chopped down, fished-out, poisoned and dug-up by the humans; and this begs the following questions: Where do the humans fit into this Gaia picture and would Gaia be better off without us?*

Only two countries in the world adopted a Constitution that recognises the rights of Mother Earth, (Pachamama) with Ecuador and Bolivia recently enforcing such provisions. In 2012, the first international court decision fined a commercial operation under the constitution for gross crime against Mother Earth.

Ecuador is the first country to recognize Rights of Nature in its Constitution – a great first step for humanity towards a change of paradigm. Ecuador rewrote its Constitution in 2007–2008 and it was ratified by referendum by the people of Ecuador in September 2008. The Ecuadorian Constitution includes a Chapter: Rights for Nature. Rather than treating nature as property under the law, Rights for Nature articles acknowledge that nature in all its life forms has the right to exist, persist, maintain and regenerate its vital cycles. And we – the people – have the legal authority to enforce these rights on behalf of ecosystems. The ecosystem itself can be named as the defendant.

Bolivia: The Law of Mother Earth, now agreed by politicians and grassroots social groups, redefines the country's rich mineral deposits as ‘blessings’ and is expected to lead to radical new conservation and social measures to reduce pollution and control industry. The country ‘…is demanding steep carbon

emission cuts, will establish eleven new rights for nature'. They include: the right to life and to exist, the right to continue vital cycles and processes free from human alteration, the right to pure water and clean air, the right to balance, the right not to be polluted, and the right to not have cellular structure modified or genetically altered. Controversially, it will also enshrine the right of nature to:

> *...not be affected by mega-infrastructure and development projects that affect the balance of ecosystems and the local inhabitant communities. It makes world history. Earth is the mother of all... It establishes a new relationship between man and nature, the harmony of which must be preserved as a guarantee of its regeneration. The law, which is part of a complete restructuring of the Bolivian legal system following a change of constitution in 2009, has been heavily influenced by a resurgent indigenous Andean spiritual world view which places the environment and the earth deity known as the Pachamama at the centre of all life. Humans are considered equal to all other entities.*
>
> *(Vice-President Alvaro García Linera).*

Canada uses a Charter for Environmental Rights to underpin the existence of the Office of the Environmental Commissioner, (Ontario) Ombudsmen and Commissioner for Environment and Sustainable Development (Ottawa). The charter of environmental rights is used in education from preschool to secondary school, to professional decision-making and to legal systems to guide better practices in Canada.

> *As of 2012, 177 of the world's 193 UN member nations recognize this right; either through their constitutions, environmental legislation, court decisions, or ratification of an international agreement. The only remaining holdouts are the U.S., Canada,*

> *Japan, Australia, New Zealand, China, Oman, Afghanistan, Kuwait, Brunei Darussalam, Lebanon, Laos, Myanmar, North Korea, Malaysia, and Cambodia. The rapid spread of this right is remarkable, given that its first formal articulation came just 40 years ago in the Stockholm Declaration that emerged from the first global earth summit. Today, citizens in 108 nations – from Argentina to Zambia – enjoy a constitutionally protected right to a healthy environment. In more than 100 countries, the right is explicitly recognized in environmental legislation. As well, 120 countries – in Europe, Latin America, Asia, and Africa – have signed legally binding human rights treaties that include the right to a healthy environment.*
>
> *(Boyd, D. The Constitutional Right to a Healthy Environment. – lawnow.org).*

This introduction links millennia of ancient, global and indigenous teachings to present day education and I wish to concentrate on the last decade in Australia (Longworth, 2012). Australia adopted 'Caring for our Future' (Knowledge Management and Education Branch, 2007) as a framework to guide a decade of education on sustainability, including climate change. Best practice education for sustainable development incorporates these components:

- Futures Thinking
- The importance of good process (transparency and identifying foreseeable costs and benefits)
- Building capacity for individual and organisational change
- Critical thinking and reflection
- Innovation
- Mentoring and facilitation
- Genuine participation in decision-making

- The formation of partnerships for change
- Lifelong learning.

With this foundation, education was divided into the sectors I wish to investigate: formal children and youth education, continuing professional development through professional bodies, and community education.

Schools

This section links the international framework to the schools in Australia and in particular, in Queensland. The following hierarchy shows the flow from conventions to proposals to policies to practice for the decade of sustainability education.

Global	International Conventions/Déclarations/Charters UNESCO, UNEP, UN Habitat, UNFCCC
Commonwealth	Decade for Sustainability Education 2005–2014
Australia	Caring for our Future, Earth Dialogues
Queensland	Education for Sustainable Futures, Qld State Schools Sustainability Initiative, Queensland Youth Environmental Council, and Teacher's Handbook, School's Earth Smart Evaluation, Principal's Sustainability Leadership Bonus.

With the imperative from UNESCO and the Australian Government, Queensland schools have been guided by Education for Sustainable Futures: Schooling for a Smart State, also called the Macer Report (Queensland Government, 2006). This follows a visit from Mikhail Gorbechev to Queensland, where school students participated in a week-long Earth Dialogue. The visit catapulted efforts for school values, internal reform for formal education, and support for teachers. The Macer report articulated that curriculum, assessment, and reporting in Queensland need to incorporate concepts and principles of education for sustainability including:

- Our natural environment – consists of complex ecosystems which form the basis for our existence on planet earth
- Biodiversity of life on earth – includes cultural, biological, social, and economic forms of diversity and the importance and value of these for the quality of human life we all enjoy
- Interdependence between humans and their environment – we are a part of a system that connects individuals, their cultures and their natural environments
- Resource management of our renewable and finite resources – recognise that we depend on these resources for our current quality of life and that they are critical for the sustainability of human civilisation
- Cultural and creative environments – require protecting as tangible and intangible evidence of human activity, including buildings, traditions, and beliefs
- Values and lifestyle choices – are at the centre of society's pressure on our natural ecosystems, and poor environmental choices may affect the wellbeing and lifestyle of future generations
- Social participation – based on positive attitudes and concerns for the environment is required to motivate people to develop the skills and necessary actions for environmental problem-solving.

Upon reflection, environmental economics also needs to be incorporated into reviews of syllabuses so that they incorporate the real costs of development, the concept of inter-generational equity and the problems arising from traditional discounting of the future, as well as intra-generational inequities that are experienced right now.

Given this mandate, primary school curriculum redesign was evident. There is some support for the first three years of high school but there is a gap in tools for later high school. COAG in 2008, agreed to standardise education

across Australia but it did not intend for a lowest common denominator. So from my perspective on necessary skills for good sustainable city governance, I would expect spatial relationships, critical thinking, and some social studies with ethical considerations for consequences. Upon reflection of the new curriculum, some reforms were introduced in 2011 and some in 2012, where geography is no longer a subject and neither is technical drawing and perspective – only the Arts. Critical thinking is limited to maths and science, which may be too structured for qualitative options evaluations. Social studies may be approached through a History subject but may not elaborate on community living with fundamentals for sustainable communities or neighbourhood planning or 'sense of place'. Ethics may be taught in any subject but may rely on the teachers competence and influence in implementing values.

Unfortunately, all this effort throughout a decade of sustainability education was cut short when the funds and curricula were curtailed early. The federal government's commitment was withdrawn in June 2012, which resulted in no support from federal to state systems, and in Queensland, a new government in April 2012 saw the end of a range of interrelated sustainability initiatives. One great loss was the Queensland Youth Environment Council comprising 22 people aged from 16 to 26 from all regions, shadowing and advising Ministers and Parliament, as excellent role models for school children across Queensland.

In 2012, the new government in Queensland disbanded the Office of Climate and stopped funding community support for sustainability education. The Queensland Sustainable Schools Program ceased (Queensland Government, 2006). I interviewed the former manager, Cam McKenzie, to illustrate what was achieved during that period. An alliance of public, private, and third sector partners is continuing through the Australian Association for

Environmental Educators.

In 2012, I facilitated some sessions for Sustainability Leadership for high school teachers in Brisbane. I am unsure of the impact overall. Artefacts include a PowerPoint presentation and a Teacher's Handbook to systematically address the roles of the school as a sustainability leader. The ideas presented include: (1) Definitions, values, stewardship and progress, (2) School as a learning centre, (3) School as a community link, and (4) School as a responsible business entity. This experience provided me with different perspectives to tackle my other roles.

It is a logical step to link the education of school children with the education of professionals who seek to create sustainable cities. The next section relates to continuing professional development for qualified people working in urban design, planning, transport, housing, water management, economic development, ecosystems services, landscape architecture, social planning, and cultural heritage.

Urban Design and Continuing Professional Development

Given the state of play for formal education, this section concentrates on education of professional people beyond the formal systems of high school and university. It was inappropriate of me to consider university curricula in the scope of this audit because there are so many variables that influence the preparedness of students to become well-honed professionals in climate-change and sustainable cities. Therefore, as continuing professional development through targeted organisations, there is a direct cause and effect relationship between mature professionals and the emergence of new tools to advance sustainable cities. I provide a hierarchy that limits the scope but can trace the impact of education.

The fundamental international declarations, charters and conventions were elaborated in the previous section but I wish to further investigate the policy and tools that are derived from those platforms. In 1999, Australia launched its ANZ National Greenhouse Strategy which provided a framework for a range of professions (I authored chapter 5.14). Considering disciplines involved, it is necessary to limit my scope to Urban Design and Environmental Policy, because of solid debate since early 1990s. The business sector is lagging with international mechanisms introduced late and the green economy finally gaining traction in 2012, although a Green Beans Network was established by Certified Practising Accountants in Australia in 1997 (when I was a co-founder).

In 2006, the **Australian Institute of Landscape Architects (AILA)** responded to a twenty-year drought by providing continuing professional development to addressing climate change. However the benefits rolled over to the general resource management for sustainable development. I was the AILA Executive Officer when Dr Tony Wong was the climate leader, and in 2012 Tony was appointed as CEO of the Cooperative Research Centre

for Water Sensitive Cities, with eight countries and 74 organisations in the alliance. My roles evolved into a stakeholder representative of Friends of South East Queensland, and later Climate-Sensitive-Cities® Partner.

In 2007, the **Australian Institute for Education for Sustainability** published a review of our urban design professional capacity to respond to climate change. This resulted in recommendations, critical skills for education, and core questions of our built environment professions. The results, showing the five questions of four main disciplines with possible responses, are presented in Figure 42.

Professional Discipline	*1. How skilled are our graduates and young practitioners in climate change adaptation?*	*2. How are our members able to gain knowledge and skills in sustainable climate change adaptation?*	*3. How is climate change adaptation being incorporated into professional development courses?*	*4. What are the needs of the profession's teachers?*	*5. How are the Institutes/accrediting bodies able to respond to these needs?*
Planning	Inconsistent level of knowledge and skills	Through an eclectic array of information with variable quality and access.	There are no professional development courses on climate change adaptation for planners.	Teachers qualified in climate change adaptation. More resources. Sharing of expert climate change adaptation practitioners.	Integrate climate change adaptation into all courses. Develop partnerships and resources.
Architecture	Very limited practical skills in climate change adaptation and sustainability.	Through traditional sources such as continuing education, university programs, newsletters, forums, own reading.	Courses on sustainability but not climate change adaptation; tokenistic or superficial coverage, if any at all	Consistency in approach to climate change adaptation education with a practical bent. More resources - time and money.	Review accreditation competencies to include climate change adaptation. More rigorous accreditation process.
Engineering	Generally good, relevant generic skills with sustainability (but not climate change adaptation) systematically addressed in all UG degrees.	Through PDP and CPD programs, conferences, journals, magazines, accreditation, and learning modules developed by EA	Underpinning skills but climate change adaptation not specifically mentioned.	Knowledge of science, practices, policy implications and societal impacts of climate change.	Include climate change adaptation as a contextual factor in any engineering activity, design task or project life cycle management process.
Landscape Architecture	Either somewhat skilled (a half) or unskilled (a third)	Self research, conferences, AILA website, related publications.	Minimal or no inclusion of climate change adaptation in most courses, although some university landscape studios were incorporating climate change adaptation.	Education in climate change adaptation. Access to up-to-date resources, science and innovative case studies.	Focus on accrediting courses and awards on integrating sustainability principles (including climate change adaptation) into the landscape design process.

Figure 42: Urban Professionals provide CPD for Climate Change

I became directly involved in implementing this as executive officer for the Urban Design Alliance (UDAL) in 2008, where research and continuing professional development opportunities were provided to members.

In 2008, **Urban Design Alliance** conducted a session in Brisbane 'retrofitting our cities for climate change', following a nation-wide three-day Enquiry by Design forum (Davis, 2011a). SEQ vulnerable ecosystems and vulnerable people were mapped in order to prioritise our range of actions. A set of recommended approaches to each scenario was tabled and provided to the state and local governments for risk mitigation negotiations. UDAL and Queensland University of Technology then conducted a marathon for 'Reading the River' for the Brisbane River Developments from The University of Queensland to the river mouth, with 77 professionals in Enquiry by Design group sessions. The summary and video links are in the Appendix. It was a good precursor to the actual flood in 2011, but alas no warnings were taken by respective jurisdictions. In fact, many inappropriate developments have replaced previous bad residential decisions and one considers that some developers 'have more dollars than sense'. The question of liability arises, when companies can argue in court that it was negligence on the part of the council to allow such building on risky sites. The town planning has been amended to Q100 (the level of the one-in-one-hundred-year flood). However, the 1974 floods were four decades ago and the town plan still has sensible provisions. One small victory is that insurance companies will not insure a risky building, but that does not help the residents in cases of emergency.

Every year the **Australian Built Environment and Development Professionals** meet federal government to advance the ideals of the peak bodies and key academic institutions. Research is tabled and recommendations negotiated. This sets the agenda for most CPD with relationships with government programs. However, His Excellency Michael

Bryce chaired quarterly sessions with all state government architects and major city architects and now includes the Urban Design Integration Commissioner. This group is also most influential with educational recommendations for formal academic systems and CPD for professional bodies beyond architecture. Climate change has been an excellent topic to focus efforts.

In 2009, **UN Habitat established the Habitat Professionals Forum** as part of the Governing Council, convened every two years and at the World Urban Forum every other year. That allowed focus for efforts internationally and across development disciplines. This has flowed to interesting new relationships within the regions and inside Australia.

The **Australian Green Development Forum's** role is a multidisciplinary advocacy and professional development in green design and net-positive development (Birkeland, 2008). It was established in 2000 bringing new energy every 2 years, commensurate with the prevailing priorities. This forum fills the gaps between other professional bodies and alliances. It is blatant about green cities, sustainable design and responsible decision-making with community consultation. It also bridges the gap between designers and builders: from concept to concrete.

Other organisations where I have not had a designated role include: Australia Sustainable Built Environment Council (ASBEC), Australian Green Infrastructure Council, and a range of green and ecocities conference organisations that have a faithful following, and the Local Government Association, and quasi academic–community project teams that meet over many years.

In summary, there is much scope for more professionalism inside and across professional bodies. In fact their ethical codes of conduct direct leadership. What an opportunity waiting to germinate.

Green Disciplines with Continuing Professional Development

Our Common Future (our Green Bible) by Brundtland, 1987	
Commonwealth	Commonwealth Human Ecology Council, Commonwealth Association of Planners, Commonwealth Association of Surveyors and Land Evaluators, Commonwealth Consultative Group for Human Settlements.
ANZ	Environmental Institute ANZ, Environmental Economics, AGDF, Climate Health Alliance, Engineers for Social Responsibility, Green Beans (Green Accountants), Environment Lawyers (including earth law), Climate Health Alliance, Doctors for the Environment.
SEQ	QELA, Environmental Defenders, Doctors for Sustainability & Justice, UDAL, Climate coalition of universities and practitioners.

Within the strictly environmental disciplines are a range of 'green' skills ranging from economics and law to health and biomimicry in design. The scope is summarised.

Community Education

Internationally, Peoples Forums such as the side events at Rio+20 Summit, CHOGM Commonwealth Peoples Forum, Youth Summits, Climate 'COP's and NGO meetings make big impacts. 'We, the Peoples' statements are presented to decision-makers for endorsement during formal government proceedings. They often concisely articulate what elected officials are not able to canvass through their own processes.

The messages urging action, legislation, policy and funding priorities bring hope and direction to activists and clarity for elected officials. It is often said that governments are not leaders and that they are merely the instrument of

active communities; in fact democracy relies on this. Therefore, the power of the people should never be underestimated, even in countries where populations seem apathetic, disengaged, or oppressed.

In Australia, some outstanding organisations have been active for decades and other new virtual networks are most effective: ARIES (Australian Research Institute for Environment and Sustainability), ACF (Australian Conservation Foundation), QCC (Queensland Conservation Council), The Australia Institute, The Brisbane Institute, Eidos (Think Tank), Australia 21, Transform Australia, BZE Beyond Zero Emissions, GetUp, LinkedIn groups and loose groups sharing common interests and information, Ecosystems Services Network of 200 volunteer scientists, and Social Media Special Interest Groups in general.

Table 6 depicts how trends over time have seen an emergence of maturity from a place of adversity to a common ground for joint efforts to provide for future wellbeing. These trends reveal:

- a decade of conservation awareness (Brundtland, 1987)
- a decade of environmental activism (Elkington, 2001)(3)
- a decade of sustainability principles, practices and rights, (AtKisson, 2010)
- a dawn of common inclusive ethical awareness about respect for self, others, and the earth. (UN, 2012).

This change in mindset based on values becomes the glue that brings together different parties, diverse projects and multiple disciplines both locally and globally.

Decade	**1980s**	**1990**	**2000**	**2010**
Ethos	Conservation awareness	Environmental activism	Sustainability principles	Ethics: respect for self, others, earth.

Table 6: Value trends over time

In scanning different educational systems, there is concern around rhetoric and continuing professional practice. According to the UN Global Compact, there is a gap between 'Saying' and 'Doing' in Sustainability. Annual Global Corporate Sustainability Report for 2013, the world's largest voluntary corporate sustainability initiative, highlights a gulf between companies' sustainability policies and the actions undertaken to achieve them. Benchmarking and reporting suggesting that while companies were making commitments in the areas of human rights, labour, anti-corruption and the environment, many were not actually implementing solutions. Leadership sees sustainability as a key factor for business success and has defined what it looks like through policies and performance targets. The goal now is to move from seeing and saying… to doing. Turning a blind eye to sustainability issues is a ticking time bomb, and hiding missteps (no matter how deep down the supply chain) is no longer an option. This gap between policies and performance exists in almost every area.

Notable disparities between intent and action included:

- 65 % of signatories were committing to sustainability at the CEO level, but only 35 per cent were training managers to integrate sustainability into strategy and operations.
- Seven out of ten companies had an anti-corruption policy in place, but only three in ten had anonymous hotlines to report instances of corruption.
- While 72 % of companies had incorporated human rights into their corporate codes, complaint mechanisms were put in place at only half that rate (37 %).
- 57 % of respondents included sustainability expectations in supplier documents. However, only 18 % of companies took the next step to assist suppliers with setting and reviewing their sustainability goals.

The report showed a focus on employees among those companies that had acted on sustainability issues, but not in terms of financial incentives. Employee training and awareness was the in the top three most frequently reported means of action in all areas, including human rights (44 %), labour (56 %), anti-corruption (42 %), and the environment 62 (%). Staff training and workshops were used by 49 % and employee orientation was considered by 51 %, but only 8 % of respondents linked executive remuneration packages to sustainability performance. Slightly more respondents (11 %) linked sustainability performance to employee compensation. 21 % used sustainability criteria in employee performance assessments. When asked to rank the top global sustainability challenges respondents cited education (63 %), poverty eradication (52 %), climate change (52 %) and growth and employment (49 %). Launched in 2000, the UN Global Compact has over 12 000 signatories from business and key stakeholder groups based in 145 countries. 8 000 of those signatories are companies. The chief executive of each company pledges to embed human rights, labour right, environmental law, and anti-corruption principles into their operations and disclose progress annually. The report noted that the 8 000 Global Compact participants represented 'just a sliver' of the world's estimated 70 000 multinationals and millions of smaller enterprises. Introducing the report, Secretary-General of the United Nations Ban Ki Moon said further involvement with business was the key (ProBono Australia, September 18, 2013).

When considering community education this should definitely focus on the business community, with more concentration of leadership from the executives and decision makers. This leads us to consider transformational leadership among businesses and the steps along a trajectory to achieve action rather than rhetoric.

According to the United Nations Global Compact: CEOs – Architects for a Better World, seven steps to sustainability and success for transformational leadership could include:

1. Realism/context: through scenario planning, business modelling with future opportunities
2. Growth and differentiation through innovation, new markets for sustainability
3. Value performance through sustainability metrics, societal impacts, and employ rewards systems
4. Technology and innovation through circular economy, data analytics, and smart infrastructure
5. Partnership and collaboration through voluntary standards, peer review, and NGO linkage
6. Engagement and dialogue for better understanding emerging needs to design new services
7. Advocacy and leadership to change the game, incentivise positive reform for SDG polices.

These seven steps can be implemented in any organisation – whether local council, NGO, professional body, or national system. So, education is important when considered more broadly than in terms of primary, secondary, and tertiary systems. Continuing professional development soon becomes personal development for those who assume leadership roles. Hence, 'be the change you want to see in the world', to quote Gandhi.

Story of Karawatha Education Centre for all

In 2012, I was appointed as EcoCentre Project Coordinator by Karawatha Forest Protection Society and Brisbane City Council to facilitate design and

construction of a purpose-built educational centre for a 30 to 100-year time frame. It aimed to address Nature Deficit Disorder escalating in children in Brisbane, by embedding '7 senses' experiential learning and latest techniques. There are many acknowledgements for all players concerned.

I designed a community questionnaire. This project allows for long-term design principles for a sustainability school and a community facility to demonstrate and facilitate better understanding of relationships between nature and humankind with greenspace in an urban context. Karawatha is part of the South-East Queensland green belt that provides expensive ecosystems services for free – air pollution purification (carbon sink), water purification, biodiversity sanctuary for rare and endangered species, climate change mitigation, (cooling heat islands from surrounding suburbs), and is declared as a protected greenspace corridor. It is of international, national, and regional significance. My involvement started in 2000. The funding of this project during fiscal asphyxiation of Brisbane and Queensland is a significant statement about its value in the longer term for the voting community.

The first Nature Play area of the EcoCentre (now called the Karawatha Discovery Centre) opened in 2016. Adults, children, and students from all schools and universities take classes, while community groups use the conference rooms, picnic areas, and walking tracks. The 100-year community wish-list has been planned in stages, and in 2018 many of the twenty-year milestones are a reality.

Summary

Formal education about sustainable development and climate

To summarise the above discussion, Table 7 presents a matrix that maps the cohorts and the extent to which climate change, sustainable development, and other economic, social, and environmental topics are explored in the education systems.

State of climate savvy capacity by cohort & by sustainability formalised in education (Davis, 2013).					
Cohorts	Climate	Sustainable development in cities	Economic	Social	Environ-mental
Primary school	√	Curriculum change			
High school	√	Curriculum change			
CPD Urban Design	√	√	√	√	√
Community Ed	√	√	√	√	√
Sustainability Commissioners	Some	√	√	√	√
Targeted NGOs	Some	√	√	√	√
Professional bodies	Some	√	√	√	√
Cooperative Research Centres	√	Some	√	√	√
Industry Bodies	Some	Some			
Courts P&E ICE	√	√	√	√	√
In 2013 the change of federal government meant discontinuing climate program initiatives, The economic rationalists outweighed social and environmental priorities. **Postscript:** In 2016, science and climate were reintroduced to the curriculum slowly.					

Table 7: Changes in COAG education agreement

Each of these organisations is anchored by 'Our Common Future' (Brundtland, 1985) and UN mandates. But the glue that really binds us together is a set of sustainability values. Those values shape an attitude shift

from a ‘world consumer’ to a ‘global citizen’. The specific values that underpin this transformation include a shift from ‘me’ to ‘we’, from more to enough, from short- to long-term, from greed to need, from quantity to quality, from materialism to holism, and from rights to responsibilities.

These values are quoted by ancient scripts like wealth of nations, cannibals with forks, constitutions, policies, corporate strategies, UN Global Compact, and Decade for Sustainability Education (Smith, 1776; Elkington, 1999; UNESCO, 2007).

The future of education might lie in the ‘intelligence of the heart’ (Martin, 2014) where ethics with compassion has the power to elevate to a higher thinking capacity and accelerate positive change in different interconnected ways.

Outcomes:

- Ancient wisdom shapes culture, law, and education.
- The decade for sustainability education translated into nine components for Queensland schools with Earth Charter value statements. Implementation is now waning.
- Professionals showed leadership, but there is room for improvement now.
- The impact of dedicated community education should not be underestimated, in fact, a healthy democracy depends on it.

Research Summary 11: Interdisciplinarity and Innovation

Title: Interdisciplinarity and Innovation	
Authority	World Health Organisation, UNECSO, UN various
Scope	International, Australia
References	Lawrence, 2013; McHarg, 1967; Transform, 2010; Major Cities Unit, 2011a; Davis, 2012c; Schülke & Bauer, 1981; Morey, Milford, Madeira, & Stori, 2011; Shankar & Brown, 2012; Gladwell, 2008; Galtung, 2001; Bradford-Moody, 2010; Churchman, 1967; Slaughter, 2010; Horton, 2012; Rose & Nicholl, 1998; AtKisson, 2010; Berman et al., 2012.
Meta-analysis	• Interdisciplinarity is a way of inclusive thinking, rather than having a project result from a group of multiple disciplines, or cross-disciplinary language, or a transdisciplinary personal academic journey. • Techniques for interdisciplinary actions are evidenced in health care, science, resource sharing, and town planning. French, German, and Japanese literature has been translated for human ecology debate and complex peace negotiations. • Cross-cultural respect is the basis for building trust when working together for a common purpose. 'Light bulb moments' are different for different cultures with Teutonic, Nipponic, Gallic, and Saxonic having different trigger points. Negotiations resembling peacemaking techniques may be required to achieve a joint resolution within a time frame. Kulhman suggests 'dance steps for innovation policy'. Diverse thinkers provide rich understanding when sharing 'cause and effect' for problem definition and possible solutions. Mediation

	skills may be required for agreeing elegant solutions. • Wicked problems need rapid acquisition of knowledge and well-considered responses. Accelerated Learning is applied in music and warfare to convert amateurs into experts. Accelerated Learning techniques are developed from many sources. Gladwell suggests 10,000 hours of study to become an expert. The Sixth Wave of Innovation explores clean technology, institutional reforms and market matrices. Collaborative Creative Communities arise in response to crises. • Sustainable Futures formulae include good science, smart technology, foresight and moral courage. • Wicked problems need to be met with scientific understandings, rich interdisciplinary debate, design thinking, sixth wave innovation, and moral courage.

Findings

Interdisciplinarity is variously defined as 'methodology, concept, process, way of thinking, philosophy, and a reflexive ideology'. It is a means of solving problems and answering questions that cannot be achieved with single-minded methods. It remains an important attempt to define and establish common ground (Thompson-Klien, 1990).

Figure 43 shows problems being workshopped against a series of techniques, so that there is an understanding of which techniques achieve specific outcomes transparently for the purposes of well-documented methodologies. Solving problems in these ways provides a systematic approach that can be replicated.

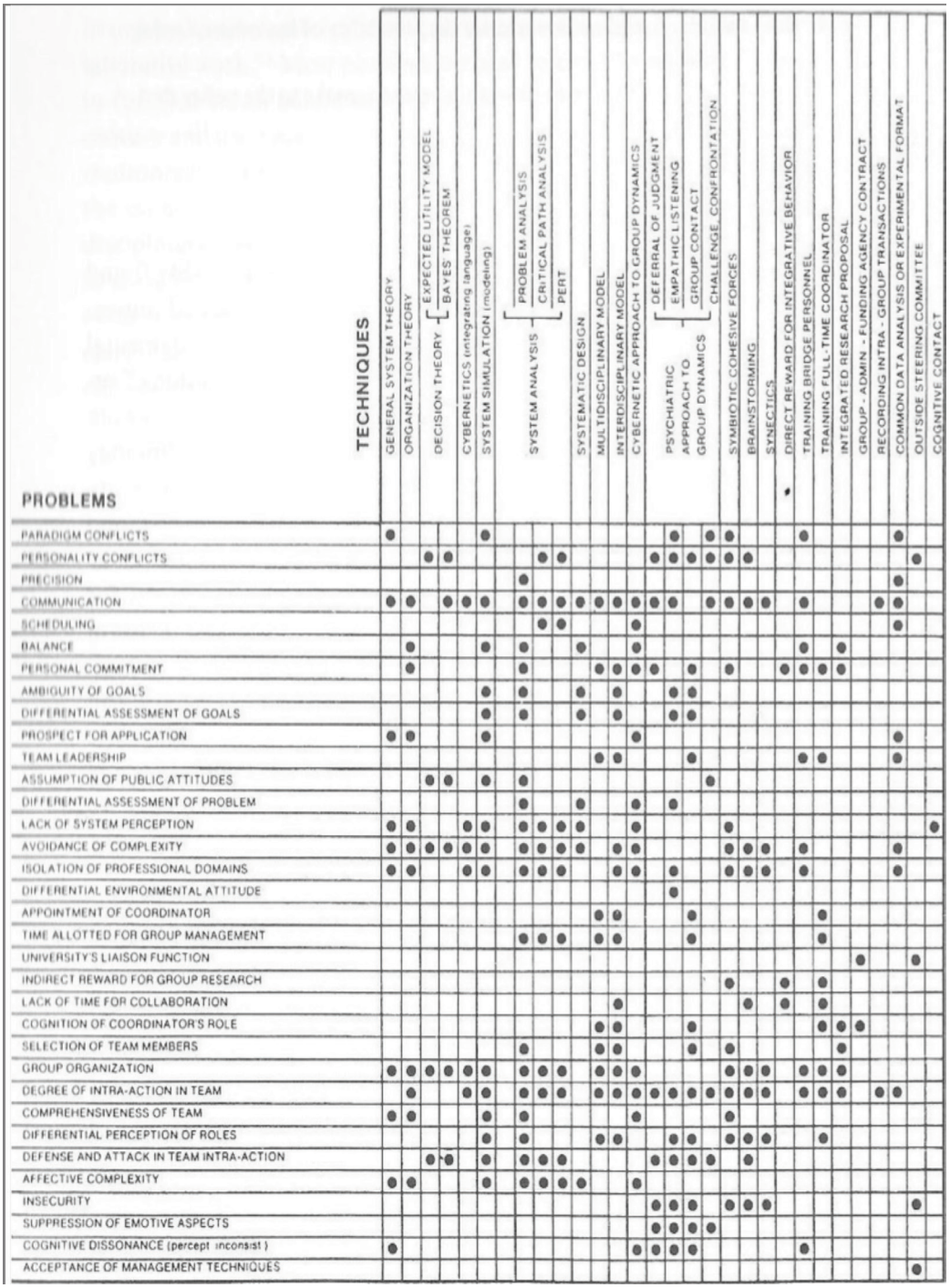


Figure 43: Problems/Techniques Matrix

In conquering complex problems, a mixture of techniques might need to be deployed in order to provide a resolution that is robust.

Since the 1970s, interdisciplinary techniques have been applied to healthcare, science, resource-sharing across borders, and town planning to assist in complex problem-solving. Firstly, I examine the difference between the terms 'interdisciplinary, transdisciplinary, and multidisciplinary' to determine

what is the most useful for the desired outcomes. In short, 'transdisciplinary' relates to the personal journey through professional development and usually attributed to one person acquiring several academically-based professional perspectives. This is especially relevant in today's world with increasing demand for high return on investment in staff. 'Multidisciplinary' often refers to projects requiring professional specialities to be considered during the investment into a venture. My argument for 'Interdisciplinarity' (Thompson-Klein, 1990) involves all participants (with their own unique academic and life experiences) working together to deliver agreed findings to their own specific professional bodies to lobby for reform accordingly.

These three concepts are illustrated below in Table 8, and are based on the work of the Swiss Academy of Science and the further development by Roderick Lawrence from the Stockholm Institute in his presentation to the joint Society of Human Ecology and International Sustainability Scientists Conference (Lawrence, 2013).

Trans disciplinary person		Multi disciplinary project		Interdisciplinary adventure
		+		
		+		

Table 8: Differences between transdisciplinary, multidisciplinary, and interdisciplinary dimensions. Adapted from Roderick Lawrence (2013) and the Swiss Academy of Science

Table 8 illustrates the differences that lead to my argument that transdisciplinary people cannot work alone to address complex problems, and that projects which depend on a smattering of elite disciplines alone may not achieve the richness needed for resolving wicked problems (Churchman,

1967). Therefore, I argue that interdisciplinary techniques recognise that each participant has a unique contribution to make towards a well-informed examination of complex issues, and when facilitated with respect, all these unique contributions build a case for resolution that is sensitive and pragmatic. It is important to continue recognition of the specific discipline, because any resolution must be robust enough to withstand probing by that discipline's professional body 'policy and practice group'.

Wicked problems can include complex public policy like sustainable development, economic and social justice, environmental stewardship, rapid urbanisation, and climate change. So, imperatives for tackling wicked problems include: (1) incorporating the diverse ingredients of interdisciplinary participants (2) techniques for getting the best from those participants, (3) mediating a shared resolution, (4) lobbying for change across professional bodies and thought leaders, with (5) rigour for implementing the appropriate reform agendas. This is where I prosecute innovation.

Innovation is needed inside the minds of those participants from different professions and experiences (Horton, 2012), inside the techniques for rich understanding and debate through Accelerated Learning (Rose & Nicholl, 1998), in tools for working towards a resolution amid a minefield of perspectives, priorities, and principles, and in advocating for positive change being led from the responsible areas. Effective techniques have been demonstrated over millennia, often in war strategies (McGee, 2010), but are now practised in peacemaking techniques (Schülke & Bauer, 1981).

Additionally, the lessons from *Action Research in a Turbulent World* (Zuber-Skerritt, 2012), *Evolutions Edge* (Taylor, 2008), *Necessary Revolution* (Senge, Smith, Kruschwitz, Laur, & Schley, 2010), *Sustainability Transformation* (AtKisson, 2010), *The Third Try* (Broinowski & Wilkinson,

2005), *The Natural Religion* (Connolly, 2008), *Diplomacy* (Cachia, 2004), Collaborative Creativity (Shankar & Brown, 2012), and 'Galtung advocates' shape techniques for optimising brain power and opportunity (Grin, Rotmans, Schot, Geels, & Loorbach, 2010).

In the past, climate interventions were seen as the quick fix of 'engineering conquering nature' while disaster managers were the 'crisis heroes'. This is no longer the accepted wisdom. The methodology for preparatory, preventative, proactive, early intervention, crisis management, recovery, resettlement, evaluation, and regulatory reforms, encompasses much more. The Climate-Policy-in-Practice Cycle® takes a more holistic approach to complex relationships between climate and human settlements (Eminent Persons Group, 2011b; Davis, 2012). Today's wisdom considers the inter-connectedness of all parts of climate emergency events, the slow burn of gradual changes, and the need to design with Nature rather than conquer it.

James Bradford-Moody, former Australian whiz-kid (2010), describes the 'Sixth Wave of Innovation' as a logical progression from the ages of agriculture, steam, steel, mass production, and Information Technology. He suggests a new resource-wise trend with clean technology (like 3D printing prototypes), institutional reforms (like carbon pricing) and a market matrix (absolute fitness for purpose) with a circular economy.

Accelerated learning has traditionally related to gifted children (Rose, 1987), to the rapid uptake of music or new languages (Rose & Nicholl, 1998), or in the defence forces to transform a novice into an expert in battle tactics (Will, 2008). However, I wish to limit my definition of Accelerated Learning for the purposes of my directed study as 'adult learning by accessing the senses in many dynamic techniques in order to change from a state of passive bystanding to transformational action'.

I adapted this definition from Ian Lowe's work (Lowe, 2012). The rapid

acquisition of knowledge is practised in music and warfare. However, a range of techniques are practised: (1) introverted study, (2) learn by doing (theoretical, hypothetical, simulation training), (3) learning by interactive methods (games, sim-disaster), (4) 'talk it through' as in ancient tribes and Quaker systems, and (5) 'learn on the run' in case of crises. More recently rapid learning uses comprehensive methods of (a) unlearning old paradigms, (b) participation, (c) state of mind and body, and (d) teaching (Kwik, 2013).

Learning quickly is the key to empowerment for effective change. Therefore, learning involves the processes that community and practice leaders embark upon as they progress from bystanding to leading transformative action (AtKisson, 2010) along a trajectory that multiplies impact (Davis, 2012). Gladwell suggests 10 000 hours of study may be required to convert from an amateur to an expert (Gladwell, 2000, 2008). Others believe that 'learning by doing' is the most efficient, especially in music and military expertise. Meanwhile, peacemakers call upon a range of interpersonal skills, high cognitive function, and shared reflections of self and others' thinking in order to be most efficient for resolving cross-cultural and wicked problems (Schülke & Bauer, 1981). All of these approaches need to be embraced, in order to address the clear and present danger of climate change.

AtKisson suggests that accelerated learning in 'Compass' involves taking sustainability theory, simplifying it, making it approachable,understandable, and useable to just about anyone, using a structured process for full participation, and making sure that the process leads to a result that produces a tangible positive, high-leverage change in the world (AtKisson, 2010). These wise words must be backed up with a solid process that is flexible enough to cater for spontaneous group dynamics so that full participation can be achieved, and allows desired results to eventuate with the ownership of action resting with the participants. As a consequence, I trawled through my

HRD study books from 1980s, facilitator's guides from 1990s, tutoring tools and lecturer dynamics (2007, but was pleasantly surprised to find genuine fidelity in the German translation for human-ecology innovative excellence (Nestmann, 2002) and the international relations mediator's techniques for Galtung peacemaking (Schülke & Bauer, 1981). The cross-cultural techniques are most effective for facilitating different disciplines for a common outcome.

Heavily relying on different disciplines, Design Thinking has been documented as far back as 1926 and is now in its fifth evolution (Pastor and Patter, 2015). Design Thinking was fundamental to primary school systems and teacher leadership assessment for secondary schools in Queensland, as a result of reforms from Sustainable Schools 1995, Values agreement from 2006 Programs, and 2020 Vision mandate for schools in 2008 (Queensland Government, 2006; Australian Government, 2008; Davis, 2012). In the Arts, Design Thinking is imperative to the curriculum endorsed by the Cultural Ministers Council in 1995. This has carried over to urban design, town planning, engineering, and manufacturing design, research and development. But the whole philosophy (of getting smarter through redesign, fitness for purpose, less waste, more functionality, and material reuse) was a practical legacy of cleaner production and consumption for UNEP (Scott and Pagan, 1999).

I was fortunate to work with the Centre for Design Innovation at Swinburne University until it was restructured in 2016. My aim for the future is to integrate design thinking with biomimicry for retrofitting cities for climate change. There are many good reasons to do this and the time is now.

In 2010, I participated in Australia's Design Shop with NASA's Matt Taylor and 60 community and thought leaders over three days. It was an emotional rollercoaster, with facilitation and adaptive processes for transformative thought. Some of the ongoing projects are quite profound: developing pattern

language, understanding conditions, and framing scenarios (Transform, 2010).

In 2012, the South Australian Integrated Urban Design Commissioner shared the lessons for a comprehensive project for redesigning Adelaide through community Design Thinking:

The Integrated Design Commission SA believes that the opportunity for design to influence outcomes is best done early. By applying the design lens 'up front' the project scope can be fully understood and its potential fully explored and realised. Integrated design understands the inter-dependence of design as a process of enquiry; planning as a process of defining; and development as a process of delivery. Truly integrated design has the power to create adaptable, enduring, flexible, resilient and transformational built environments. An integrated approach balances long-term value over first cost. The Commission is taking a leadership role to inform design and planning through new initiatives such as the introduction of Design Review Panels. A Recipe for Systemic change supports this program.

Former Commissioner, Tim Horton spoke in Regional Development Australia (Housing Forum) in 2012 as part of my projects.

Design Thinking is encouraged as a fundamental tool for exploring complex problems, and it is now practised as a technique in NGO alliances and professional bodies to tackle sustainable development, rapid population growth, urban design, social planning, and resource optimisation in industrial design. At the same time, the Australian Design Alliance chaired by His Excellency Michael Bryce bases its mandate on innovative approaches

and Enquiry by Design.

A worldwide movement for innovation is being annually monitored through Greendex by National Geographic and Globescan. In 2012, seventeen countries volunteered their information for scrutiny. The survey canvassed housing, transport, food and goods. It then compared GDP and other country indicators to compare trends. The surprising finding was that low GDP countries are leap-frogging in innovation whereas the rate of innovation is declining in 'richer' countries like Australia. Do we interpret that as 'necessity is the mother of invention?' No, because there are many factors influencing this phenomenon.

In order to do more with less in a finite resource world, there needs to be smarter considerations, with scarce resources applied to the highest purpose. This then presents an ethical argument about how to use current and possible future resources for both inter-generational and intra-generational equity. This is where the Earth Charter can be useful as an ethical framework for decision-making, including value propositions between need and greed, materialism or holism, quantity or quality. Future consequences need to be factored into today's decisions.

However, all innovation is generally directed towards future desirable outcomes. Therefore, an exploration of futures tools is warranted.

Coined by Stephan Kulhman, we need to make world music tuned to sustainable development for dance steps for innovation policy and practice (Grin et al., 2010). In dancing, there are many ways to achieve synchronicity while weaving a creative dynamic. Each partner has individual styles and yet together they are even more powerful by synergising their energy, without losing their individuality. These are the ingredients for innovative thoughts as determined by Galtung, the Nobel Peace Prize winner and innovator in five different languages. He went further when defining how to create

messages for resolutions by understanding how decisions are made by people from different cultures. By tracing how information is shared before a joint agreement could be achieved, he could ensure that the right ingredients were present to facilitate a joint resolution. He drew thinking styles from cultural norms during his peacemaking efforts. However, later students of his work related his drawing to intellectual styles and social structures as triggers for innovation. I go further and relate those intellectual styles to those nurtured within traditional professional disciplines. As we mature, we understand others' ways of thinking and become more malleable about our messages to achieve desired joint resolutions. However, at all times, we should not lose our own individuality while working synergistically with others.

Figure 44 is a copy of the original hand drawings by Galtung, to explain how different cultures come to creative moments of achievement. The light bulb moment!

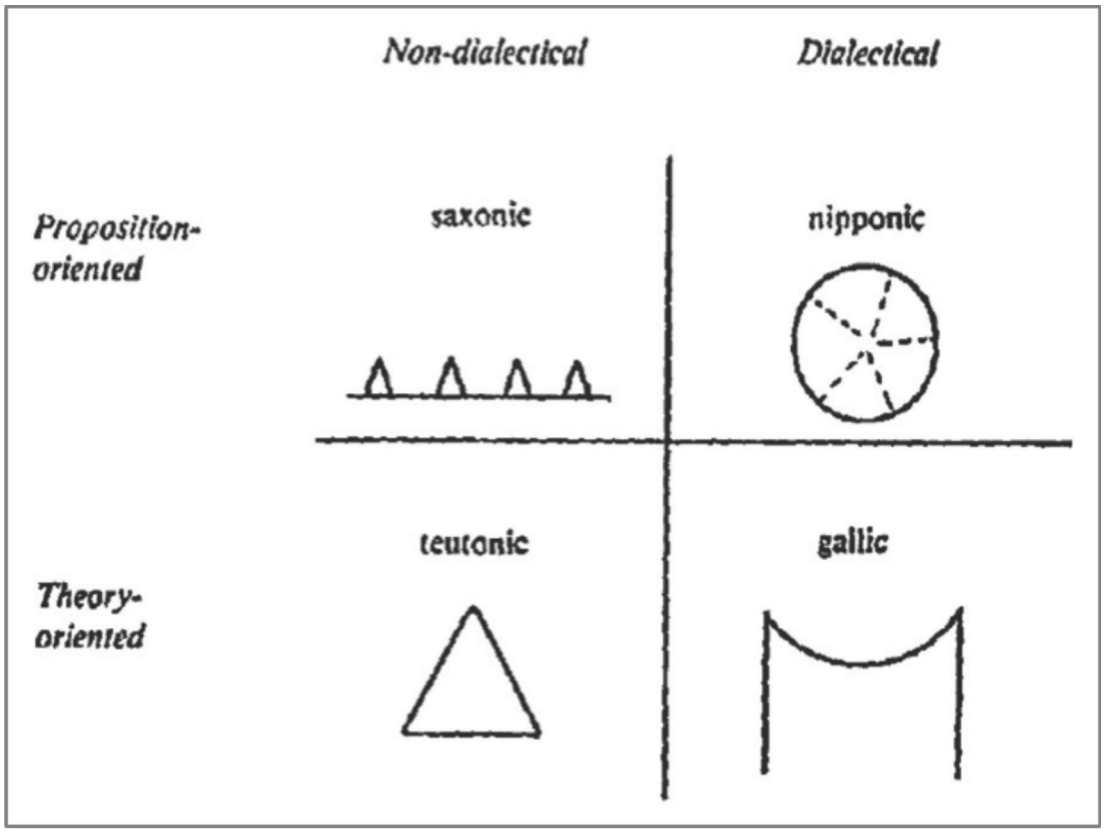


Figure 44: 'Four styles, four figures of thought' (Source: Galtung)

Grin explains those thinking models as:

1. Teutonic – vertical, polarised, individualist = grand design
2. Gallic – horizontal, individualist, polarised = metaphors
3. Saxonic – horizontal, individualist, less polarised = incremental
4. Nipponic – vertical, collectivist, non-polarised = inherited authority.

When I tried this analysis on colleagues, we resulted in my being a sponge that gets networks of vacuums full, and then explodes with colourful creativity, a professor who ratchets up information in a series of plateaux until the Eureka moment, while others spoke of brain farts.

The deep analysis is interesting, but the concept of cultures impacting so severely on how information is shared in order to come to some joint agreement or to create a resolution that is owned by all, is most valuable for the practice of interdisciplinary innovation.

In conclusion, lessons from ancient times of war and peacemaking, from this century of war between human settlements and nature, and this last decade of war with climate change, indicate that longer-term resilience can be achieved through interdisciplinary understanding, rich debate, and innovation. In order to achieve practical innovation there are some necessary ingredients: (1) authorised representatives with open hearts and minds, (2) effective methods for optimising brain power, commitment and opportunity, and (3) a tenacity for long-term horizons when adopting reform agendas. Each professional body with its unique styles of thinking has a role to play in shaping a safer future, but together building a legacy that all can be proud of, is the fundamental human ethic.

Outcomes:

- Rich and rigorous solutions arise from patient and trusted interdisciplinary debates.

- Different disciplines and cultures have different triggers for ‘light bulb moments’.
- Wicked problems deserve well-informed debate, so accelerated learning can facilitate ways forward.
- Design Thinking leads to an evaluative culture, but innovation without compassion and ethics is useless for a sustainable future.

Research Summary 12: Fiduciary Duty and the Atmospheric Trust

Title: Fiduciary Duty and Care for the Commons for Climate Governance	
Authority	UNFCCC, Integrity Inquiry, various
Scope	International, Australia
References	Coghill, Sampford and Smith, 2012; Coaldrake, IPCC, UNFCCC, Coghill, 2012

Findings

- Introduction – 2012 essays with definitions and law
- Position of trust in public office
- Values and functions from 2013 benchmarking for good governance
- How independent review closes the loop (third-loop learning)
- Continuum for governance and review functions
- Independent review for climate governance – globally, nationally, and locally
- Success stories.

- Fiduciary duty is discussed in courtrooms but must be understood and considered in any decision-making environment where other people are impacted.
- Governance can be defined as 'what government does', which begs the question of 'what is government for?' The best contemporary explanation involves the fiduciary duty to care for the peoples, the greater public interest, the greater public good, the common good, and care for the commons-shared resources like the atmosphere, land, water, oceans, and outer space (Coghill, Sampford, and Smith, 2012).
- In democratic societies the 'responsive rule' should apply. Paul Finn emphasises the importance of 'standards for conduct properly to be expected of persons occupying fiduciary positions, that is, persons who, by virtue of position, responsibility or function, were expected to act in

another's interest and not their own interest' (Finn, 1995).

- In international law, this is called Jus Cogens which relates to 'natural law' from 1758, and peremptory norms from 1923 in the International Court of Justice. These are the building blocks for sound urban climate governance.

The continuum for independent governance review functions has developed beyond the traditional role of an auditor-general. In summary, review can be plotted along a linear projection, but the value can be measured in a vertical axis. This trajectory has been useful in my work since 2002, and more so now as I tackle international law in my current role. Each year, a spin-off of G20 is I20 focussing on integrity.

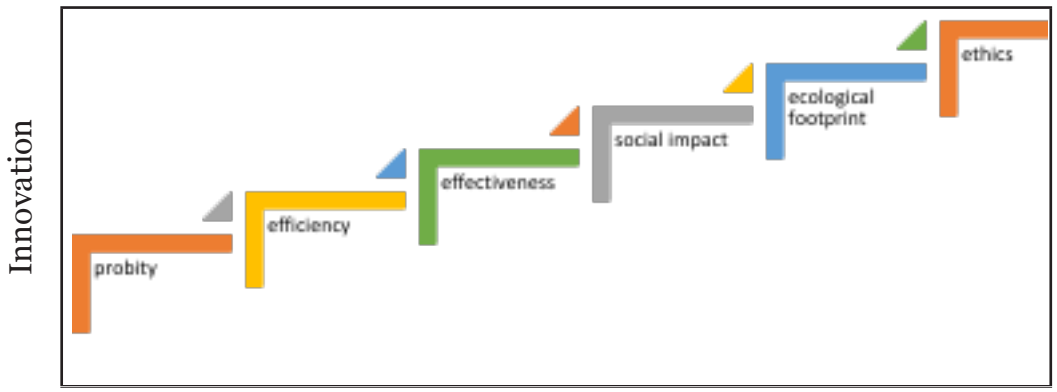


Figure 45: Independent Review and Innovation Trajectory

Figure 45 illustrates how the role of a Sustainability Commissioner incorporates innovation into all these parameters, depending on the severity and alleged concerns.

Outcomes

- Mary Robinson proposes seven justice principles.
- There are seven legal approaches to handling climate justice issues relating to 'environmental refugees'.
- Professional bodies have 'codes of ethics' for 'do no harm' and 'use your specialist skills for just purposes' (Gardiner, 2006; Bull, 2013).
- Making decisions to assist in disaster events takes moral courage

when considering internally displaced and non-resident people (Gardiner, 2006).

- The 'Anthropocene is not ethical' as it does not respect the interconnected relationships required for global balance. A healthy earth-centred philosophy does (Wild Law, 2012).

Research Summary 13: Climate Ethics

Title: Climate Ethics	
Authority	UNCHR, Ramphal, professional bodies, CHOGM, AOSIS, C40 Lord Mayors.
Scope	International, Commonwealth, Pacific, Australia.
References	Gamlen, 2010; Ramphal Commission, 2011; Mackey, 2012; UNISDR Asia and Pacific, 2011; Finucane, 2009; Davis, 2013b; Davis et al., 2013; Commonwealth Foundation, 2009.
Meta-Analysis	• 'Do unto others as you would have them do to you' (Matthew 7) and 'Do No Harm' are fundamental principles for ethics. Climate change brings a perfect 'moral' storm. • The sequence for life impacted by climate change is: vegetation, small animals, larger animals, the vulnerable people who live in cities, and then all people. • Climate refugees are not covered under UNHCR conventions in their current form, but Mary Robinson's Foundation for Climate Justice is lobbying hard. • Of the 53 countries in the Commonwealth, 35 are small island states, with diminishing safe land mass on which people can live. All Commonwealth citizens should be provided with humanitarian aid in the forms of emergency help and long-term survival, even if it means permanently migrating to somewhere safe. The humanitarian approach includes a new life of dignity, and contributing to a new society. • There are seven legal approaches to handling climate ethics.

	• Professional bodies have their own 'code of ethics' which all essentially mean 'Work for the greater good' and 'Use your specialist skills for just purposes' to support those who do not have the skills. • Making decisions to assist in disaster events takes moral courage when people are evacuated, permanently displaced or seek refuge abroad. • The 'Anthropocene' does not respect the interconnected relationships required for global balance. A healthy compassionate earth-centred philosophy does.

The Perfect Moral Storm by Stephen Gardiner in 2011 considers climate ethics from three angles:

1. 'The Global Storm', with the dispersion of causes and effects, fragmentation of agency, and institutional inadequacy
2. 'The Intergenerational Storm', that includes incurring liabilities to be paid by future generations
3. 'The Theoretical Storm', including moral corruption (complacency, distraction, unreasonable doubt, selective attention, delusion), which David Suzuki in the 2013 Jack Beale Lecture describes as 'wilful blindness', and which can be interpreted as criminal negligence in Canadian law (Bull, 2013).

Kevin Rudd, former Australian Prime Minister, calls climate change 'the greatest moral, economic, and social challenge of our time' (The Australian, 2008). The moral issues lay with the vulnerability of people and 'the inter-connected community of life', and the human rights approaches to care. It becomes an inter-generational issue relating to which generations actually who 'caused harm' and who pays the residual costs. It is an intragenerational issue of today where some nineteen countries cause pollution, while the more

vulnerable people in the other countries bear the brunt of selfish actions.

As climate thresholds are breached, land vegetation is lost, causing the loss of small mammals and other animals. This then cascades into the loss of larger animals. As the ocean becomes acidified, these patterns are repeated. The web of life is shattered. In developing countries, the next loss is borne by disadvantaged people who have limited choices as crops fail, and drought, fires and floods kill. In developed countries, it is the same except humanitarian aid is more forthcoming. People in cities are generally more vulnerable (can't feed themselves) than some rural areas. Finally, extreme climate events impact all people without discrimination.

> *A person who owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it.*
>
> *(Definition of the term 'refugee' by the UNHCR 1951 Convention and its 1967 Protocol.)*

The Age of the Anthropocene (Man over Nature) has not factored interconnectedness in decisions. As a result, the balance for wellbeing and renewal of natural systems is askew.

In the meantime, preparation, mitigation, adaptation, and migration measures should be priorities as the local case dictates. This is where arguments for sovereign rights begin. Where citizenship is evident,

humanitarian support is immediately validated. Although some internally displaced people are most vulnerable, there are mechanisms for international humanitarian aid. Where non-citizens seek safe havens, international laws are applied. Under the current 'Refugee Convention' (UNHCR), the law is grey unless 'climate is expressed as War', even though the resulting circumstances are the same. People are forced to leave their home for fear of hunger, harm or death. Despite years of lobbying, that convention does not assist most climate migrants (Robinson: 2012). Former Irish Prime Minister, Mary Robinson now chairs the Climate Justice Foundation as a result of The Elders' legacies.

According to Mary Robinson, seven principles apply to Climate Justice (Mary Robinson Foundation, 2011), including:

1. Respect and protect human rights.
2. Support the right to development.
3. Share benefits and burdens equitably.
4. Ensure decisions on climate change are participatory, transparent, and accountable.
5. Highlight gender equality and equity.
6. Harness the transformative power of education for climate stewardship.
7. Use effective partnerships to secure Justice.

These provide a comprehensive framework to make and implement decisions fairly.

Back in the Commonwealth countries, there is the argument about Commonwealth citizenship which facilitates sharing. Near-neighbours generally have programs to help people within their own region. This is done

in multi-lateral or bilateral agreements or specific aid programs under the radar. However, these are not a robust long-term arrangements, especially in the times of global financial crises. The Ramphal Commission delivered three reports on 'People on the Move' (Gamlen, 2010).

- Of the 53 countries in the Commonwealth, 35 are Small Island States, with diminishing safe land mass on which people can live. All Commonwealth citizens should be provided with humanitarian aid in the forms of emergency help and long-term survival, even if it means permanently migrating to somewhere safe. The humanitarian approach includes a new life of dignity, and contributing to a new society. In Australia, three- and five-year training programs encourage young people under 40 to train to work in roles in Australia, as working business migrants who will pay tax and eventually become permanent voting residents (Australian Aid Blue Book, 2011). However, children and older people are not necessarily catered for. Older people do not wish to leave their traditional lands and culture even though quality of life is diminishing. Children may be even more vulnerable as records may not be kept, schools may be destroyed and families shattered (Bunari et al., 2013).

AUSAID's 2013 budget cuts meant that vulnerable people who would have been trained now have to beg instead of entering the country as contributing residents or skilled migrants. In 2018, humanitarian aid was further reduced to an all-time low at 27% of GDP, so that there is less capacity to cope with near-neighbour forced migration.

In 2013, Climate Frontline with the World Council of Catholic Churches published Sister Wendy Flannery's approach that people from low-lying Small Island States 'cannot walk on water'. so there is a moral obligation to save them. Her argument focuses on fundamental human rights as the issue with corresponding legal tools required for positive action (Flannery, 2012;

Herpen, 2012).

What ethics are expected from professionals who carry out humanitarian responsibilities?

Responsibilities are thought-provoking as they also relate to professional ethics. Below, I list a series of articulations of professional ethics that arise from workshops:

1. The Red Cross has seven principles (1) Humanity, (2) Impartiality, (3) Neutrality, (4) Independence, (5) Voluntary Service, (6) Unity, and (7) Universality.
2. The medical profession's Hippocratic Oath means climate must be taken very seriously in order to 'never do harm' and 'prevent disease' (The Centre for Policy Development, 2010).
3. In the UK, scientists have an oath 'to minimise adverse effect your work may have on people, animals, and the natural environment'.
4. The Institute of Planners: 'Members shall use their best endeavours to ensure the development: (1) is sustainable; (2) provides for the protection of natural and man-made resources (3) is aimed at securing a pleasant, efficient and safe working, living and recreation environment; and (4) is efficient and economic.'
5. Engineers have a 'social responsibility' to apply their specialist skills for the greater good.
6. Architects make a vow 'to improve quality of life'.
7. Australian Ecological Engineers goes much further to 'work in harmony with ecology'.
8. In Queensland, all citizens under EPA are responsible for a duty of care: 'A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm' (Environmental

Protection Authority, 1994). There is also an obligation to report harmful incidence. If you fail to report, you are part of the problem.

9. From professional ethics comes organisational ethics. NGOs and governments within Commonwealth countries are required to meet six objectives, including one prescribing that democracy includes environmental and human rights. The fourteen values of the new charter reiterate this.
10. The United Nations is founded on the UN Declaration, a Universal Declaration of Human Rights, and the Earth Charter. These mandates prescribe an ethical relationship between state and state, and the person, and the person and the earth, respectively. As a consequence, professional people working in these organisations and related networks are expected to honour those obligations.

Adapted: Professional Ethics 2013,
Reiterated in Melbourne in my speech June. 2015.

Rev. (Prof.) Noel Preston was Australia's Commissioner for the Earth Charter from 2000 and a proponent for the International Earth Dialogues held in Brisbane in 2006. He described three streams of ethics in his section that deal with the natural environment:

1. Anthropogenic,
2. Ecocentric
3. Existential ethics.

(Preston, 2001 2006)

In climate ethics forums, there are seven legal approaches to climate justice (Macguire and Lewis, 2012; Mackey, 2012; Wild Law, 2013; Gardiner, 2011).

Outcomes

- Climate Ethics are considered through many lens by academics, religious groups, humanitarians, and professional bodies.
- Climate change impacts indiscriminately on all humans and living

things, which challenges our moral compass.

- The Age of Anthropocene (Man over Nature) produces unintended consequences and there is a greater need for better interconnected thinking with action for our common sustainable future.

Research Summary 14: Futures Thinking For Cities

Title: Futures Planning for Cities	
Authority	UN Habitat, UNEP, UNFCCC, Future-Cities, UNH Prof Forum, Urban Futures Board, Birkeland; K4C; Urban Design Alliance.
Scope	International
References	Commonwealth of Australia, 2010; Al-Shawaf & Guenther, 2012; Department of Infrastructure and Transport, 2011; The Australian Sustainable Built Environment Council (ASBEC), 2010; Wall, 2011; UNEP, 2012; Slaughter, 2010; Senge et al., 2010.
Meta-analysis	• UNEP's Foresight Project findings underpin the Rio+21 themes for Green Economy and Sustainable Development Governance. Cross-cutting issues were highest priority with social and institutional reforms, then food, water, and climate before energy. International interdisciplinary qualitative surveys were conducted. • Many tools are deployed for Futures Thinking. However, of the twenty reviewed, each has its limitations, so a suite of tools might be required to manoeuvre the dynamics of emerging challenges. • Planning for longer-term for cities may be a mix of fear and hope. Learning from international city performance evaluations provides a springboard. Ten steps for building 'cities as sustainable ecosystems' are summarised and ten points for 'designing resilient cities' are being implemented as best practice by Melbourne. Brisbane has fallen to twentieth as an international liveable city.

	Urban Design incorporates environmental care and climate change impacts. Because cities comprise more than essential infrastructure, environmental, social and cultural aspects deserve higher priority. • A 'sustainable futures formula' might comprise science, technology, foresight, and moral courage, but consideration is also needed for sustainability values along with equality, optimism, ethical transparency, presence, and personal commitment.

In 2011/2012, I participated in UNEP's comprehensive Foresight Project coordinated by Veronique Plocq Fichelet, with 400 professionals (scientists, economists, engineers, planners, and landscape architects) and a twenty-person international panel of luminaries (UNEP: 2012). The qualitative survey findings resulted in the themes for Rio+20 in 2012, ably chaired by UNEP's Achim Steiner. The final themes were the Green Economy and Sustainable Development Governance (UN, 2012). Figure 46, on the following page, illustrates the 21 top issues clustered into logical topics, with ranking for the highest priority urgency for action. It illustrates that the cross-cutting issues needing cooperation for governance and social reforms are the highest ranking matters (indicated on the far right). Resolutions from Rio+20 reflect some of these priorities.

Mainstream Future Study is practiced in many institutions beyond tactical business and strategic planning. In fact, organisations that don't undertake environmental scans of their industry trends, opportunities and threats, emerging partnerships, and international impacts are more likely to fail in the longer term (Senge et al., 2010). Over the past eighteen years, I conducted a series of Greening the Boardroom events and subsequently contracted for confidential in-house work for corporations and government enterprises,

Issue ID	Issue Title	Ranking*
	Cross-cutting issues	
001	Aligning Governance to the Challenges of Global Sustainability	1
002	Transforming Human Capabilities for the 21st Century: Meeting Global Environmental Challenges and Moving Towards a Green Economy	2
003	Broken Bridges: Reconnecting Science and Policy	4
004	Social Tipping Points? Catalyzing Rapid and Transformative Changes in Human Behaviour towards the Environment	5
005	New Concepts for Coping with Creeping Changes and Imminent Thresholds	18
006	Coping with Migration Caused by New Aspects of Environmental Change	20
	Food, biodiversity and land issues	
007	New Challenges for Ensuring Food Safety and Food Security for 9 Billion People	3
008	Beyond Conservation: Integrating Biodiversity Across the Environmental and Economic Agendas	7
009	Boosting Urban Sustainability and Resilience	11
010	The New Rush for Land: Responding to New National and International Pressures	12
	Freshwater and marine issues	
011	New Insights on Water-Land Interactions: Shift in the Management Paradigm?	6
012	Shortcutting the Degradation of Inland Waters in Developing Countries	15
013	Potential Collapse of Oceanic Systems Requires Integrated Ocean Governance	13
014	Coastal Ecosystems: Addressing Increasing Pressures with Adaptive Governance	19
	Climate change issues	
015	New Challenges for Climate Change Mitigation and Adaptation: Managing the Unintended Consequences	7
016	Acting on the Signal of Climate Change in the Changing Frequency of Extreme Events	16
017	Managing the Impacts of Glacier Retreat	21
	Energy, technology, and waste issues	
018	Accelerating the Implementation of Environmentally-Friendly Renewable Energy Systems	7
019	Greater Risk than Necessary? The Need for a New Approach for Minimizing Risks of Novel Technologies and Chemicals	10
020	Changing the Face of Waste: Solving the Impending Scarcity of Strategic Minerals and Avoiding Electronic Waste	14
021	The Environmental Consequences of Decommissioning Nuclear Reactors	17

* Ranking based on scoring by the UNEP Foresight Panel and after considering the polling results of more than 400 scientists worldwide.

Figure 46: Top Future Issues (UNEP Foresight Panel)

specialising in foreseeable futures – 4SF®. I am continually learning new techniques and language to adapt to trends, merging industries, and global marketplaces.

Futures Planning processes are fraught with challenges, because some thinking tools don't support long-term land planning or climate impact decisions. Some new tools conflict with traditional methods because past systems were not as dynamic. A better strategy is to have a set of tools to manoeuvre as conditions change and emergencies arise.

> *Traditional planning tools seek to 'control the uncontrollable'; assessment tools seek to 'predict the unpredictable', life cycle*

> *assessment tools try to 'quantify the unquantifiable' and future tools help to 'expect the unexpected'.*
>
> *(Birkeland, 2008)*

Ironically little has been done by the traditional tools to mitigate environmental risks beyond mere defensive design like flood barriers (Birkeland, 2012).

City Futures: Fear and Hope

Newman argues hope and fear in four scenarios for the future of cities being (1) collapse, (2) ruralised, (3) divided, and (4) resilient while he introduces waves of innovation to address participatory city planning and future building (Newman & Jennings, 2008).

In planning for the future, it is wise to learn from the past and to learn from early adopters of diverse approaches and techniques. Therefore, ranking performance of cities through evaluations is crucial to continuous learning about better ways. In 2002/2003 I reviewed Brisbane City Council's performance in order to plan for 'Brisbane 2010'. At that time 103 dashboards and indicators were available for testing. However, each had a specific focus based on the funding agency that commissioned the dashboards of indicators. The Creative Cities Measure was based on the work of Richard Florida to determine the resilience capacity to reinvent itself as changes occurred that impacted the city in unforeseen ways. (Brisbane then ranked tied 23 in the world). There were many measures: bohemian index, happiness index, smart (IT & economic), barometers, dashboard lights, traffic lights indicators for danger in slack performance, and a myriad of green matrices and mapping (Davis, 2003). Now it is easier to input online to an international system like smart cities or World Bank performance assessment. But magic number measuring does not change behaviour.

In the past five years, more sophisticated systems have supported specific environmental care and climate change adaptation for cities. New institutions

arose for Urban Scope, Eco-polis, Ecocities, Green Cities, Green Futures, and Future Cities. Guidelines and practice manuals abound but the most useful for Brisbane include *Subtropical Design* (Kennedy, 2010), *Cities as Ecosystems* (Newman & Jennings, 2008), *Future Cities Design* (continuously updated online), *Urban Futures* (Follent: 2012; Queensland Board for Urban Places, 2010), *Urban Design Protocols* (Major Cities Unit: 2012; Urban Design Alliance, 2011) and *Planning for Sustainable Cities* (UN Habitat: 2009). In 2013, Brisbane fell to twentieth place in the International Liveable Cities Ranking. Many factors contribute to this rating. However, many lessons arise from the above-mentioned efforts.

Ten Steps for Cities as Sustainable Ecosystems.

According to Peter Newman, former Sustainability Commissioner in two states, Chair of Curtin University Sustainability Policy and invited author for UN Habitat's 'Planning Sustainable Cities', there are ten steps to designing resilient cities (Newman et al., 2009; United Nations Habitat, 2009). These are:

1. Set the vision (participatory) and prepare implementation strategies.
2. Learn on the job.
3. Target public buildings, parking, and road structures as green icons.
4. Build transport-oriented development, people-oriented development, and green-oriented development together (I call that landscape-oriented development).
5. Transition to resilient infrastructure – step by step.
6. Use prices to drive change where possible.
7. Rethink rural regions with reduced oil dependency.

8. Regenerate households and neighbourhoods.
9. Facilitate localism.
10. Use approvals to regulate for post-oil transition.

In conclusion, he visualises and gives examples of cities as sustainable ecosystems.

Ten Aspects for Resilient Cities.

Melbourne was showcased as a world sustainable city in 2009 with its ten point plan being (1) vision, (2) economy and society, (3) biodiversity, (4) ecological footprints, (5) model cities' ecosystems, (6) sense of place, (7) empowerment, (8) partnerships, (9) sustainable production and consumption, (10) governance and hope (WUF: 2010). Much can be learned from Melbourne's implementation in the past decade, especially in the innovative approaches towards participatory urban design delivering urban acupuncture – 'healing the city' (Urban Design Alliance, 2011).

The City of Melbourne was the first in Australia to develop a Climate Change Adaptation Strategy. The City is now leading urban adaptation action in Australia and has set ambitious targets to cool the city by 4°C. The City has delivered a $30 million adaptation program to transition Melbourne's urban landscapes from vulnerability to resilience. Actions include urban forest expansion, streetscape adaptation, green roofs, stormwater harvesting, open space expansion, permeable pavements and cutting-edge adaptation research.

Banksia Award Judges thought this project was leading in its depth analysis of climate change impacts on the City of Melbourne and demonstrated results in achieving mitigation of these impacts. This well-thought-through approach will provide long-term benefits for the environment, economy, and community.

Meanwhile, Brisbane fell to twentieth place in the Liveable (conditions) Cities list. The assessment takes in to account more than 30 factors across the five broad categories – stability, health care, culture and environment, infrastructure and education, providing a score out of 100. Overall Brisbane scored 94.2 compared to Melbourne's 97.5, Adelaide's 96.6 (joint fifth), Sydney's 96.1 (seventh) and Perth's 95.9 (ninth).

While Brisbane rates equally with front-runner Melbourne for health care, it lags behind in infrastructure, including public transport and culture and environment, which take climate actions into account.

The Top Ten cities in the world for living conditions 2013:
(1) Melbourne, Australia (2) Vienna, Austria (was top for about a decade), (3) Vancouver, Canada (4) Toronto, Canada (5) Calgary, Canada (tied fifth) Adelaide, Australia (7) Sydney, Australia (8) Helsinki, Finland (9) Perth, Australia (10) Auckland, New Zealand… 20) Brisbane, Australia (The Economic Intelligence Unit, 2013).

This index supersedes the Liveability measures as assessed by New York Executives on placements elsewhere to seek hardship bonuses with index being discredited by the finance industry.

Futures Formulae (Meta-Scanning)

Is there a magic formula for conquering the future? Probably not! But there probably are some important ingredients for a recipe for sustainability for the future. The French call this ‘diet for endurance’ (CESD: 2012). In addressing vulnerable cities, I call this a ‘prescription for wellbeing’ (Davis, 2011b). However, Slaughter argues for specific ‘meta-scanning’, and considers (1) Science, (2) Technology, (3) Foresight, and (4) Moral Courage (Slaughter, 2010).

I reflected that extra ingredients are required that better embed the values for

Sustainability, but perhaps they are subsumed inside 'moral courage':

1. Equality to end the Anthropocene when human supremacy prevails over nature (Wild Law, 2013), or rebut intergenerational and intra-generational inequity.
2. Optimism to counteract helplessness from 'acts of god' like climate extreme events, or despair from overwhelming impacts, or apathy (Australia Institute: 2009 & 2012; Anderson, 2012).
3. Ethical transparency requires an ethical charter to withstand scrutiny of doomsday-ers.
4. Presence (Asians call this 'Grace' WUF; 2008) to pay attention by not drowning in the minutia of everyday life. Humans are the only species capable of rapid value-based judgements, so our right and responsibility is to care for those less able, by seizing opportunities to renegotiate for a better common future. (Schelling: 1854).
5. Personal commitment to lead by example: Costa Rica's head office for Earth Charter endorses the opening sentence of the Declaration with personal responsibility. Gandhi-followers chant is 'be the change you want to see in the world'. Without personification of a future goal, it would be unreasonable for others to adopt new behaviour (e.g. Executives in Transport portfolios were required to use public transport at regular intervals to 'live their policies' by first-hand reality testing. This 'leading by example' considerably improved policy (QT:2000).

Outcomes

- UNEP's Foresight Project findings underpin the Rio+21 themes for Green Economy and Sustainable Development Governance. Cross-cutting issues were highest priority with social and institutional

reforms, then food, water, and climate before energy. International interdisciplinary qualitative surveys were conducted.

- Many tools are deployed for Futures Thinking. However, of the twenty reviewed, each has its limitations, so a suite of tools might be required to manoeuvre the dynamics of emerging challenges.
- Planning for longer-term for cities induces a mix of fear and hope. Learning from international city performance evaluations provides a springboard, with ten steps for building 'cities as sustainable ecosystems' and ten points for 'designing resilient cities' being implemented as best practice by Melbourne.
- Urban Design incorporates environmental care and climate change impacts. Because cities comprise more than just essential infrastructure, then environmental, social,and cultural aspects deserve higher priority.
- A 'sustainable futures formula' might comprise science, technology, foresight and moral courage, but consideration is also needed for sustainability values along with equality, optimism, ethical transparency, presence, and personal commitment.