



Brighter prospects: Enhancing the resilience of Australia

Steve Cork (Editor)
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About the Editor

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About the Australia21 Organising Group

The idea for and development of this publication was undertaken by an internal Australia21 group. This group comprised Dr Steve Cork, Dr Brian Walker, Paul Barratt AO, Richard Eckersley, Allan Behm, Em Prof Bob Douglas AO, Dr Lynne Reeder, and Prof Ross Buckley.

About Australia 21

Australia21 is a non profit company whose core focus is multidisciplinary research and development on issues of strategic importance to Australia in the 21st century.

The company's charter commits it to:

- Promoting interdisciplinary and inter-institutional discussion to germinate new research on topics of significance to Australia's future.
- Building networks between researchers, community and business leaders and policy makers.
- Improving community understanding of the factors that will contribute to a better future for our children.

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Foreword

Since the beginning of the 21st Century, interest in the notion of resilience has expanded rapidly. As a science, largely in the domain of ecology and natural resource management, it took off in the 1970s.

There was a parallel, older, interest in resilience in the field of psychology, centred on the characteristics of individuals and the environments they lived in, that together determine how people cope with, or fail to cope with, stress and trauma. These two discipline areas have recently come together, with insights from both informing new thinking. Aside from these scientific developments, in the last few years resilience has become of great interest to people who are concerned with the future of regions, of nations, and of the world. New Centres and Institutes of resilience are appearing. To those not involved in this development resilience appears to be a new buzzword taking over from 'sustainability'. This is unfortunate for it

is a very important development that needs to be understood, and this publication has been written to put the term into a wider policy context.

It is not difficult to see why the interest in resilience has emerged. Insights from scientific developments have led to awareness that ecosystems, social systems and linked social-ecological systems (such as agricultural regions, urban complexes or commercial fisheries) behave like complex adaptive systems. That is, they are self-organizing within limits. There are two important outcomes of this systems behaviour:

- i) It is not possible to tightly control the dynamics of such systems (they shift and change and re-organise if one part is held constant, or 'optimised'), and, furthermore attempting to do so reduces their ability to absorb shocks. i.e. they need to change and vary in order to remain resilient.
- ii) There are limits to how much such systems can change and still recover. The measure of a system's resilience is the size of a shock, the amount of change which that system can absorb and still continue to function in much the same kind of way.

This increasing scientific understanding and awareness is occurring at the same time that society's leaders are becoming increasingly concerned about our ability to cope with a number of looming global and regional scale threats — climate change, pandemics, market collapses, peak oil, ocean acidification, collapsing fisheries, water 'wars', terrorist activity, to name some. We cannot prevent or even predict most of them. Defence and security organisations increasingly recognise that bigger walls and more armaments are not the solution; the priority is to enhance our capacity to cope with whatever shocks occur. In other words, the need is to build resilience. We need a resilient food production system, resilient energy systems, water and transport systems, resilient cities and health and education systems. And the signs are that many of these systems are less resilient now than they were previously.

Though references to 'resilience' now appear in various Departmental vision and mission statements, it is not yet being applied or researched in policy development in Australia. Europe is somewhat ahead — www.UKresilience.gov.uk, the Dutch Research Institute for Transitioning, the Stockholm Resilience Centre, and the Cranfield University Resilience Centre, being examples. In the USA indications are that interest in 'resilience' is about to expand rapidly. It is therefore very timely that Australia21 has initiated this inquiry into Australia's resilience, and what it means for our strategic development. The inquiry began with a roundtable in Sydney in 2007, which resulted in an Australia21 working paper, *How Resilient is Australia?*

This collection of papers is a follow-up to that initial effort. The essays are an eclectic mix, chosen to cover a range of issues in which resilience plays a central role. They are not intended to be a complete or definitive set, but collectively they raise the issues that Australia needs to address, at all levels of society, if we are to develop along a trajectory of non-declining human wellbeing. I commend this volume to all those with an interest in Australia's future.

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Section 1 — Overview

1.1 Introduction

Dr Steve Cork

The literature on plant and animal evolution is full of examples of species that have become so tightly adapted to living in their current world that they had no ability to adapt to a changed environment when it came and so became extinct.

Recent research suggests that societies have faced similar challenges and in those that have collapsed, it appears to have been cycles of increasing complexity and rigidity that reduced their ability to keep functioning as climate, ecosystems, markets and geopolitics changed. The distinction between the fates of species and societies is that, whereas species that go extinct are replaced by other, better adapted species, societies that collapse can likewise disappear or (more commonly) can reorganise into a different society, or merge with or be overtaken by another society.

In today's world change is faster and less predictable than ever before. Global interconnections combined with water, food, space and other resource limitations are resulting in political and social unrest. Until very recently the accepted approach in dealing with this uncertainty has been to identify the "best" strategy and then to implement it through top-down management. Over the past 50 years we have seen the dominance of Keynesian, then free-market economics and the adoption of liberal democracy by various countries, including Russia.

In environmental management the idea of environmental, economic and social “sustainability” has been in vogue for several decades. The objective was to define sustainability and then design strategies to achieve it. More recently, environmental scientists in particular, have realised that there is no one sustainable combination of environment, economy and society and that those configurations that might work now will not necessarily work in the future. The focus has moved towards identifying states that are clearly not sustainable and to avoid them while building and maintaining the ability of linked environmental-social systems to respond to change while still retaining their essential functions and identify within a range of possible states that are not prescribed by management strategies. The capacity to respond to change while maintaining identity has been called “resilience”.

This sort of thinking has always been part of engineering. Bridges and buildings have long been designed to change their configuration, within limits, to cope with extremes of load and weather. Similar thinking has been emerging recently in fields as diverse as institutional design, clinical medicine, psychology, and, although not yet mainstream, economics. Engineers tend to use the term “robustness” and their aim is to build structures that are robust in the face of a known range of potential shocks of defined magnitude. “Robust policy” design likewise strives to design policies that will achieve their aims under a range of conditions. A resilience approach extends the robust design thinking to encompass real surprises — novel disturbances and shocks that exceed the normal variance in the environment.

Although definitions and research approaches to understanding resilience differ among workers in the field, the vast majority of studies agree that resilience:

- Is conferred by complex interactions within systems (be they the physical and psychological processes within an individual person and between that person and their environment, or a society or an ecological system).
- Cannot be understood without considering whole systems going beyond the immediate system of interest.
- Is not about staying the same or resisting change but is about staying within a set of states that maintain key functions and identity of the system.
- Requires the systems to have spare capacity, a diversity of ideas and resources, and the ability to self-organise in response to challenges and opportunities.
- Can be general (i.e. helps a system deal with a range of challenges) or specific (i.e. helps a system deal with specific challenges).
- Does not mean that it is possible, or advisable, to fully design a resilient system, or to answer the question “how much resilience is enough”, but it is possible to identify processes and trends that might be making a system less or more resilient in relation to different future scenarios and to flag concerns where it appears that resilience might not be adequate.
- Is not always desirable, especially if a system is not functioning the way we want it to and we are trying to transform it into a different system.

The essays in this volume reflect perspectives on resilience from a range of experts in various disciplines. The authors were asked to contribute these viewpoints as a way to get readers thinking about processes and trends that might be increasing or decreasing aspects of Australia’s resilience to future changes. A rigorous definition of resilience has not been imposed as we see value in hearing the different ways in which this concept resonates with people from different backgrounds. We have, however, asked all authors to be clear about their definition and to recommend policy and management to enhance desirable resilience and/or reduce undesirable resilience. The different interpretations and policy recommendations are addressed in Section 1.2.

Resilience is being talked about more and more. Methods are being devised to assess how resilience is developed and maintained and how it might be measured in a wide range of social and environmental systems. Neither this concept nor these methods should be seen as the answer to all problems facing the modern world. Resilience thinking is one, valuable way to interpret our world. It frequently raises issues overlooked by other approaches. However, resilience thinking itself warns against narrowness of thinking and therefore encourages the diversity of ideas that comes from looking at issues from a range of viewpoints. We hope that this volume will encourage further thinking about how well Australia and Australians are preparing for the next few decades.

1.2 Policy implications

Dr Steven Cork

Questions like “How much resilience does Australia have?” and “How much resilience does Australia need?” are closely related to risk-assessment and mitigation questions that are central to all good policy formulation and implementation. Such questions go further, however, than most risk assessment and mitigation processes.

In best-practice risk assessment and mitigation processes, the range of risks is identified, the probabilities and potential impacts of each are assessed, and strategies are developed to address the highest priority risks, usually individually. Thinking about resilience also prompts us to assess the sorts of challenges and opportunities that might be faced, but, in addition, it encourages us to look at the dynamics of the whole system at multiple scales. Not just the focal scale of primary interest, but the scales above and below, in time and space, to understand how the system at the focal scale might be able to deal with perturbations and how that capacity can be enhanced and/or maintained.

Just as it is impossible to assess precisely how much risk is faced when implementing a policy, it is impossible to say how much resilience, of what kinds, Australia needs. To answer this question we would need to know, rather precisely, what shocks, challenges and opportunities Australia might need to respond to, when and where these responses would be needed, what parts of Australia’s ecological and social systems would need to respond, and what mix of high resilience (to keep systems or parts of systems functioning generally as they are) and low resilience (to allow systems or parts of systems to transform if necessary) might be needed.

It is however, possible to identify areas of concern, where resilience appears to be needed but seems to be declining to levels that give the relevant system little opportunity to respond to and absorb any disturbance. Similarly, it is possible to identify areas where there is too much “undesirable” resilience that appears to be making it difficult to move systems to a more “desirable” set of processes and functions.

The authors of essays in this volume have explored the processes that build and maintain resilience in Australia and Australians, looked for signs that resilience is increasing or decreasing, and considered what general or specific challenges and opportunities Australia might face in the future. In the following sections, some of the key themes emerging from the essays are summarised and the main policy implications distilled.

National confidence

The confidence of Australians (their belief in the future and their own abilities to deal with it), individually and collectively, might be one of the key indicators of our resilience. This issue was raised directly by Richard Eckersley in relation to population psychology but it emerges indirectly in many other chapters, for example:

- Calls for increasing levels of awareness and understanding of possible future challenges so Australian's can be better prepared.
- Increasing people's confidence in their security in relation to economic, social and environmental changes.
- Increasing people's trust in decision-making processes by involving them more completely and genuinely.
- Building better and more transparent risk-mitigation strategies into financial systems.
- Transforming education to produce young people who are fully prepared, capable and confident to meet future challenges.

Education

Although the education system is the specific focus of one chapter, deficiencies in approaches to education of young people and the broader community are raised in almost every chapter, with respect to inadequate resourcing, narrowness of focus, failure to promote broad and innovative thinking, and failure to consider people's development from birth to death.

Reserves (spare capacity)

Running down of reserves (spare capacity) is a direct or indirect theme in virtually all chapters. The current pursuit of narrowly defined economic efficiency is seen by resilience scientists as a prime factor in declining resilience in western countries over several recent decades. The chapter authors have identified depletion in both amounts and diversity in human and natural capital of skills and resources as major concerns with respect to the environment, physical and mental health, education, prevention and management of disease and pest threats, national and personal security, and management of national and personal economies.

Leadership and statesmanship

Leadership and statesmanship are identified as key requirements to address all of the issues raised in this volume. It is recognised that modern politics shies away from leadership that involves rapid change or change that challenges public opinion, but such leadership is called for as challenges mount and the limits of Australia's resilience are approached. Past governments in Australia have created a vicious cycle by not adequately engaging the public in debate and decision making about the future, so that it is now difficult for voters to understand or support the types of changes that are required to prepare Australia for the near and medium-term futures. There are signs that greater government leadership, transparency and public engagement in decision making might be emerging in the USA and Australia. This volume's authors encourage that change.

Rethinking perceptions

Another theme that looms large from the chapters is the need to re-think our perceptions of the components of our social systems and the relationships between the social and environmental components of the larger system that we live in.

Paul Barratt notes that it is fundamentally important to the achievement of resilience that *all organisations with a contribution to make are fit for purpose — they have a clear mission, they are adequately resourced and adequately governed, they have high quality leadership, their staff is adequately trained and has appropriate authorities and resources, and their relationships with other relevant organisations are clear.* He provides numerous examples in which these requirements are not being met across business and public administration and explores why this has happened and how it can be addressed.

Allan Behm discusses the need to re-conceive security to include all aspects of individual and community well-being — bringing human security considerations into the national security domain. This has consequences for the way in which a new resilience framework incorporates the protection of rights and the promotion of values. It also has consequences for the way in which national security decision-making leverages Australia's intellectual capital base to increase the number of parties to the national security conversation.

Graham Marshall urges us to break out of "business as usual" thinking about approaches to governance and think more deeply about core beliefs about the ways governance works.

Paul Barratt, Graeme Pearman and Mike Waller argue that dealing with climate change will require Australians to break free of the undesirable resilience created by perverse policies encouraging behavior that augment climate change.

Richard Eckersley draws our attention to the false dichotomy between the biomedical aspects of health and broader national and international factors that equally influence physical and mental health but which are barely considered in discussion of population health or, if they are considered, are considered separately.

Ian Dunlop argues that there is an urgent need to change the official view of the oil economy from one of "abundant supplies" to "peaking and soon declining supplies" and to make better-informed interpretations of oil-price trends so that we see the real signals being sent by the market.

Both Stephen Prowse and Bob Douglas paint a picture of fragmented approaches to biosecurity and pandemic preparedness that must be reconceived as system-level cooperative approaches involving communities as well as agencies if Australia is to have any chance of coping with future health and/or pest shocks without fundamentally changing our quality and way of life.

Nick Gruen and John Quiggin urge a reinterpretation of financial systems to accept that these systems are unlikely to be endlessly self-correcting, that they are probably changing in undesirable ways slowly and almost imperceptibly while approaching critical thresholds of instability, and that they currently are designed to cope with usual situations whereas they will increasingly need to be able to cope with unusual trends and events.

Steven Cork argues that environmental issues cannot be addressed successfully unless we cease to see ecological systems as separate from social and economic systems. Despite rhetoric recognising this need, responsible agencies continue to act as if the systems are separate by dividing responsibilities across portfolios and apply partial solutions that frequently make matters worse rather than better due to unexpected feedbacks from other parts of the system.

John Hendry outlines the efforts and successes of one school that is building resilience thinking into the education and the personal development of its students.

Robert Lewis, Jim White and Wayne Chandler review evidence indicating that Australian education systems are failing *to initiate the young into those aspects of our culture upon which their (and our) humanity depends*. They argue that it is not the objective that needs to be reconceived in this case (although the need to educate Australians of all ages is increasingly recognised) but the means of achieving this objective. Approaches based on incremental, slow changes are no longer adequate (if they ever were) and an "education revolution" is needed. They note the intentions of the new Australian government but question whether these intentions are being implemented adequately.

Positives

What of the positives? Is Australia completely lacking in resilience? The very fact that a volume such as this can be written and circulated among decision makers across government, industry, and community sectors is testament to Australia's open democratic process that allows free speech and diversity of ideas. Such processes are at the core of a nation's ability to find new ideas and solutions to new challenges and they are not available in many other countries. Each of the chapters in this volume has described aspects of declining resilience in different sectors of Australian social and ecological systems. These concerns arise partly from the perception that previously high resilience is being lost and partly from a belief that there is still sufficient resilience on which to build to face coming challenges.

In a sense Australia has been the "lucky country" in that we have not faced some of the major upheavals faced elsewhere in the world. This is likely to change in coming decades. On the one hand it might be argued that we have had sufficient resilience

to deal with the challenges we have faced in the past. The question is whether we have enough to face the future. The authors contributing to this volume think there is a significant risk that we won't and they have recommended ways to build resilience in critical areas. In the following sections we consider the key themes emerging from the volume in more detail, including their policy implications.

Policy responses

As explained in "How Resilient is Australia"¹, developing policy strategies for maintaining and building Australia's resilience requires consideration of "resilience of what to what". Some aspects of resilience will give Australia and Australians the ability to respond to a wide range of changes, while others will be important for preparing us for specific challenges. "How Resilient is Australia" reported opinions of a diverse groups of leading thinkers about areas in which change in Australia's resilience appears to be occurring and where policy intervention was thought to be needed (Table 1).

Table 1: Changes in Australian society that might be influencing resilience, in general, and the capacity to manage critical thresholds².

| Area in which change is occurring | Net direction of change |
|---|-------------------------|
| Official encouragement of diverse ideas, skills, and viewpoints | ↓ |
| Generation of new ideas, skills and viewpoints outside official processes | ↑ |
| Official efforts towards clarity of values and directions | ↓ |
| Unofficial debate to clarify values and directions | ↑ |
| Official encouragement for sharing of, and respect for, alternative ideas and information | ↓ |
| Unofficial sharing of, and respect for, alternative ideas and information | ↑ |
| Capacity to achieve consensus and commonality of purpose | ↓ |
| Exploration and identification of challenges and opportunities | ↓ |
| Members of the Australian workforce with time and motivation to invest in ideas and build and maintain social connections and cooperation | ↓ |
| Retired members of society with time and motivation to invest in ideas and build and maintain social connections and cooperation | ↑ |
| Investment in innovation | ↓ |
| Motivation, optimism and the capacity of individuals to deal with social and economic problems | ↓ |
| Trust and respect | ↓ |
| Spare capacity to deal with the unexpected | ↓ |
| Complexity of the way Australian society functions (including bureaucracy, regulation, information, human interrelationships, and economic systems) | ↑ |

¹ Cork, S., Walker, B., and Buckley, R. (2008). *How Resilient is Australia?* Australia 21, Canberra. http://www.australia21.org.au/whats_new.htm

² *ibid.*

The current volume took this process further by asking the expert authors to identify for themselves what areas of resilience they considered to be in need of attention and to consider in more depth the options for policy intervention. Each author has considered the sorts of shocks and opportunities that Australia might face in the future. We have not tried to summarise these in this Chapter as they are many and complex. However, Table 2 summarises the policy initiatives recommended by the authors. Some of the recommendations might be aimed at building general resilience and some at specific resilience. The chapter from which the recommendation comes is indicated in Table 2 so that the reader can get further explanation of why this suggestion has been made. These recommendations range from broad to specific because in some areas it is currently only possible to identify the need without much detail about how to meet that need, while in other areas the actions required are much more obvious to the authors.

Table 2: Summary of the policy responses suggested for dealing with resilience challenges

| Policy recommendations and advice | Chapter |
|--|-----------------------------------|
| Take action to apply the principles of effective and resilient organisations to Australia’s public agencies, learning from analyses of recent failures to deal with crisis situations, with particular attention to thorough and interlocking systems of authority, training, staff selection, mentoring and resource allocation that are required to produce the requisite organisations. | Barratt (1.3) |
| Develop policies that cut across society and ecosystems to encourage diversity, connectedness, openness, capacity for quick response, reserves of resources, and overlapping institutions so that issues do not fall between the institutions and any issue does not rely on just one institution for a solution. | Cork (2.8) |
| Develop environmental policies that consider implications across linked social-ecological systems to avoid partial policy and management solutions and perverse outcomes (e.g. solutions to habitat decline need to consider the types of species that used to be in landscapes and the functions they performed and the underlying processes that continue to drive decline, even after apparent threats are removed). | Cork (2.8) |
| Create governance systems that involve people who live closest to environmental change as key decision makers are more likely to detect and respond to change quickly than centralised governance systems far from the sites of change. | Cork (2.8) |
| Seriously consider what types of environmental-social actions are required urgently and resource them in proportion to their importance to their contribution to Australia’s future resilience. | Cork (2.8) |
| Fund research into the extent and nature of decline in Australian ecosystems to a point that will support informed strategies for building and maintaining resilience. | Cork (2.8) |
| Develop policies to train sufficient environmental scientists to meet the needs of local and regional governments and support employment of such people so that informed and resilient information gathering and planning can be achieved at the “coal-face” of environmental change. | Cork (2.8) |
| Consider the impact of climate change on the nation in the context of the changes it will bring at local, regional, sub-national, national and global scales. | Barratt, Pearman and Waller (2.1) |

| Policy recommendations and advice | Chapter |
|--|-----------------------------------|
| <p>Develop adaptive strategies for climate change to consider how Australia can be resilient not only to changes in temperature, precipitation and weather patterns, but also to changes in our terms of trade, changes in the economic, social and environmental circumstances of countries in our region, and increasing demand upon the humanitarian capabilities of the Australian defence force and Australian NGOs.</p> | Barratt, Pearman and Waller (2.1) |
| <p>Do not use uncertainty surrounding the climate change issue as a reason to delay disciplined analysis and decision or hard decisions.</p> | Barratt, Pearman and Waller (2.1) |
| <p>Where market-based mechanisms are applied to address climate change adaptation and mitigation, maintain a market economy that is as broadly based as possible and avoid market intervention for political reasons (because these usually are addressing only part of the system-wide problems).</p> | Barratt, Pearman and Waller (2.1) |
| <p>Deeply integrate domestic policy into global discussions and agreements.</p> | Barratt, Pearman and Waller (2.1) |
| <p>Pay serious and urgent attention to indications of declining social, physical and emotional wellbeing among young Australians.</p> | Eckersley (2.2) |
| <p>Think of health as more than a matter of healthcare services (including increasing the proportion of the health budget allocated to prevention and public health and removing the bias against mental health).</p> | Eckersley (2.2) |
| <p>Reorient education to give it a clearer focus on increasing young people’s understanding of themselves and the world to promote human growth and development, not just materially, but socially, culturally and spiritually.</p> | Eckersley (2.2) |
| <p>Set stricter standards for the corporate sector, especially the media and marketing industries, to guard against moral hazard and psychological harm.</p> | Eckersley (2.2) |
| <p>Work to change the stories or narratives by which Australians define themselves, their lives and their goals (including making better health (in the broadest sense), not greater wealth, the nation’s defining goal).</p> | Eckersley (2.2) |
| <p>Pay serious attention to constitutional reform, to build capacity for a coherent national response to the unexpected and a society that is capable of adapting at short notice to the pressures of a pandemic.</p> | Douglas (2.7) |
| <p>Call a national pandemic summit to bring civil society from across Australia into a planning exercise that expands ownership of pandemic planning from government to the community at large, and from avian flu to a broad suite of pandemic scenarios.</p> | Douglas (2.7) |
| <p>Develop a series of “Hypotheticals” in communities across the nation where community leaders are encouraged to experiment with the ideas for managing catastrophe in their community.</p> | Douglas (2.7) |
| <p>Involve the community (perhaps starting with high school students) in an open discussion about who should be the first recipients of limited supplies of life-saving drugs and prophylactic vaccines In their school and community.</p> | Douglas |

| Policy recommendations and advice | Chapter |
|---|----------------|
| <p>Develop some realistic media productions about what makes some societies able to adapt and transform in response to catastrophic events while others spiral into chaos as occurred in New Orleans following Hurricane Katrina.</p> | Douglas (2.7) |
| <p>In discussion with schools, hospitals, churches and small businesses, develop “first aid community plans” for what to do if 40% of the population suddenly becomes seriously ill with a highly contagious infectious disease.</p> | Douglas (2.7) |
| <p>Develop consistent and holistic policy to address, in an integrated way, the convergence of peak oil, global warming, and the need to radically reduce our carbon emissions from fossil fuel use, including:</p> <ul style="list-style-type: none"> • An honest, public, acknowledgment by the government and business leaders of the real challenges we now face. • Urgent education campaigns to inform the community and gain support for the hard decisions ahead. <p>Establish an emergency, nation-building, response plan to place the economy on a low-carbon footing, minimising the consumption of oil, akin to a 21 Century version of the 1950’s Snowy Hydro Scheme, but much bigger and broader, or the Marshall Plan which reconstructed Europe post-WW2.</p> | Dunlop (2.4) |
| <p>Develop policies that prepare for the unexpected with respect to biosecurity, including:</p> <ul style="list-style-type: none"> • Training programs to increase capacity and improving the use of technology. • Improved career paths for professionals in the sector. • More participatory and collaborative approach to disease control and management. • Increased attention of forecasting and resource allocation through improved information management to. | Prowse (2.6) |
| <p>Consider the emerging evidence that there is a resilience dividend to be gained in complex problems from crafting governance systems that are polycentric (i.e., comprising multiple decision-making centres retaining considerable autonomy) rather than monocentric (including reduced costs of enforcing rules and reducing the probability of widespread policy failure).</p> | Marshall (1.4) |
| <p>Consider alternative means of resourcing the participation of civil groups in polycentric arrangements, thereby circumventing the restrictions of tied funding from government being ‘the only game in town’ (this might reduce government’s dominance but will increase the nation’s resilience to a range of shocks).</p> | Marshall (1.4) |
| <p>Establish multi-faceted policies that encourage leadership at all levels of society, ongoing clear communication of ‘resilience thinking’ to laypeople, sponsorship of deliberative fora that encourage the ‘surfacing’ and respectful challenging of outmoded beliefs, rewriting the textbooks and curricula for school and university education, and making the most of those opportunities that do arise to craft polycentric governance arrangements, learn from them, and celebrate their accomplishments.</p> | Marshall (1.4) |

| Policy recommendations and advice | Chapter |
|---|----------------------------------|
| <p>Re-formulate a national security policy that includes a new security logic that addresses the emergent strategic discontinuities, the huge shifts in power balance, and the new threats to national well-being that reside in the complex cocktail of nationalism, ideological competition, terrorism, pandemics, global warming, and the growing prospects of a global competition for energy and water.</p> | Behm (2.9) |
| <p>Increase national savings and the resilience of the Australian economy through, for example:</p> <ul style="list-style-type: none"> • Investing some of the dividends of recent windfalls (including offshore). • Continuing and even expanding the policy of compulsory superannuation. • Encouraging more conservative prudential policies for Australian financial institutions that keep aggregate borrowings from overseas sufficiently low to reduce the risk of a systemic failure arising from a credit crisis. • Calibrating capital adequacy requirements and/or prudential rules on borrowing with greater sensitivity to the economic cycle. • Providing a simple deposit taking service that would give citizens a low cost and relatively liquid means of placing their savings with government in return for some reasonable interest payments as well as a means of making payments to others in the same system. • Expanding government operations to protect against illiquidity in financial markets beyond the core banking markets within which current central banks now operate. | Gruen and Quiggin (2.3) |
| <p>Build resilience thinking into approaches to education by learning from pioneering programs in schools.</p> | Hendry (2.5) |
| <p>Set ourselves a new national vision for Australia to become the most educated country, the most skilled economy and the best trained workplace in the world.</p> | Lewis, White and Chandler (2.10) |
| <p>Move on from the old paradigm of “public” .v. “private”. People have a right to choose where they study, we must accept that there are many ways we can educate people in Australia and they should be valued and we must concentrate on developing every Australian to their full potential to enhance individual worth, social capital and the “public good”.</p> | Lewis, White and Chandler (2.10) |
| <p>Develop a national approach to education including a national curriculum based upon the 21st century needs of learners and learning, national registration and certification of teachers and a reduction in the significance, interference and size of state bureaucracies.</p> | Lewis, White and Chandler (2.10) |

1.3 Organising to deliver resilience

Paul Barratt AO

Abstract

Of fundamental importance in delivering resilience in any domain is ensuring that all organisations with a regulatory or functional contribution to make actually perform their intended purpose to the required standard. This means ensuring that they have a clear mission, are adequately resourced and adequately governed, have staff that is adequately trained and has appropriate authorities and resources, that there are clear relationships with other relevant organisations, and that there are systems in place to ensure that the governing body and leadership are in control of the business at all times, and have timely notice of any shortfalls in performance. After a case study illustrating the failures that can occur when these criteria are not met, a framework is presented outlining the accountability and performance management practices that are required.

“Over the years, if imperfectly, socialists have had to learn that faith is not enough. Things have to work. Frequently the best course is to rely pragmatically on the market. Now... the lesson for conservatives is equally clear. Faith in the universal efficiency and beneficence of the market, however devout, is also not enough. Here, too, ideology is not a substitute for thought.”

John Kenneth Galbraith³

This Australia 21 publication outlines the considerations that will determine the extent to which Australia is resilient in policy areas that are important to the nation’s future. If we wish to ensure our resilience, we will no doubt make various arrangements designed to contribute to that result. This will typically consist of some mix of regulation, agencies to oversight compliance with the regulations, and agencies to deliver services consistent with both the policy goals of the governments and the regulations designed to align action with those goals.

Of fundamental importance to the achievement of resilience is ensuring that all organisations with a contribution to make are fit for purpose — they have a clear mission, they are adequately resourced and adequately governed, they have high quality leadership, their staff is adequately trained and has appropriate authorities and resources, and their relationships with other relevant organisations are clear.

Consider the following examples:

The United States Government has a Federal Emergency Management Agency, but as the case of Hurricane Katrina showed, if the Agency is not capable of performing its functions, then the supposed capacity of the society to absorb a shock and continue to function turns out to be illusory.

Australia was an enthusiastic supporter of sanctions against Saddam Hussein’s Iraq, and put Customs Regulations in place to implement them in accordance with UN Resolutions, but the sanctions were totally ineffective and Australia distinguished itself by the volume of cash that was paid by way of kickbacks to the Saddam Hussein regime.

³ John Kenneth Galbraith, *Oil: A Solution*, New York Review of Books, 27 September 1979.

The world's major ratings agencies gave AAA ratings to Collateralised Debt Obligations and other paper that turned out to be worthless, thereby making a significant contribution to the global financial crisis.

Investors in funds controlled by Bernard Madoff were entitled to expect that they would be protected by the regulatory activities of the Securities and Exchange Commission and by the annual audits of the funds, but in both cases these protections turned out to be illusory. Those who invested indirectly through the wealth management activities of banks or other funds were entitled to rely also on both the due diligence of the fund managers and their professional prudence in spreading risk, but again they were not protected.

Failures of this kind are not new. Consider the following example:

Norway sold 20 tons of heavy water to Israel in 1959 for use in an experimental power reactor. It was to be used for peaceful purposes only. Norway insisted on the right to inspect the heavy water for 32 years, but did so only once, in April 1961, while it was still in storage barrels at Dimona, the reactor site. Israel simply promised that the heavy water would be used for peaceful purposes, and Norway relied on that promise⁴. In 1967 Israel assembled its first two nuclear devices, using plutonium derived from the Dimona reactor; ten days later it went to war⁵.

A more positive example is the emergency response to the bombings in the London Underground, where the close proximity of working hospitals and the effectiveness of the medical and para-medical response undoubtedly saved many lives.

Fitness for purpose is to a very important degree ensured by the quality of the organisation's corporate governance. Corporate governance is, or ought to be, directed to ensuring that all aspects of the business of the organisation, be it a regulatory authority, a service delivery agency or a private business enterprise, are under control while the organisation goes about meeting the expectations of its legislation, clients or customers. As high-performing business leaders understand implicitly, controlling the business and maintaining the connection with customers are the *sine qua non* of staying in business, the ultimate test of resilience.

Having the organisation's business under control refers not only to being in control of the entity's functions and delivering the desired outcomes. It refers also to the systems in place to enable the governing body ("Board") and senior management to ensure that:

The organisation is meeting all of its responsibilities and acting within the boundaries of all applicable laws and regulations including those relating to public safety, occupational health and safety, environmental impacts, employment law etc.

All risks to the achievement by the entity of its corporate objectives (regulatory, service delivery, commercial or compliance) are, as far as possible, identified, assessed and controlled.

There are systems in place to ensure the sustainability and continuity of the organisation's capabilities.

There is in place an appropriate framework to ensure that the organisation's personnel at all levels are held accountable for delivering what is required of them, and that they are suitably recognised when they do so.

⁴ Warner D. Farr, LTC, US Army, *The Third Temple's Holy of Holies: Israel's Nuclear Weapons*, The Counterproliferation Papers, Future War Series No. 2, USAF Counterproliferation Centre, Air War College, Air University, Maxwell Air Force Base, Alabama, 1999.

⁵ War D. Farr, *op.cit.*, citing Burrows, William E. and Windrem, Robert, *Critical Mass. The Dangerous Race for Superweapons in a Fragmenting World* (New York, New York: Simon and Schuster, 1994)

282–283; Avner Cohen, *Israel and the Bomb*, Columbia University Press, 1988, p. 274.

Not only must staff know what they should do: they must also know what they should NEVER do, and understand the sanctions that will be applied for crimes and misdemeanours.

The Board and senior management have timely notice of any shortfalls in performance in relation to any of the required parameters.

The Board and senior management as appropriate can take timely and effective action to rectify such shortfalls and prevent their recurrence.

Achieving this state of affairs requires leadership of the highest order, and sound management practice. The people appointed to lead the organisation must have the moral and intellectual authority to command respect throughout the organisation, and credibly demand ethical behaviour from all staff. They must have the skills to select, motivate and reward executives who have appropriate skills and potential not only to carry out their assigned tasks, but to align, motivate and mentor their subordinates in accordance with the organisation's purpose. They must have the capacity and will to recognise quickly and deal decisively with underperformance, malpractice and inappropriate behaviour. The leadership must also have the management skills to design, roll out and operate the required systems, and the domain knowledge for effective decision-making regarding organisational risks.

The role of the Chief Executive Officer (CEO) within this framework requires the CEO, under the policy direction of the governing body, to establish five managerial frameworks:

- A **client/customer framework** which requires the organisation to deliver the required portfolio of goods and/or services to its clients or customers, in a manner that meets their expectations in respect of all the attributes they would value: price, quality, performance, reliability, safety, security etc.
- A **resource acquisition framework** that establishes the protocols by which the organisation obtains necessary funds, acquires physical inputs such as plant, equipment and infrastructure, and acquires human resources and specialist skills such as IT skills, training and various forms of specialist advice.
- A **resource allocation framework** defining how financial resources, human resources, technical resources and physical assets are to be allocated having regard to competing claims and priorities.
- An **accountability framework** which establishes who is accountable to whom, for what, by when, with what resources, and to what standards. This framework must do more than define accountability within the chain of command: it must also define role relationships outside the chain of command, ie, what duties individual managers and front-line staff owe to people who are not in direct supervisory positions over them, and who has authority to decide upon matters upon which they cannot agree.
- A **control framework**, ie, all the systems that enable the Board and higher management to monitor what is going on within the organisation and take timely steps to intervene when corrective action is necessary.

Clearly achieving an appropriate degree of control over the business of the organisation requires a level of assurance about the behaviour of each and every person within the organisation, and their alignment both with the purpose of the organisation and with its compliance obligations.

No organisation can hope to achieve the required level of assurance through attempts to micromanage the behaviour of individuals through ever more elaborate rules, regulations, codes of practice etc. The assurance must be systemic, part of the organisation's DNA. It can only be achieved by leadership which communicates clearly what is required of staff, which motivates and resources them to deliver it, and which recognises them when they do.

There are several modern trends that are inimical to the standards of competence and governance that are required in order to provide the necessary assurance and deliver resilience. These include:

"Mate-based" appointments — the practice of appointing Board members, CEOs and other senior officers on the basis of their known political allegiance, membership of some kind of "inner circle", or being someone that the person to whom they will be reporting is "comfortable with", rather than on the basis of a rigorous assessment of their knowledge, skills, experience and relevant personal attributes.

The tendency of a number of Australia's top 100 companies to recycle the members of a small and remarkably narrow though well remunerated elite — one that is not particularly distinguished by either competence or expertise — through their governing Boards may have been a significant contributor to the decline in shareholder value during 2008.

The practice of populating government agencies with the politically aligned can hardly be said to have enhanced the quality of government policy making or service delivery in recent years. Australia has experienced more than a decade of economic boom conditions, but there is widespread dissatisfaction with the state of the nation's infrastructure, education and medical services, to name just a few.

The cult of the generalist, the notion that a person who is smart enough can do anything he/she turns his/her mind to, thereby discounting domain knowledge to zero. There have been countless disasters in the corporate, public sector and military realm perpetrated by people who were perhaps intelligent but lacked the requisite domain knowledge and experience. Wisdom is always a product of experience and knowledge, not intelligence.

The illusion that all risks can be quantified and therefore can be regulated. This is often associated with the illusion that the past is a guide to the future. These two illusions have come together disastrously in the "Value at Risk" approach to the management of financial market risk⁶.

Confused thinking about who owns various risks. State Governments have assumed that when they privatise the electricity system or the public transport system they are passing all the risks to the private operator, but the public still holds the government accountable for the safe and reliable operation of the system. If the lights go out, or the trains are crowded or do not run on time, or privately-owned and operated infrastructure costs much more than a traditional publicly-owned infrastructure investment, governments soon find out that they are still carrying the political risk, even though they are not the ones managing the risk.

⁶ See for example *Professionally Gloomy: risk managers take a hard look at themselves*, The Economist, 15 May 2008.

A touching faith that outsourcing is synonymous with efficiency.

An obsession with efficiency at the expense of effectiveness and resilience. There are two aspects of this:

Especially in the military domain, laudable as efficiency is, effectiveness is usually the most important objective. When people are being put in harm's way, utilising equipment that is difficult or impossible to replace, the important thing is to maximise the prospects of victory, not to achieve some sort of trade-off which is a "reasonable balance" between cost and prospects of success.

If the desired state of critically important organisations is that everyone works very hard all the time, where is the capacity to deal with peaks of activity? Why should we expect in those circumstances that hard-pressed regulators would spot unusual patterns of activity and have the time to reflect that there is something not quite right, something that should be investigated more closely? And if everyone is hard pressed, just who would undertake that closer investigation? Should we be aggrieved if regulators, emergency responders and military personnel are not flat out all the time?

Case Study: The Waterfall Rail Accident

The findings of the Special Commission of Inquiry into the Waterfall Rail Accident present a striking case study of how corporate governance is not a dry as dust matter of who attends how many meetings and whether or not there is a nominations committee or a remuneration committee. It is a real world matter of how those who are charged with the governance of an organisation make sure that their writ runs, and how ensuring that the organisation is effectively governed and led can literally be a matter of life and death.

Poor governance at the State Rail Authority of NSW (SRA) led directly to poor managerial leadership, a confused, ramshackle organisation, confused lines of authority, no effective accountability, bizarre approaches to human resource management, decisions made with no regard for attendance to safety, and a reactive rather than a systemic approach to risk.

The accident which was the subject of the inquiry occurred at approximately 7:14 am on 31 January 2003, when a four car Outer Suburban Tangara passenger train, designated G7 and travelling from Sydney Central railway station to Port Kembla, left the track at high speed and overturned approximately 1.9 kilometres south of Waterfall railway station. The train driver and six passengers were killed. The train guard and the remaining 41 passengers suffered injuries ranging from minor to severe⁷.

In the Executive Summary of the Final Report of the Inquiry, the findings of the interim report on the proximate causes of the accident were summarised as follows⁸:

Investigation of the causes of the accident at Waterfall proved to be an extraordinarily difficult task. The cause of the accident was not apparent. The train driver was deceased and the guard claimed to have no recollection of events prior to the derailment. While G7 had been fitted with a data logger, it was not operating at the time. Consequently, there was no record of the actions of the deceased driver in the period immediately before the derailment.

In the interim report of the Inquiry, the Commissioner concluded that the mechanism of the accident was a high speed rollover. G7 was travelling at approximately 117 km/h as it entered the curve on which it derailed. The speed limit at that point was 60 km/h.

⁷ Special Commission of Inquiry into the Waterfall Rail Accident, *Final Report, Volume 1*, January 2005, Executive Summary, page i.

⁸ *Ibid.*, pp.iii–iv.

Extensive investigation and testing led to the conclusion that both the condition of the track and associated infrastructure, and mechanical malfunction of G7 could be excluded as possible causes of the accident. Deliberate or reckless behaviour on the part of the driver could also be excluded.

The train driver, Mr Zeides, had a number of risk factors for coronary heart disease. Post-mortem examination revealed that he had a 90 per cent blockage of the left anterior descending coronary artery. While this did not establish conclusively that he had a heart attack, the preponderance of evidence was that he was at considerable risk of an incapacitating cardiac event.

Being able to exclude the possible causes mentioned above, the inference from the known state of Mr Zeides' health led the Commissioner to find that he suffered a sudden incapacitating heart attack at the controls of G7.

That conclusion led the Commissioner to examine why, in those circumstances, there was a failure of the deadman system, which is supposed to prevent an accident of this kind if the driver has a sudden heart attack. The deadman system was designed to stop the train unless the train driver maintained continuous pressure either on a spring-loaded hand control or a foot pedal. The foot pedal was designed so that if too much or too little pressure was applied, the emergency brakes would be applied.

Expert evidence before the Special Commission indicated that an incapacitated driver weighing more than 110 kilograms could, by the static weight of his legs, hold the foot pedal in the set position whilst G7 was in motion, preventing an emergency brake application. Mr Zeides weighed 118 kilograms at autopsy.

The Commissioner was satisfied that Mr Zeides was using the foot pedal when he had a heart attack and that the foot pedal failed to operate as intended.

It became apparent that the SRA had information for approximately 15 years that the deadman foot pedal in Tangara trains had the inherent deficiency that train drivers over a certain weight could set the pedal inadvertently if they became incapacitated. In attempting to determine why such a dangerous state of affairs had been allowed to exist for such a long period, the Commissioner concluded that there were serious deficiencies in the way in which safety was managed by the SRA over that period of time.

Apart from the unsafe rolling stock, it was also necessary to understand why the train guard failed to take any action when it became apparent G7 was travelling at excessive speed sufficient to alarm the passengers, and how the train driver, a person at considerable risk of a heart attack, could have passed the periodical medical assessments.

As well as these deficiencies, there were deficiencies in the way in which the safety regulatory system operated. The safety regulatory regime in place, which had as its purpose the prevention of incidents of this kind, failed to operate on this occasion. This must be regarded as one of the latent or indirect causes of the accident.

The Commissioner's findings on the emergency response when the accident occurred are disturbing and give an idea of just how pervasive the safety problems of SRA were⁹:

The Rail Management Centre (RMC) did not trigger a major incident management response until 7:32 am, although information sufficient to do so was known 14 minutes earlier.

⁹ *Ibid.*, p. xiii

Power to the area was not isolated until 8:06 am; during the intervening period several attempts were made to reset the circuit breakers that had been tripped by the derailed carriages — fortunately these were not successful.

Valuable time was lost by police, fire brigade and ambulance officers as a result of inaccurate information as to the location of the accident, and lack of knowledge about access gates and tracks.

Emergency response personnel were not aware of the external door release on Tangara carriages, which would have enabled passengers to be promptly evacuated.

The train guard was not permitted to use the most efficient means of communicating critical information to the RMC, namely the Metronet radio in his cabin.

There were other communications equipment deficiencies, including the lack of awareness of signal telephones by emergency response personnel, and the fact that satellite telephones were not immediately available.

There were deficiencies in communications procedures, including the fact that there was no single nominated person at the RMC and no compliance with any language protocol.

The procedure for identifying a site controller in charge of the accident site was not followed.

The emergency services were not operating under a co-ordinated response plan.

There was no proper site control; there were unauthorised persons on the site and congestion on the access track caused by vehicles with the keys removed.

The rail commander on site failed to perform the emergency response function intended for that role.

At a corporate governance level the Commissioner made the following findings with respect to successive Boards and Chief Executives of the State Rail Authority and its successor RailCorp¹⁰:

They failed to implement a system by which each could quickly and readily obtain information as to the overall safety of the organisation.

They failed to have clearly identified measures for determining the level of safety of each organisation and the safety performance of managerial staff.

They failed to have clearly defined and appropriate safety responsibilities and accountabilities included in managerial position statements.

They failed to have measurable criteria for assessing the safety performance of individuals in managerial positions.

They failed to have adequate internal audit systems in place to test the adequacy of the safety management systems in place.

They failed to use external auditors to test the adequacy of the safety management systems.

There were many more findings on the adequacy of the safety management systems applicable to the circumstances of the accident, 139 in all, covering emergency response, design and procurement of rolling stock, driver safety systems, risk management, data loggers, communications, train maintenance, medical examinations, safety document control, training, rail accident investigation, safety culture, occupational health and safety, passenger safety, corporate safety governance, RailCorp Safety Reform Agenda, safety regulation, integrated safety management and the independence of the regulators and the Rail Accident Investigation Board¹¹.

¹⁰ *Ibid.*, pp. liii–liv

¹¹ *Ibid.*, Full Report, pp. 318–332.

The Special Commission's Report serves to illustrate just how thorough and comprehensive are the measures required to ensure that a large and complex organisation is in control of its affairs and delivers what is required of it, including when it is under stress.

Such organisations require a robust system of managerial accountability, something that was conspicuously lacking in the case of the State Rail Authority of NSW, and would no doubt also be found to be lacking in the organisations that contributed to the failures mentioned at the beginning of this paper.

Robust systems of managerial accountability do not occur by accident; they require thorough and interlocking systems of authority, training, staff selection, mentoring and resource allocation, to name some of the more important. There is no one system which alone can deliver the required managerial accountability, but the brief summary below is offered to illustrate what is involved.

The Management Accountability Hierarchy

A well-known framework for effective leadership of a so-called Management Accountability Hierarchy is that developed by Elliott Jaques over a long period of time from the 1970s and implemented in, amongst other organisations, CRA during the 1980s and 1990s¹². The following draws on his work. It gives an indication of the personnel accountability and performance management practices that would need to be set up in order to ensure that a large organisation's governing authority and leadership could have confidence that the business is under control in every relevant sense and can not only deliver its core business purpose but can comply, and know that it complies, with all of its statutory and regulatory obligations.

The framework for establishing the "Requisite Organization" has five key themes:

- **Placing the right people in the right jobs**
Ensuring that the job descriptions throughout the organisation are properly constructed, and that all of the people appointed to them are equipped, by way of personal qualities, qualifications and experience, to perform their duties to the requisite level of effectiveness.
- **Doing the right work at the right level**
Ensuring that all of the work that is done needs to be done (people not just doing things right, but doing the right things) and that it is done at the lowest level at which the individual to whom the work is assigned can reasonably be expected to perform it to the requisite standard.
- **Adding value at every level**
No work should pass through a pair of hands that has no contribution to make. This only imposes delay, and prevents the real players from dealing with each other directly.
- **Holding authorised managers accountable for their performance**
Ensuring that all managers have the authority (standing, skills, resources and authorisations) to undertake their assigned duties, and that they are held to account not only for their own personal effectiveness but for the personal effectiveness of those whom they manage.
- **Establishing a culture of continuous improvement**
Holding all managers accountable for establishing continuous improvement arrangements and for all programs and processes that they control.

¹² Elliott Jaques, *Requisite Organization: A Total System for Effective Managerial Leadership for the 20th Century*, Cason Hall & Co., Arlington VA, Revised Second Edition, 1996.

Many organisations are reluctant to invest in their own capacity to improve, to change and to adapt. In order to realise these five themes, re-skilling of the workforce, encouraging new ideas, rewarding initiative, training managers, developing leadership skills, investing in new technologies — all these forms of investment are critical to building resilience within organisations, and to building organisations that are resilient. World's best practice is a laudable aim. But it cannot be achieved by complacently protecting mediocrity, or failing to find out what world's best practice is, and where it is practised. Singapore gets it right. In 1999, Singapore had six of its up and coming Government officials at the Kennedy School of Government at Harvard University. Australia had none from any level of Government.

These objectives of the five key themes are realised by setting down a clear set of expectations for managers at every level, plus rules for induction and coaching, performance appraisal, establishing continuous improvement processes, responsibilities of supervisors of managers, and protocols for staff selection and de-selection.

In any organisation a manager is by definition a person in a role in which he or she:

Has legitimated power to expend material, technical and human resources.

Is held accountable not only for his/her personal effectiveness but also for the output of others.

Is also accountable for building and sustaining an effective team of subordinates capable of producing the required outputs, and for exercising effective leadership.

In performing their management role, managers are expected to add value by: Setting context, including imparting a clear sense of corporate direction in accordance with the corporate plan:

Disaggregating the more complex tasks into a multiplicity of simpler tasks and assigning the component tasks to officers who at their level could reasonably be expected to complete the task effectively with a minimum of guidance and supervision.

Reintegrating the completed components into a finished product of appropriate quality.

Ensuring that subordinates are allocated the resources to enable them to complete the task in a timely manner to the required standards.

Reviewing outputs retrospectively in order to sustain standards and judge the effectiveness of their subordinates.

In assigning tasks to subordinates all managers should specify what is required, to what standard, by when, and what resources are allocated to apply to the task. Managers are held accountable for instituting effectively a range of processes and procedures that will lead to maximum work unit effectiveness through maximising the personal effectiveness of staff:

They are required to take a systematic approach to the induction of new staff, and give to them personally a wider picture of the work to be done, current problems and priorities, how the work fits into the wider business unit and organisation-wide context, and any other information relevant to the subordinate's rapidly gaining a rounded picture of the situation.

They are also expected to coach their subordinates day by day for their work in their current role both in the interests of the organisation and in the interests of the growth and advancement of the subordinate. Training should be arranged to extend the subordinate's knowledge and skills for the work in the role.

Managers must conduct performance appraisals which measure the personal effectiveness of staff in producing the required outputs under the prevailing circumstances.

All managers are accountable for establishing and maintaining continuous improvement arrangements for all programs and processes that they control.

Ensuring that managerial subordinates are effectively discharging their managerial leadership accountabilities is itself a key accountability.

All managers must ensure that each and every one of their subordinate managers is doing the following both consistently and effectively:

- Regularly meeting with immediate subordinates in managerial team working sessions.
- Setting context, and regularly updating it.
- Conducting manager-led two-way planning discussions.
- Engaging in just-in-time task assignment that specifies what is to be produced, to what standard, by when, and what resources are assigned for the task.
- Engaging in personal effectiveness discussions and coaching.
- Ascertaining whether the subordinate manager's evaluations of the applied capability of subordinates equilibrate with the judgements of their own subordinates by the manager's colleagues.
- Showing evidence of good selection and induction procedures, and of effective de-selection judgement and disciplinary action when necessary.

All managers with subordinate managers have important duties to the immediate subordinates of the subordinate manager (i.e., to the feeder group for the work level they supervise directly). They must ensure the establishment of clear working relationships between all subordinates at the second level down (i.e. subordinates of their direct reports), maintain sufficient personal contact with each member of the feeder group to be an effective mentor, and decide and oversee their development programs.

Managers at all levels have important rights and duties in respect of the selection and de-selection of staff. The key managerial prerogative is the authority not to have subordinates who are operating at a level below the bottom of the work band for the duties of their position. This flows directly from the principle that all managers in the organisation are accountable for the output of their subordinates.

This does not amount to a right to hire and fire. What it does amount to is the authority not to have a candidate the manager judges inadequate imposed by higher authority.

Managers must also have the right to initiate a de-selection procedure, which is the authority to remove a subordinate from their role, in accordance with a prescribed procedure, when the subordinate is no longer working up to scratch for whatever reason, e.g. lack of commitment, external preoccupations or failure to keep pace with the evolving knowledge and skill requirements of the position.

Of equal importance to the definition of accountabilities within the managerial hierarchy is the clear definition of role relationships. Although large organisations are normally organised into vertical managerial silos, most work processes flow horizontally from silo to silo. For example, in a railway company infrastructure people inspect and maintain the track on which train services people operate the trains; passenger fleet maintenance people

maintain the trains that the train operations people drive; internal audit has rights of access to all parts of the organisation. Thus for most individuals there are people other than their supervisor who can initiate tasks that they are required to perform, and who will make a contribution to the evaluation of their performance.

It follows that as well as knowing who his or her manager is, it is important for each and every employee to know precisely what duties he/she owes to other people in the organisation, and what authority people in these task initiating roles have over them.

The question of requisite organisational design is not a trivial one. To quote Elliott Jaques:

My view is that the way to get managerial leadership is through the development of the organization itself. Get the organization right, and the people and the managers who give leadership to them will be enabled to work together in full collaboration and with constructive mutual trust. Given half a chance, people are keen to get on with their work, and to have work to get on with. What is missing is an adequate organizational framework within which to work and cooperate with each other¹³.

This accords with my own experience of over twenty years at senior leadership levels in the Australian Public Service. The prime sources of inefficiency and conflict are not unwilling, unable or difficult people; they are poor organisational design and the poorly specified accountability and authority that almost inevitably go with it. An effective and resilient organisation has none of these.

¹³ Jaques, *op. cit.* page pair 2.

Conclusion

To conclude as we began: of fundamental importance to the achievement of resilience in any domain is ensuring that all organisations with a contribution to make, are fit for purpose — i.e. they have a clear mission, they are adequately resourced and adequately governed, they have high quality leadership, their staff is adequately trained and has appropriate authorities and resources, and their relationships with other relevant organisations are clear.

Sources:

The principal sources for this paper are:

Elliott Jaques, *Requisite Organization: A Total System for Effective Managerial Leadership for the 20th Century*, Cason Hall & Co., Arlington VA, Revised Second Edition, 1996.

Special Commission of Inquiry into the Waterfall Rail Accident, *Final Report, Volume 1*, January 2005.

1.4 Governance for sustaining trust in a complex world

Dr Graham R. Marshall

Abstract

Objectivism, universalism, mechanism, atomism and monism are five elements of modernist thought that have deeply influenced Australian governance in the past century. This has led to a form of administrative rationalism that has been further influenced by neoliberal economic policies that together have not played well for resilience. Confidence in monocentric, “one shoe fits all” solutions to all forms of governance has waned and in its place is emerging “polycentrism” with multiple decision making centres retaining considerable autonomy. But there are now large vested interests in monocentric solutions that will be difficult to confront as Australia moves towards a more resilient and more open approach to its public administration that better incorporates the inputs from civil society.

In Australia, we have been grappling with serious challenges to the resilience of our governance arrangements for at least four decades. Various new governance approaches have been tried in an attempt to address these challenges, such as the regional delivery model for community-based natural resource management, but resilience in this sphere seems as elusive as ever. Recent insights from ‘resilience thinking’ reveal these attempts have been too much like ‘business as usual’. Some core beliefs about the way governance works, that served us well in earlier times, will need to be questioned more deeply if future attempts to bolster the resilience of our governance systems are to make more headway.

These core beliefs are those upon which the scientific and industrial revolutions contributed so monumentally to human knowledge, and upon which the modern era was founded. Ongoing successes from applying these beliefs in solving scientific, technological and other social problems imbued these beliefs with scientific credibility. The first of these modernist beliefs is objectivism, namely that people can remain apart from the system they are seeking to understand and act upon. The second is universalism — a belief that the myriad phenomena of the world, and the relationships between them, can be explained by relatively few universal principles. The third is mechanism, namely that all natural and social systems work like machines; i.e., behaving in regular, and therefore predictable, ways. The fourth is atomism, a belief that all systems can be understood completely as the sum of their parts. The last of these is monism — that there is a single best way of understanding any natural or social system (Norgaard 1994).

By the early 20th century in Western societies, governance in the public sphere was striving to become scientific in modernist terms, in part to bolster citizens’ trust in its competence by appealing to the hold of science on the public imagination. Objectivism led to a distinction in governance functions between the realms of ‘politics’ and ‘administration’. The latter realm was to regard values and policy directions set in the political realm as externally determined, and thus objective, and pursue them efficiently on the basis of the other four modernist beliefs. Universalism, for instance, was reflected by the confidence of ‘administrative rationalists’ that phenomena widely dispersed in space and time could be understood by applying a few basic principles, and that solutions to local problems could accordingly be devised from afar by a central authority. Monocentric government administration, with its decisions implemented through a single integrated command structure, thus came to be viewed as the most cost-effective governance arrangement across all areas of public policy (Marshall 2005).

The 20th century did not play out well for the resilience of the administrative rationalist approach to public governance. Monism, or the belief that human conflict would fade away as ideological, religious and other 'divisive' ways of thinking converged steadily on scientific rationality, seemed contradicted by escalation in the human cost of war, terrorism and other forms of conflict (Nelson 1987). Administrative rationalism was revealed as lacking scientific rigour, its principles often contradictory platitudes (Simon 1946). Once the hero of the industrial revolution, the 'machine' had by virtue of an accumulation of wars, nuclear and chemical accidents, and other tragedies, become a metaphor for social and ecological destruction (Ezrahi 1990). Consequences of public policy interventions were found increasingly harder to predict than expected on the basis of mechanism and atomism, and continuing intervention on this basis thus led to an accelerating accumulation of unexpected side-effects (Norgaard 1994). Increasingly, these side-effects emerged beyond the scale that individual national governments could address effectively by themselves (Berkes 2007; Berkes et al. 2006; Dietz et al. 2003). The scope for choosing interventions apolitically on the basis of science narrowed as the policy arena became increasingly influenced by sectional interests better able to act collectively, compared with the general public, in lobbying governments and influencing public opinion (Olson 1982). Aside from the specific factors already mentioned, the accumulated general effect of organising public governance according to modern beliefs (i.e., 'modernisation') was to distance public and private life to a degree historically unprecedented. Political crises arose because governments had 'come to be devoid of personal meaning and... therefore viewed as unreal or even malignant' (Berger et al. 1977 p.3).

By the 1970s, citizens' trust in administrative rationalist governance had eroded in Australia and many other nations to a point that the resilience of this governance model in gaining sufficient cooperation from citizens to implement its decisions was under threat.

Governments looked towards new ways of operating. One main response was to acquiesce to the strong demands that had arisen for community participation in public decision-making. Aside from legislating rights for such participation in otherwise centralised decision-making processes, Australian governments from the 1980s onwards began decentralising responsibilities to community-based programs as a way of strengthening popular ownership of, and cooperation with, public policy decisions. Advocates for such programs were influenced by community development, rural development and other disciplines that had demonstrated the contributions that community empowerment, supported by change agents, could make in solving otherwise intractable problems.

The other main response was to agree that the aspiration of achieving all public goals through direct administration was unrealistic, and at the same time substitute the idea that these goals be attained through centralised manipulation of the 'market mechanism' (Nelson 1987). This response followed from mainstream economic arguments that the 'invisible hand' could achieve spontaneously what direct administration could not, provided that governments refocused their energies on remedying 'market failures' (e.g., externalities and monopolies).

This second response has been central to how the ideas of New Public Management (NPM), now the dominant paradigm for public governance around the world (McLaughlin et al. 2002), have come to be applied. This paradigm underpinned the Australian Government's commitment made in the late 1990s to 'effective federalism' (Crowley 2001). It sees government as 'steering not rowing', using market and market-like instruments in delivering public services. A key outcome from adopting this viewpoint in Australia has been a marked shift towards governments 'purchasing' the production of public services from 'providers' (Carroll et al. 2002). The dominance of this paradigm owes much to the far-reaching ideological sway of neo-liberalism since the 1980s. This is an ideology that advocates roll-back of government and increased reliance on markets.

So dominant have been NPM ideas that governments soon came to reinterpret their commitments to community-based programs through the prism of these ideas, and particularly in terms of a purchaser-provider model where governments purchase public services (e.g., delivering social support or funding on-ground conservation works) from community-based organisations (e.g., charities or Landcare groups) as providers of these services. More particularly, this reinterpretation was via mainstream economic theory founded on the modernist belief in mechanism. Consequently, this theory justifies confidence by any government in its ability to predict all the key details of purchaser-provider contracts needed for the market's invisible hand to adequately deliver any chosen set of policy goals (Marshall 2008). Given this confidence, any government has little reason to treat citizen groups as true partners in so-called community-based arrangements, and consequently to show as much accountability to such groups as it expects them to show it. Even so, many supporters of community-based approaches have been co-opted into what is mostly a top-down policy agenda. This is explained by the pervasive influence of neo-liberal ideas on the contemporary public imagination, governments' astute cloaking of these ideas in 'partnership rhetoric' (Lockwood et al. 2005), and also because the purchaser-provider payments on offer are usually 'the only game in town'.

Meanwhile, the problem for Australians of building governance systems resilient to the novel and immense challenges we will face this century awaits solutions unconstrained by beliefs that our reality has outgrown. Fortunately, an extensive international body of knowledge from institutional analyses conducted over at least two decades is available for us to draw upon (e.g., Berkes et al. 2003; Ostrom 2005; van Laerhoven et al. 2007). This accumulated knowledge reveals the serious handicaps that modernist beliefs often place on efforts to understand and solve problems of governance. It demonstrates contemporary governance problems are normally better understood as complex adaptive systems rather than as behaving mechanistically (Anderies

et al. 2004). Confidence in monocentric efforts to devise universal, one-shoe-fits-all, solutions effective for all governance settings (e.g., purchaser-provider arrangements) is therefore unjustified. Science has moved on, and the modern project needs to catch up.

This knowledge demonstrates also the folly of looking only to governments and markets as structures for addressing the complex governance challenges we face. It reveals community-based and other civil structures often have vital roles in shoring up the respective weaknesses of government and the market (Baland et al. 1996). Such structures are often well-positioned to establish trust from both citizens and government, for instance, and thus, by acting as 'mediating structures', to rekindle citizens' trust in governance arrangements (Berger et al. 1977).

We find also from this research that blending of civil structures into multi-layered governance systems often enhances their resilience in other ways too. However, this is true only to the extent that this blending is sensitive to the respective comparative advantages of governments, markets and civil structures in each different setting. Government might be the dominant player in one setting, the market in another and civil society in yet another. In most cases, however, each will benefit substantially from support by the others. Moreover, inclusion of civil structures into governance systems will impart resilience only when these structures are allowed discretionary powers sufficient to adapt their modes of operation to the unique and evolving circumstances each inhabits.

There is a resilience dividend to be gained in complex problems, therefore, from crafting governance systems that are *polycentric* (i.e., comprising multiple decision-making centres retaining considerable autonomy) rather than *monocentric* (Ostrom 1999). The dividend from the decentralised aspect of polycentric governance can include (i) reduced costs of enforcing rules by strengthening their local legitimacy and by making it easier to craft rules than can be monitored affordably; and (ii) enabling 'multiple units [to experiment] with rules

simultaneously, thereby reducing the probability of failure for an entire region' (ibid. p.526). Polycentric governance confers resilience also by complementing its decentralised aspect with more centralised levels of governance able to deal with problems exceeding the capacities of some lower-level units to solve alone (e.g., inter-community conflict). The overlapping and redundancy of governance units in polycentric arrangements may itself contribute to resilience, by enabling information about innovations that have worked for one unit to be conveyed more easily to other units. Further, it means that 'when small systems fail, there are larger systems to call upon — and vice versa' (ibid. p.528). This benefit follows from the modular structure of a polycentric system: the substantive self-reliance of each of its components enables the overall system to keep performing when some components 'go off the rails' (Walker et al. 2006).

The key to reaping resilience dividends by crafting polycentric systems of governance is the principle of subsidiarity: allocate each governance responsibility to the lowest level of governance with capacity to exercise it effectively (Marshall 2008). Higher-level governance structures are thus viewed as subsidiary to lower-level ones, assuming responsibilities only to the extent that lower levels cannot accomplish them alone. However, efforts to apply this principle often confront formidable obstacles not only from vested interests but also from the continuing hold of universalism, mechanism and other modernist beliefs on the worldviews of many politicians, policy makers, community leaders, and citizens more generally. Politicians and government officials, for instance, have vested interests in obstructing subsidiarity whenever this principle recommends decentralisation of responsibilities on which their power, status or remuneration depends. And policy advisers trained in mainstream economics, for example, are predisposed by the modernist beliefs underlying this training against recognising communities and other civil groups as competent to be anything more than 'providers' of services tightly pre-specified from the top down (Marshall 2005).

These obstacles would not seem so formidable but for the considerable advantages derived by governments vis-à-vis civil groups from their 'fiscal dominance' and from being able to play to the continuing hold of modernist ideas on the public imagination when resisting polycentric arrangements (Young 2002). Part of the solution to the Australian Government's fiscal dominance involves reminding both policy makers and citizens that the bulk of taxation powers were entrusted to it not because it is necessarily best equipped to decide how tax revenues should be invested, but due to the economies available from centralised collection. Another potential part of the solution is to explore and agitate for alternative means of resourcing the participation of civil groups in polycentric arrangements, thereby circumventing the restrictions of tied funding from government being 'the only game in town'.

The answer to government's second advantage ultimately requires reinspiring the public imagination with ideas based on the best science available for the world we inhabit today. Homer-Dixon (2006 p.282) observed: '[W]e can't hope to preserve at least some of what we hold dear... unless we're open the radically new ways of thinking about our world... We need to exercise our imaginations so that we can challenge the unchallengeable and conceive the inconceivable'. This task will necessarily be multi-faceted, including leadership at all levels of society, ongoing clear communication of 'resilience thinking' to laypeople, sponsorship of deliberative fora that encourage the 'surfacing' and respectful challenging of outmoded beliefs, rewriting the textbooks and curricula for school and university education, and, perhaps most importantly, making the most of those opportunities that do arise to craft polycentric governance arrangements, learn from them, and celebrate their accomplishments.

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Section 2 — Policy areas

2.1 Climate change: What sort of resilience will be required?

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Abstract

In fashioning its adaptive response to climate change, Australia needs to be resilient not only to changes in precipitation, temperature and weather patterns, but also to changes in our terms of trade, destruction of our tourist icons, changes in the social, economic and environmental circumstances of countries in our region and increasing demand upon the humanitarian capabilities of the Australian defence force and Australian NGOs. Our domestic policies and measures must be deeply integrated into global discussions and agreements. Uncertainty on this issue is not a reason for delaying decisions but flexibility can be maintained through application of a portfolio approach to energy options while national and international experience are developed.

The aim of this paper is to outline the considerations that will need to be brought to account in assessing Australia's resilience against changes that might be induced by anticipated climate change to the middle of the century. This resilience might be defined as the ability of Australia's social, economic and environmental systems to maintain their general structure and functions even though they must adapt and change in the face of climate induced challenges.

Climate change presents a classic illustration of the requirement to analyse resilience at any scale in the context of one or more scales above and below the scale in question. To analyse the impact of climate change on Australia as a whole we need to consider the impact of climate change on the nation in the context of the changes it will bring at scales above (global and regional) and at scales below — sub-nationally and locally.

The classic, well understood consequences of climate change at a global level are:

- Sea level rise.
- Storm tracks in both the tropics and the temperate zones will be pushed to higher latitudes.
- Higher frequency of extreme weather events.
- Higher frequency of hot days and lower frequency of cold nights.
- Warmer ocean surface temperatures.
- Retreating glaciers and more rapid melting of winter snow on high ground.
- Changes in local ecosystems.

To understand how these global changes will impact upon Australia's social, economic and environmental systems it is necessary to consider how they will impact upon some key regions.

The final report of the Garnaut Review states that by 2100 the impacts of unmitigated climate change on Australia could include:

- A 92 per cent decline in irrigated agricultural production in the Murray-Darling Basin, affecting dairy, fruit, vegetables, grains.
- Catastrophic destruction of the Great Barrier Reef, with the reef no longer dominated by corals.
- Snow based tourism in Australia is likely to have disappeared. Alpine flora and fauna highly vulnerable because of retreat of the snowline.
- Up to a 34 per cent increase in the cost of supplying urban water, due largely to extensive supplementation of urban water systems with alternative water sources.
- Significant risk to coastal buildings from storms and sea-level rise, leading to localised coastal and flash flooding and extreme wind damage.
- Over 4000 additional heat-related deaths in Queensland each year.
- Sea-level rise beginning to cause major dislocation in coastal megacities of south Asia, south-east Asia and China, and displacement of people in islands adjacent to Australia¹⁴.

Earlier impacts on the Murray Darling Basin could include a 12 per cent reduction of production by 2030 and a 49 per cent reduction by 2050¹⁵. As the Murray Darling Basin represents 40 per cent of the gross value of Australian agricultural production, these outcomes would have very substantial impacts on the national economy, and catastrophic impacts upon the communities that depend upon this production for their livelihood. Beyond 2050, fundamental restructuring of the irrigated agriculture industry will be required¹⁶.

¹⁴ Garnaut R., *Garnaut Climate Change Review, Final Report*, Cambridge University Press, 2008, pp. 127 ff.

¹⁵ *Ibid.*, p.130

¹⁶ *Ibid.*, p.130

In the 10th percentile hot, dry case, in the absence of mitigation, by 2050 the rivers in the Basin would barely be flowing¹⁷.

Many natural landscapes that are important to the Australian tourism industry would be significantly affected in a future of unmitigated climate change. These include the Great Barrier Reef and tropical rainforests of tropical north Queensland, Kakadu, the deserts of Central Australia, the Ningaloo Reef and coastal environs of south-west Australia and the alpine regions of New South Wales, Victoria and Tasmania. Many are World Heritage areas, which Australia has international legal obligations to protect¹⁸.

Climate change would lead to loss of attractions; loss of quality of attractions; costs of adaptation; increased cost for repair, maintenance and replacement of tourism infrastructure; and increased cost for developing alternative attractions¹⁹.

The following three areas have been identified as the most threatened:

- **Tropical North Queensland** contains the coral reef complex, severely threatened rainforest areas, beaches in danger of inundation and increasing storm damage. There are threats to tourism from increased incidence of bushfires and increased ultraviolet radiation²⁰.
- **South-west Western Australia** is the scene of Australia's only internationally recognised biodiversity hotspot, one of 34 in the world. It has high risk ratings based on the greatest diversity of vulnerable native flora, a vulnerable wine industry and, together with the Murray-Darling Basin, the greatest salinity problem in the country²¹.
- In the **Top End of the Northern Territory**, national parks and wetlands are at risk, and tourism is threatened by increased exposure to ultraviolet radiation and increased exposure to disease²².

Climate change will have wide-ranging and significant effects on the infrastructure critical to the operation of settlements and of industry across Australia. This will occur through changes in the average climate and changes in the frequency and intensity of severe weather events²³.

Increased frequency and intensity of cyclones in northern Australia will lead to increased risk of disruption of iron ore and coal exports from the Pilbara and Queensland respectively. This increased risk will be figured into the purchasing patterns of our major customers, with consequences for our suppliers and their stakeholders.

Climate change is likely to affect the health of Australians over this century in many ways. Some impacts, such as heatwaves, would operate directly. Others would occur indirectly through disturbances of natural ecological systems, such as mosquito population range and activity²⁴.

The main health risks in Australia include:

- Impacts of severe weather events (floods, storms, cyclones, bushfires).
- Impacts of temperature extremes including heatwaves.
- Vector-borne infectious diseases (for example, dengue virus and Ross River virus).
- Food-borne infectious diseases (including those due to Salmonella and Campylobacter).
- Water-borne infectious diseases and health risks from poor water quality.
- Diminished food production and higher prices, with nutritional consequences.
- Increases in air pollution (for example, from bushfire smoke).
- Changes in production of aeroallergens (spores, pollens), potentially exacerbating asthma and other allergic respiratory diseases.

¹⁷ *Ibid.*, p.130

¹⁸ *Ibid.*, p.133

¹⁹ *Ibid.*, p.133

²⁰ *Ibid.*, p.134

²¹ *Ibid.*, p.134

²² *Ibid.*, p.134

²³ *Ibid.*, p.135

²⁴ *Ibid.*, p.139

- Mental health consequences and the emotional cost of social, economic and demographic dislocation (for example, in parts of rural Australia, and through disruptions to traditional ways of living in remote indigenous communities²⁵).

The full national and local effects of these changes can only be understood, however, in the light of parallel changes taking place internationally:

- The Consultative Group on International Agricultural Research has predicted that food production in Asia will decrease by as much as 20 per cent due to climate change. These forecasts are in line with IPCC projections showing significant reductions in crop yield (5–30 per cent compared with 1990) affecting more than one billion people in Asia by 2050²⁶.
- The key Australian export markets in China, India, Indonesia and elsewhere in Asia are projected to be relatively badly affected by climate change. Climate change would be associated with a decline in international demand for Australia's mineral and energy resources and agricultural products²⁷.
- Australia's strong reliance on emissions intensive energy resources means that we could also be vulnerable to poorly targeted mitigation responses by other countries, such as protectionist responses that impose tariffs on Australia's emissions intensive exports²⁸.
- It is estimated that 105 million people in Asia would be exposed to a one-metre rise in sea level²⁹.
- Sea-level rise would have proportionately the most severe consequences for low-lying atoll countries in the Pacific³⁰

- As a consequence, there could be substantial climate induced migration, with serious consequences for international security. Climate-induced migration is set to play out in three distinct ways. First, people will move in response to a deteriorating environment, creating new or repetitive patterns of migration, especially in developing states. Second, there will be increasing short-term population dislocations due to particular climate stimuli such as severe cyclones or major flooding. Third, larger-scale population movements are possible. These may build more slowly but will gain momentum as adverse shifts in climate interact with other migration drivers such as political disturbances, military conflict, ecological stress and socio-economic change.³¹
- Severe weather events have the potential to generate an increasing number of humanitarian disasters requiring national and international relief. Because it has the resources and skilled personnel to respond quickly and effectively, Australia will be called upon to shoulder the brunt of any increase in emergency and humanitarian operations in its immediate neighbourhood³².

The consequence of this analysis is that, in fashioning its adaptive responses to climate change, Australia will need to be resilient not only to changes in temperature, precipitation and weather patterns, but also to changes in our terms of trade, changes in the economic, social and environmental circumstances of countries in our region, and increasing demand upon the humanitarian capabilities of the Australian defence force and Australian NGOs.

²⁵ *Ibid.*, p.139

²⁶ *Ibid.*, p.146

²⁷ *Ibid.*, p.145

²⁸ Commonwealth of Australia, *Green Paper on Carbon Pollution Reduction Scheme*, p.7

²⁹ Garnaut Review, *op. cit.*, p.148

³⁰ *Ibid.*, p. 149

³¹ Alan Dupont and Graeme Pearman, *Heating up the Planet: Climate Change and Security*, Lowy Institute for International Policy, 2006, p.57

³² Garnaut Review, *op. cit.*, p.148

Our policy framework itself must be resilient, against:

- Climate outcomes falling on the outliers of the anticipated range of outcomes — the policy must be designed to be suitable over the whole plausible range.
- Unexpected developments (shocks).
- The climate policy actions of others: if others take significantly weaker or stronger actions than our current stance, then we should be able to respond by changing our policy settings without changing our policy framework.
- Intense climate impacts on other states (eg Asian food crisis, sea level rise making island states uninhabitable).
- Market effects of international climate action (eg marked reduction of coal price, upwards pressure on food prices).

It needs also to recognise that resilience can be either desirable or undesirable. Undesirable resilience might include the preservation of reflexive ideas that:

- Industries and householders must be sheltered from the consequences of government decisions even when the purpose of those decisions is to induce behavioural change.
- Users must pay even when it is in the public interest to induce individuals to behave in certain ways (eg the notion that the public transport systems should recover all their costs from passengers even though it is in the public interest to encourage more people to use public transport).

The changes will not necessarily be linear or incremental: they may reach critical thresholds or 'tipping points' beyond which it is not possible to return to the status quo ante. Examples of tipping points at the national or local level might include:

- Major acidity problems such as are currently emerging in Lake Alexandrina in response to the catastrophic reduction in Murray River flow.
- Declines in some rural communities in response to reduced water availability — particularly communities dependent upon permanent plantings such as orchards and vineyards which go beyond their capacity to recover from lack of water.
- Extinction of a number of native species that are at the edges of their environmental tolerances in response to temperature and water shocks.

In developing appropriately resilient responses, we could do worse than heed the five main themes of the draft report of the Garnaut review, which could be summarised as follows:

- Domestic policy must be deeply integrated into global discussions and agreements. Only a global agreement has any prospect of reducing risks of dangerous climate change to acceptable levels³³.
- Global and national mitigation is only going to be successful if reductions in emissions can be made and demonstrated to be consistent with continued economic growth and rising living standards. For Australia, our prime asset in meeting the climate change challenge is the prosperous, flexible, market-oriented economy that has emerged from difficult reforms over the past quarter century. The corollary of this is that an effective market-based system will be as broadly based as possible, with any exclusions driven by practical necessity and not by short-term political considerations³⁴.

³³ Ross Garnaut: *The Garnaut Climate Change Review: Final Report*, Cambridge University Press, 2008, p. xxvii

³⁴ *Ibid.*, p. xxviii

- Uncertainty surrounding the climate change issue is a reason for disciplined analysis and decision, not for delaying decisions. Under uncertainty, knowledge has high value, and this makes the case for increased investment in applied climate science. Rigorous decision making under uncertainty recognises that options have value, and that option values decay with time³⁵.
- To be practical, any policies on national or international mitigation will need to be and to be seen to be equitable³⁶.
- Good governance is critical: there will be no success in mitigation, at a national or international level, without good governance in relation to climate change policies³⁷.
- The rate at which implementation of technology can take place to meet both the demand for energy use and the requirement for emissions reductions. Not all options have the same implementation curve.
- Technical feasibility in some options remains uncertain at least for some locations and some applications. The relative costs and performance for several important emerging technology options will not be resolved until the 2015–2025 timescale.
- Community acceptability of each technology is not equal, nor is this acceptability independent of geographic location and potential impact on the wider social and environmental situation.

Resilience principles must be applied to the development of strategies to mitigate greenhouse-gas emissions. Climate change results primarily from the way in which we source and utilise energy. Mitigation of climate change implies the restructuring of our energy system. Examination of alternative energy resources and application technologies shows clearly that whilst many options exist each with, at least superficially, advantages and disadvantages, in all cases we lack sufficient information to be certain about:

- Their respective ultimate cost of implementation and operation, related to the untested, or emerging state of the technology, the opportunities for cost improvement through scaling up, and the cost disincentive through resource limitations and other environmental or social imposts.

This state of uncertainly demands that flexibility be maintained and options be kept open through the application of a portfolio approach in which no option is ruled out entirely, but a strategy is followed in which all options are entertained (through education, research, training, government and industry intervention in pilot and larger applications) whilst local and international experience is built and applied to the on-going refinement of the strategy. This may not be as efficient as investing in the “ultimate” system (if it was known at this stage), but avoids confronting potentially dislocating failures in ill-informed and incorrect investments. In this sense, ensuring future resilience has a price, but that price is likely to be much smaller than committing to premature and catastrophic mis-investment.

³⁵ *Ibid.*, p. xxviii

³⁶ *Ibid.*, p. xxix

³⁷ *Ibid.*, p. xxix

2.2 Population health: the forgotten dimension of social resilience

Richard Eckersley

Abstract

The health and wellbeing of the current generation of young Australians are arguably declining. This is contrary to “received wisdom” and has important implications for personal and social resilience. Australian society is seen as rougher, tougher, more competitive and less compassionate than it was, producing stress, edginess and a feeling of personal vulnerability. With growing talk of apocalyptic futures, three responses are increasing: nihilism, fundamentalism and activism. Only the last is a resilient response. To address this health and resilience decline we must reconceptualise the health care, re-orient the education system and set stricter standards for the corporate sector, especially in media and marketing. We need also to make “better health”, not “greater wealth”, the nation’s defining goal.

The health of a population is a critical dimension of the resilience of a society. Population health is both a consequence and a cause of social changes, an important component of social systems that shapes their capacity to weather adversity, to maintain their essential structure and function under the pressure of hostile events and circumstances.

This is not generally recognised. A false dichotomy often characterises debate and discussion about national and international affairs. On the one hand, these matters are seen as shaped by large, external forces such as economic developments, technological change, environmental degradation and resource depletion, and war and conflict.

Population health may be affected by these forces, although this is often assumed rather than explicitly examined (except in the case of war and natural disasters), but health itself is not usually seen as a contributor to larger-scale social developments. The perspectives of economics, politics and, increasingly, environmental sciences dominate the discourse. On the other hand, considerations of health focus on internal, psychological and physiological processes and personal attributes, circumstances and experiences. The dominant frame of reference is a biomedical model of health (or more accurately, ill-health) as an attribute or property of individuals.

This separation is misleading. The reality is that change in both the social and personal worlds is shaped by a complex interplay between the world ‘out there’ and the world ‘in here’ (in our minds and bodies). We need to understand this interplay to comprehend what is happening in both worlds. In other words, human ‘subjectivity’ plays an important part in the functioning of social systems, including their resilience; this is what most distinguishes them from other, biophysical systems, such as ecologies and climate.

The dichotomy is also paradoxical in that, with the possible exception of increasing wealth, improving health is the most widely used measure of human development. Wealth has only ever been a means to the end of a better life; health is a core component of that end. If population health is not improving, it is hard to sustain the belief that, as a society, we are making progress. And if health is declining, this not only reflects social regression, it can reinforce it. If people are getting sicker and sadder, this weakens the confidence and resolve we need to face and overcome threats and adversities.

Challenging the orthodoxy of improving health

Is health an issue for us in these times?

The orthodox view of population health in Australia and, indeed, most of the rest of the world, is of continuing improvement in line with historic trends (1). This view is based mainly on declining mortality and so rising life expectancy, as well as high levels of self-reported health and life satisfaction. Globally, life expectancy has more than doubled in the last one hundred years, and is still rising; it is one of humanity's greatest achievements.

However, while mortality might once have been a good summary measure of health, this is now questionable. The orthodox view underestimates the growing importance to overall health and wellbeing of non-fatal, chronic illness, especially mental disorders. Similarly, high levels of self-reported health and happiness cannot be taken at face value. Self-reported health is not an accurate measure of health status: many people with serious health problems will still say their health is excellent or very good. Likewise, happiness measures do not reflect all aspects of wellbeing.

The 'mismeasure' of health is especially relevant to young people. Their health is not only important in its own right, or for their sake; it is crucial to assessing the overall state and future of society. The young reflect best the tenor and tempo of the times by virtue of growing up in them. Because of their stages of biological and social development, they are most vulnerable to social risks and failings. Many of the attitudes and behaviours — even the illnesses — that largely determine adult health have their origins in childhood, adolescence and early adulthood. Thus the health of young people shapes the future health of the whole population and, in a broader social sense, the health — and resilience — of society.

To take Australia as an example of the developed world, death now strikes very few young people: about 40 in every 100,000 each year (1). Also, the major causes of death do not necessarily reflect underlying changes in physical and mental health (especially the biggest killer, road accidents). On the other hand, research in Australia and other developed nations suggests 20–30% of young people (20–30,000 per 100,000) are suffering significant psychological distress at any one time, with less severe, stress-related symptoms such as frequent headaches, stomach-aches and insomnia affecting as many as 50%. Mental disorders account for almost half the total 'burden of disease' in young Australians, measured as both death and disability — far more than the second biggest contributor, injuries.

A few examples demonstrate the extent to which the high prevalence of diminished wellbeing amounts to a problem for social resilience. A recent survey (2) of more than 10,000 Australian students from prep school (age 4–6) to year 12 (age 17–18) found that about 40% scored in the lower levels of social and emotional wellbeing. Between about a fifth and a half of students said they: were lonely (18%); had recently felt hopeless and depressed for a week and had stopped regular activities (20%); were very stressed (31%); had difficulty controlling how depressed they got (32%); lost their temper a lot (35%); worried too much (42%); and had difficulty calming down when upset (a measure of resilience) (48%). (Yet, to illustrate the point above about the inadequacy of happiness measures, 89% of the students said they were happy).

Several surveys by the Australian Childhood Foundation (3–5) of children 10–14 or 10–17 produce a similar picture of high levels of stress, worry and anxiety. For substantial minorities, increasing to majorities for some questions, their sense of confidence in themselves, their community and their place in the world is under threat. Based on one survey (5), the foundation established three categories of children: those who felt well-connected and supported — 52%; a 'worried' group — 42%; and a 'disconnected and insular' group (the most vulnerable) — 8%.

While these findings imply a worsening situation, long-term trends in mental health are very difficult to establish conclusively because of the lack of good, comparative data (1). The issue remains contentious; not all studies show an increase. However, the weight of international evidence indicates the prevalence of psychological problems among young people has risen in developed nations in recent decades, with the latest US research suggesting a 5–8-fold increase over the past 70 years. The trends are despite the increased treatment of mental disorders.

There are also other adverse patterns and trends in young people's health, including: rising obesity, and obesity-related diseases such as diabetes; high levels of physical inactivity; poor nutrition; increasing allergies; more young people in care and protection; and rising rates of violent crime (which mainly involves young people) (1).

These arguments also apply to overall population health, but with some important qualifications (1). Mental disorders are the third largest contributor to the total burden of disease, after cancer and cardiovascular disease, and the largest contributor to the non-fatal component of the disease burden. The proportion of all Australians reporting 'mental and behavioural problems' as long-term conditions increased from 6% in 1995 to 11% in 2005. However, this picture is offset by declining death rates for leading health problems, including the degenerative diseases of cancer, heart disease and strokes, which are also major causes of disability (these diseases have relatively little impact on young people's health because of the time it takes for them to develop).

Recent international research suggests the disease burden of mental illness has been underestimated, which would further challenge the orthodoxy of improving health. One study (6) found people attributed higher disability to mental disorders than to the commonly occurring physical disorders, especially with respect to their 'social and personal role functioning'; with 'productive role functioning', the disability of mental and physical disorders was comparable.

Another analysis (7) argues that the burden of mental disorders is likely to have been underestimated because of inadequate appreciation of the connection between mental illness and other health conditions. Mental disorders increase the risk of both communicable and non-communicable diseases, and contribute to unintentional and intentional injury. Conversely, many health conditions increase the risk of mental illness.

Public moods and attitudes

The discussion of health so far has focused mainly, but not wholly, on clinically significant illness. If we go beyond this focus to consider people's moods and attitudes more broadly, the evidence adds to the disturbing picture of poor personal and social resilience.

Many studies over the past decade, both qualitative and quantitative, reveal levels of anger and anxiety about changes in society that were not apparent thirty years ago (8). The studies show many people are concerned about the materialism, greed and selfishness they believe drive society today, underlie social ills, and threaten their children's future. They yearn for a better balance in their lives, believing that when it comes to things like individual freedom and material abundance, people don't seem 'to know where to stop' or now have 'too much of a good thing'.

A report on 'the mind and mood' of Australians (9) says there is growing concern about the state of Australian society — rougher, tougher, more competitive, less compassionate — that is producing stress, edginess and a feeling of personal vulnerability. Australians feel they 'seem to lurching from one difficulty to another with the prospect of a serious crisis emerging'. One survey (3) reported 'a growing sense among parents that childhood is at risk because the daily environment in which children live is perceived to be increasingly less safe, stable and predictable'. It found that 80% or more of parents believed children were growing up too fast; worried about their children's futures; and felt children were targeted too much by marketers.

The concerns people express about life today and in the future are important to social cohesion and resilience because they weaken people's belief in a broader social ideal and a commitment to the common good, so reinforcing individual goals and priorities. They can also impact on personal wellbeing (1, 8). Psychological research shows that viewing the world as comprehensible, manageable and meaningful is associated with wellbeing. Biomedical research shows that people become more stressed and more vulnerable to stress-related illness if they interpret the stress as evidence that circumstances are worsening, feel they have little control over its causes, and don't know how long it will last.

Population health's social impacts

Declining health, in both the narrower (clinical) and broader (wellbeing) sense, is an important factor in determining whether societies flourish or languish, including how they cope with adverse events and conditions. The historian Kenneth Clark observed that civilisation, however complex and solid it seems, is really quite fragile (10). After reviewing thousands of years of the rise and fall of civilisations, he warns that 'it's lack of confidence, more than anything else, that kills a civilisation. We can destroy ourselves by cynicism and disillusion just as effectively as by bombs'.

The interplay between psychology and history can be dramatic. The historian Norman Cohn, in his study of the revolutionary chiliastic or millennialist movements which swept Europe in the Middle Ages, said the movements represented a 'collective paranoiac fanaticism' (11). He argued that societies become vulnerable to revolutionary chiasm when the existing structure of a society was undermined or devalued, and the normal, familiar pattern of life had undergone 'a disruption so severe as to seem irremediable'.

It was then that particular calamities would appear particularly calamitous, producing 'an emotional disturbance so widespread and acute, such an overwhelming sense of being exposed, cast out and helpless, that the only way in which it can find effective relief is through an outburst of paranoia, a sudden, collective and fanatical pursuit of the Millennium.'

Cohn saw this paranoid response in the 20th century totalitarian movements of Communism and Nazism. All its ingredients also exist in the 21st century. The resulting social pathology is evident in today's fundamentalist cults and terrorist groups, such as the al-Qaeda terrorist network. There have also been signs of millennialist fervour in the United States in the wake of the September 11 terrorist attacks.

Diminished resilience, then, not only affects people's capacity to respond to adversity in a generic sense; it can dramatically influence the course their response takes. This is apparent in the 'psychosocial dynamics' of global threats such as climate change (12). People appear to be responding in at least three different ways to 'apocalyptic suspicions' about the 21st century: nihilism (the abandonment of belief in a social or moral order), fundamentalism (the retreat to certain belief), and activism (the transformation of belief). Each of these responses offers benefits to people's individual wellbeing and resilience, but in quite different ways: nihilism through a disengagement and distraction from frightening possibilities and prospects; fundamentalism through the conviction of righteousness and the promise of salvation; and activism through a unity of purpose and a belief in a cause. Yet only activism (which arguably demands more collective resilience, energy and resolve) will allow us to deal constructively with global threats.

Public policy implications

We need to think of health not just as an individual illness that requires treatment, but also as an issue having national, even global, causes and consequences. We need to think of health as a way of better understanding ourselves, how we should live, and the societies we live in. Just as someone who is unwell, physically or mentally, will be less able to function effectively and withstand adversity, so too will an unhealthy population make a less resilient society. More than this, people's health and wellbeing can be an important factor in determining whether societies respond effectively to adversity — or in ways that make the situation worse.

Global warming and the global financial crisis demand greater national and international intervention and regulation to avert potentially catastrophic outcomes. So too do the trends in population health. These include (1):

- Thinking of health as more than a matter of healthcare services. This should include increasing the proportion of the health budget allocated to prevention and public health. The tradition bias in healthcare, especially medicine, against mental health also needs to be removed.
- Reorienting education to give it a clearer focus on increasing young people's understanding of themselves and the world to promote human growth and development, not just materially, but socially, culturally and spiritually.
- Setting stricter standards for the corporate sector, especially the media and marketing industries. Just as quality of life depends on the regulation by government of the social and physical environment to protect our physical safety and health and of the economy to ensure national economic benefits and financial propriety, we need to regulate cultural influences better to guard against moral hazard and psychological harm.

- At the most fundamental level, changing the stories or narratives by which Australians define themselves, their lives and their goals. These changes should include making better health (in the broadest sense), not greater wealth, the nation's defining goal. This, in turn, would shift the emphasis of economic activity away from private consumption for short-term, personal gratification towards social investment in building a more equitable, healthy and sustainable way of life.

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2.3 Boiling frogs and black swans: How resilient is our economy — and how could we improve its resilience?

Dr Nick Gruen
Prof John Quiggin

Abstract

The Australian economy has become substantially more resilient to the 'normal' shocks of national economic life in the last generation as a result of policy changes and developments in the financial markets. On the other hand it is not clear that such changes have made our economy more resilient to large shocks of the kind that produce depressions. Australia's greatly increased foreign indebtedness means that in the event of a global depression we could fare very badly indeed. The present crisis has taken on global proportions with frightening speed. One way of enhancing our economic resilience might be an increase in the level of compulsory savings through superannuation or through some means whereby citizens deposit some of their savings with governments, thereby competing with the commercial banking system. It is sensible for governments in the current crisis to be protecting against illiquidity in financial markets.

The boiling frog has long been the standard cliché referring to the situation in which people — particularly groups — fail to notice danger because of the smooth small increments with which it creeps up on them. The frogs, we are told (apparently falsely³⁸) won't jump out of water as it is heated to boiling point if it is heated slowly enough.

In the context of resilience, the boiling frog metaphor may be seen as a warning that gradual adverse changes may not be noticed until the system in question has passed the point where a shift to a new, adverse state, is irreversible.

The metaphor is of some use in thinking about modern management of risk, as is another that has become popular more recently, that of the black swan. Most formal theory of risk is developed from mathematics which takes as its context certain well defined probability distributions. The mathematics elegantly investigates the implications of the information we have *providing our notion of what kind of population the sample comes from is accurate*. And we can never really know if it is accurate.

Thus every observation of a swan until the discovery of Australia tended to confirm the proposition that all swans are white. But it turned out they were not!

There is a nasty coalescence of phenomena by which much of the risk management apparatus we have set up, from the theory of risk management to the institutions of the financial market, is well equipped to deal with the risk involved in 'normal' states of the world but fails when unusual events occur.

Yet things as diverse as limited liability companies, bonuses linked to corporate performance and risk management protocols with undue reliance on 'mark to market' valuations all tend to reward behaviors like excessive leveraging which greatly increase returns in normal times — and often increase individual remuneration even more — at the cost of catastrophe in the event of some unusual 'black swan' event.

Shouldn't managing for this latter eventuality be at the heart of risk management? The task of divining the resilience of our economy to adverse shocks in the future — whether they come from within or without must begin and end with modesty. Niels Bohr's observation that prediction is always difficult, especially about the future is a standard of economics conferences and is even taken to heart at the better ones.

³⁸ http://en.wikipedia.org/wiki/Boiling_frog provides some evidence and links

To discuss the Australian economy's resilience to future shocks sensibly, the kind of shock we have in mind would range from a global economic downturn lasting a year or so of either a relatively modest or severe kind. It is also sensible to consider something more serious again, perhaps a depression of the magnitude of the 1890s or the 1930s or just the decade long stagnation we saw in Japan in the 1990s. Our judgement is that the Australian economy is likely substantially more resilient to a mild downturn and that it may be more resilient to a sharper but still short lived downturn.

However the big risk is the extent to which we have increased our foreign borrowing and the huge resulting increases in our foreign indebtedness. In some possible futures it would become evident that such borrowing had been unwise and in the event of a really severe and prolonged global economic downturn our borrowing is likely to see the Australian economy perform very badly not just absolutely as most economies would do in such circumstances, but even relative to the poor performance of other economies.

We begin with a brief consideration of the economic implications of environmental damage. Without downplaying their environmental significance, we conclude that these threats do not pose a threat to the resilience of our economy, either now or in the future.

Economic resilience and the environment

The economic dimension to ecological degradation is this: Biodiversity loss, salinity, water and depletion of various natural resources reduce the economy's productivity. While these problems generate economic costs, they're not large in the scheme of things. Further, though there may be some local 'tipping points' the macroeconomic implications of all of these phenomena will assert themselves both slowly and in a way that markets are relatively well suited to dealing with — and to the extent that they are not, we have developed a range of collective institutions, such as community action groups and governments at all levels which will also assist markets to deal with the problems.

The one exception to this is global warming. Here, although effects will emerge relatively slowly, there are global tipping points that we are in danger of tripping if we have not already and the economic consequences could be substantial. Accordingly it is worth expending resources in order to combat global warming for as long as the scientific consensus suggests that not doing so exposes us to the risk of a loss which is greater, possibly much greater.

Even here, in pure economic terms even the costs of global warming will be dwarfed by the growth of knowhow. This is not an argument against tackling any of our environmental problems — and addressing them efficiently will reduce their economic costs. However it does put the issues in perspective *looked at from the perspective of economic resilience*.

Further, one might well want to address any or all of these concerns even at the cost of some diminution of economic consumption because of their intrinsic value. We should be able to do so without any significant diminution of the resilience of our economy.

Resilience to relatively minor shocks

Australia's economy is probably much more resilient to minor economic shocks than it was a generation ago. The Australia of the 1970s imposed heavy constraints on the flows of goods and capital and set wages centrally. While central wage setting could conceivably improve the economy's capacity to absorb certain kinds of shock — as it arguably did in the mid 1980s — most of the time central wage setting was dominated not by economic thinking but by the political attitudes embodied in the concept of 'comparative wage justice'. In these circumstances external shocks such as booms in our terms of trade were liable to set off boom bust cycles in the economy. This occurred in the mid 1970s and again just a few years later.

In the Australia of the late 1990s, flows of foreign capital and goods had been liberalised, the exchange rate floated, monetary authorities were independently targeting low and stable inflation and wage setting had been decentralised. Of course we will need several more cycles to be really confident, but theoretical considerations suggest that the economy will handle such shocks much more flexibly and the empirical evidence we have confirms this expectation.

Thus for instance in the Asian financial crisis of the late 1990s, the exchange rate depreciated heavily, yet inflation and wages remained moderate providing Australia with a trajectory through the crisis that would be hard to fault. In macroeconomic terms this trajectory resembles a typical Keynesian response to a downturn, except that it was engineered by the market. Thus where initially the shock was to the traded sector in the form of reduced demand for our exports and falling import prices, a substantial portion of that shock was passed on to the rest of the economy by the falling dollar. Likewise external borrowing rose to enable Australians to smooth their consumption through the temporary downturn in external demand.

Likewise in the current difficult economic circumstances, we are far from being out of the woods yet and a recession is quite possible. But so far the Australian economy appears to be weathering the various storms around it much better than it might be doing with the institutions of the 1970s.³⁹ It is notable for instance that our appreciating exchange rate since the early 2000s has moderated the inflationary impact that Australia's terms of trade boom would otherwise have had. Likewise decentralised wage bargaining and the credibility of independent monetary policy has prevented the current terms of trade boom from creating a wages boom.⁴⁰ Note also that as a slowdown has approached, exchange rates have suddenly fallen — from a Trade Weighted Index of 73 in June 2008 to 64 in mid September at the time of writing. Markets do not always behave so benignly but all of what we have described here seems straight from the textbook.

Indebtedness domestic and foreign and the current account

Access to a global financial system has the potential to increase Australia's resilience to economic shocks whatever their source. By borrowing from overseas lenders, Australian households can smooth their aggregate consumption and firms can finance new investments even when domestic institutions are unwilling or unable to extend credit. This was in evidence during the Asian financial crisis, improving the resilience of our economy.

On the other hand, by increasing the risk of a foreign debt crisis, excessive reliance on overseas borrowing may reduce the resilience of the economy, particularly to large external shocks. If large debts are incurred under favorable conditions, as has been the case in Australia, there is a risk that foreign creditors will be unwilling to extend additional credit if circumstances deteriorate.

Australia's actual experience yields only equivocal evidence on the question.

On the one hand, the Australian economy has exhibited a high degree of resilience since the severe recession of 1989–91.

The expansion since the recession has been on some measures the longest in our history. But contrary to the expectations of many, even a substantial improvement in our terms of trade has not produced sustained balance of trade surpluses or any significant reduction in the ratio of foreign debt to GDP. This is partly the result of increased investment, particularly in mining to increase production of increasingly valuable commodities.

But this has not been the whole story and to the extent that it has not been (and to some extent even to the extent that it has — since changing circumstances could undermine the returns of the investments we are making) we are taking a risk.

³⁹It should be acknowledged that similar predictions of success were made in 1989 at what may prove to be a similar time of the cycle vis-à-vis today. It would be better to wait before being too confident that we will make it through this cycle with a 'soft landing', particularly given the collapse of Lehman Brothers announced on the day this piece was due for submission!

⁴⁰On both points see Gruen, D., "A Tale Of Two Terms-Of-Trade Booms", Address to Australian Industry Group, Economy 2006 Forum, Melbourne, available at <http://www.treasury.gov.au/contentitem.asp?NavId=016&ContentID=1077>

If all goes well, our increased indebtedness will have enabled us to finance increased investment with minimal sacrifices in our own consumption, something that is to be welcomed. On the other hand it is possible to envisage a scenario in which this course of action would look foolish in hindsight. It is not that difficult to imagine a situation in which the economies of the developing giants of China and India experience a slowdown, particularly as a result of reduced import demand from depressed Western economies and/or some domestic problem such as inflation and/or financial crises as occurred in the case of the Asian financial crisis of 1997.

Financial sector shocks

The Australian economy, like the global economy of which it is a part, has experienced spectacular growth in the volume and sophistication of financial transactions since the 1970s. A vast range of new financial products collectively referred to as derivatives, has emerged. These products include options, swaps, and securitized obligations. The total volume of derivatives currently outstanding is well over \$300 trillion or more than five times the annual value of world output.

Derivative contracts provide households, firms and governments with a range of flexible options to manage the risks they face. Regulators have devised a sophisticated framework to ensure that financial institutions use such options to achieve a sustainable allocation of risk, rather than engaging in dangerous speculation that might create the possibility of bank failure, or worse, a failure of the entire system. Despite the difficulties that have affected a number of institutions in the last year, no such systemic failure has emerged.

By comparison with US and European banks, the core of the Australian banking sector has suffered little damage from the current financial crisis. However, the rapid emergence of the crisis in the US, where only a year ago problems were thought to be contained to the subprime sector of the home mortgage market raises the concern that a similar crisis could emerge here.

Moreover, in the event of a global systemic crisis causing the failure of major US banks, it is unlikely that Australia would emerge unscathed. Such a crisis may already be underway.

A global depression

Before the emergence of stagflation in the 1970s many economists would have believed that we had essentially mastered economic management sufficiently to rule out another Great Depression. We do know more, and it does seem unlikely that we would make the series of mistakes that led to the Great Depression. But most economists are no longer as complacent as they were in the 1960s on this point.

Certainly the financial crisis we are currently experiencing has been easily the most comprehensive since the Great Depression. And it has taken on global proportions with frightening speed. Of central importance is the extent to which the financial sector has expanded beyond the structure for which we have developed reasonably comprehensive (though not error proof) prudential supervision.

Further, we are moving away from a world in which there was a dominant economy — the United States — which was both able and prepared to take a global leadership role in maintaining global aggregate demand and stabilising the global financial system. The Asian development model as pioneered by Japan and the imitated throughout Asia has emphasised export led development. But countries seeking to increase net exports must do so with trading partners prepared or able to increase their net imports.

And the importing countries have typically been the English speaking developed countries. Most have run up sizable foreign debts and so their capacity to continue on this path is likely to moderate. As Dani Rodrik put it recently, “We are moving to a new world economy, and one of the casualties of the transition could well be the East Asian export-led growth model”.⁴¹

It is possible, though not very likely that this could lead to a situation in the developing economies where growth stalls and in such a situation it is also possible that those countries or some of them would encounter financial crises as Asia did in the late 90s. A coincidence of the kinds of ‘bad news’ outlined above, could lead to a very severe and prolonged global downturn.

In such a situation Australia’s position would be unusually bad. Our terms of trade are amongst the most volatile in the world but unlike commodity importing countries, that volatility tends to amplify the effect of the volatility in global growth rather than dampen it — as occurs with commodity importing countries. This, our stock of foreign liabilities and our ongoing current account deficit would all tend to lead Australia’s performance through such a difficult time to go from being above the economic performance of its peers to below them.

What could be done to improve our resilience?

One way of improving our economic resilience would be to increase national savings. We might use some of the dividends of the current windfall we are experiencing in our terms of trade to invest for the future. If we were to do so offshore this would diversify the investments held by Australians and so reduce risk in the future. The Norwegians have done this via a sovereign wealth fund with their own resources windfall from North Sea petroleum.

In this context we note the benefits of compulsory superannuation. By increasing Australian saving and by channeling it overwhelmingly into professionally managed, relatively high return portfolios of assets (including a substantial portion of offshore investments) this policy has also made us less reliant on foreign capital, something which will stand us in good stead should foreign investors become less favourably disposed to Australia in the future. The contrast with New Zealand is instructive. With no compulsory super, New Zealand’s firms have worse access to capital and have accordingly invested less heavily. Likewise the New Zealand has invested a far less capital per person in foreign assets and runs a higher current account than Australia. These things make its economy relatively less resilient to adverse shocks. Increasing compulsory superannuation further would probably be sensible in this context, as would facilitating the expansion of superannuation contributions through ‘default’ mechanisms according to which people’s contributions would rise over time unless they made a conscious decision to opt out of such plans.⁴²

But even with compulsory super and various other measures to increase national savings dating back to the Fitzgerald report of the early 1990s, household savings have remained low or negative, and national savings remain inadequate to produce a decline in the current account deficit.

A concern with resilience might, therefore, suggest the adoption of more conservative prudential policies for Australian financial institutions. The aim would be to ensure that aggregate borrowings from overseas were kept sufficiently low to reduce the risk of a systemic failure arising from a credit crisis. It might also make sense to try to facilitate a situation in which lenders took greater account of the cycle in their decisions about the creditworthiness of borrowers and the security of assets. One way this might be done would be to calibrate capital adequacy requirements and/or prudential rules on borrowing with greater sensitivity to the economic cycle.⁴³

⁴¹ http://rodrik.typepad.com/dani_rodriks_weblog/2008/09/is-export-led-growth-passe.html

⁴² Gruen, N., 2006, “Designed defaults: how the backstop society can failsafe Australians’ superannuation”, Progressive Essays, available at <http://tinyurl.com/omves> (pdf). Nevertheless if this were done, steps should also be taken to reduce the regressiveness of the tax concession on saving within the superannuation system.

⁴³ Thus for instance one might allow lenders to lend 75 percent of the value of residential property of a certain quality during booms and 85 percent during downturns before requirements for additional security — via mortgage insurance were required. It would not be possible to ‘fine tune’ such a policy, as regulators will not know precisely where we are in the current cycle, but they can have a reasonable idea of *approximately* where we are.

In the age of the internet, governments could provide a simple deposit taking service that would give citizens a low cost and relatively liquid means of placing their savings with government in return for some reasonable interest payments as well as a means of making payments to others in the same system. This system could compete with the existing banking system.⁴⁴

More generally, it has been accepted since the recovery from the Great Depression that governments have a central role in providing market making facilities of last resort to shore up liquidity in critically important financial markets. In the wake of a generation of financial innovation, government market making of last resort is playing 'catch up'. It seems both likely and sensible that the state will expand its operations to protect against illiquidity in financial markets beyond the core banking markets within which current central banks now operate. The difficulty will be in working out the details and the limits of this transition.

Postscript

We reread the above with some trepidation after a few months which seemed like an eternity in the financial markets. The piece was written as financial crisis loomed, but it was written before Lehman Brothers — a major financial institution — was allowed to go into liquidation. While it seems the caution we expressed about our own ability to predict the path the crisis would take forsook any chances we may have been able to take of demonstrating our clairvoyance, the piece above seems to us to stand up relatively well.

We were right to make the distinction between the navigation of small and large shocks. It seemed quite clear that 'the great moderation' the reduction in volatility from the end of the last major recession in the early 1990s and 2008 should be seen as an improved capacity to deal with minor shocks.

The question was always whether it would assist in the handling of larger shocks. We expressed our skepticism. Now we know more. Indeed as Daron Acemoglu argued recently it looks like the financial systems improved capacity to handle small shocks came *at the cost of its ability to handle large shocks*. As he puts it, lesson one from the crisis is this:

The seeds of the crisis were sown in the Great Moderation... Everyone who patted themselves or others on the back during that time was really missing the point... The same interconnections that reduced the effects of small shocks created vulnerability to massive system-wide domino effects. No one saw this clearly.

It is possible to make the case that the Australian economy traded lower vulnerability to small shocks for greater vulnerability to large shocks in an additional way. In addition to the embrace of a variety of financial innovations to which Acemoglu is referring, the period of the Great Moderation sees Australia using the increased availability of foreign capital to fund increased borrowing during periods of low export demand (following the Asian crisis) and increased investment (during the mining boom). The resulting smoothing of domestic consumption has come at the cost of higher foreign debt which, as the article above makes clear increases our vulnerability to external shocks — the kind of shocks we are experiencing now.

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⁴⁴ See Gruen, N., "Govt could be net banker" *Australian Financial Review*, 29th July 2008.

2.4 Peak oil — catalyst for a resilient, sustainable society

Ian T. Dunlop

Abstract

The peaking of global oil supplies will probably be the catalyst that forces the world to address global warming and a sustainable future. Yet it continues to be ignored by successive Australian governments despite our special vulnerability to it. A resilience approach to this problem will require honest public acknowledgement by government and business leaders of the real challenges we now face; urgent education campaigns and an emergency nation building response plan that will focus on energy conservation and efficiency, large scale conversion to renewable energy, major changes in our transport system, phase out of high carbon emission facilities, introduction of high speed broadband, investment in low emission technology and rapid reform of the tax system. The question must be asked whether our current form of government can rise to this exciting challenge in these difficult times.

Now that oil prices are receding from their July (US\$147/bbl) peak, there is an inevitable tendency to assume the oil problem is fixed and move on to the next issue. Unfortunately nothing could be further from the truth. We have been given a warning which we should heed, as the problem is certainly not fixed. The peaking of global oil supply, Peak Oil, will probably be the catalyst which forces the world to seriously address the related questions of global warming and, beyond that, global sustainability, far more rapidly than we are expecting. In short Peak Oil is a good thing, provided you are well prepared; it is likely to have even greater impact than global warming in the short term!

It is, however, the issue our political leaders seemed determined not to mention, although an increasing number of international oil company CEOs are quietly acknowledging the reality we now face. Having built our prosperity on cheap energy from fossil-fuels, particularly oil, it is perhaps understandable that we are reluctant to admit that business-as-usual is over as that cheap energy disappears.

Peak Oil takes its name from the bell-shaped curve which typifies the production profile of any oilfield. Once an oilfield is discovered, oilwells are drilled and production rises until drilling saturation is reached, whereupon production levels off at the peak. Production then drops, along the declining segment of the bell-shape, until the reservoir is exhausted. This production profile applies to an individual oilfield, to all oilfields in a region and now to the globe, although it may get distorted along the way by, for example, by geopolitics.

At the peak, oil does not run out, as roughly half of the ultimately available oil remains to be produced. However, it is the point, globally, at which further expansion of oil production becomes impossible because production from new oilfields is more than offset by the decline of production from existing oilfields. It may be a sharp peak if, for example, some of the giant fields start to decline rapidly, or it may be an undulating plateau spread over a number of years if, for example, oil demand is destroyed as a result of recession, or countries are no longer able to afford high oil prices. Once demand begins to exceed supply, oil prices rise, as they have been doing over the last few years — the bigger the gap, the higher the price.

The “official view”, until recently, from organizations like the International Energy Agency (IEA), the energy watchdog of the developed world, was that we had abundant oil resources available from both conventional and unconventional sources, which would meet rapidly expanding global demand as China and subsequently India became large consumers. The economists took comfort as the oil price rose, on the grounds higher prices would stimulate additional production so that supply eventually balanced demand and forced the price down in the classical mode — as Brian Fisher, the former head of ABARE, colourfully put it: *“If the price of eggs is high enough, even the roosters will start laying!”*ⁱ

Maybe so, but this is primarily a technical, rather than an economic, issue. It is one thing to have theoretical oil resources in the ground; it is quite another to convert those resources into practical oil flows to the market; it now seems that there are unexpected problems in so doing, to the extent that we probably are approaching the peak of global supply. We may have already passed the peak, or it may be some years ahead, but the exact date is less important than accepting the principle and taking action to prepare for it.

The “official view” is now scrambling to catch up with reality; as the Chief Economist of the IEA recently commented *“... putting these two things together, the short term and medium term security of our oil markets, plus the climate change consequences of this energy use, my message is that, if we don’t do anything very quickly, and in a bold manner, the wheels may fall off. Our energy system’s wheels may fall off... within the next seven years”*ⁱⁱ. In urging OECD governments to rapidly change policy from ‘business-as-usual’, he commented that *“... we must leave oil before it leaves us”*ⁱⁱⁱ.

His concerns were echoed last month by Mohamed El Baradei, Director-General of the International Atomic Energy Agency, in calling for a global energy organization *“... to take action on the energy crisis that is taking shape before our eyes. ... We need to act before crisis turns into catastrophe.”*^{iv}.

Sheikh Yamani, the former Saudi and Opec Oil Minister, anticipated it long ago with the observation that *“The Stone Age did not end for lack of stones, and the Oil Age will end long before the world runs out of oil.”*

The reasons supply is not expanding are:

- First, we are not discovering new oilfields quickly enough, and certainly not any giant fields.
- Second, data on existing fields is suspect, particularly in the Middle East, so we may not have as much oil as we thought.
- Third, production from many existing oilfields is declining as part of the natural process often more quickly than admitted officially.
- Fourth, unconventional oil resources, such as deep water and tar sands, are proving more difficult to develop, technically and economically, even with higher oil prices — they also have major environmental problems such as high carbon emissions and high demand for water and energy, to the point where, in some cases, almost as much energy is needed to produce the oil as is ultimately recovered.
- Fifth, oil producing countries are using more oil domestically and are less prepared to export it.

Given the absolute dependence of modern societies on oil and gas, price hikes and supply shortages will be traumatic, as already evidenced by recent unrest in Europe, and protests in the Middle East and Asia as oil subsidies were withdrawn. Peak oil was ignored by the previous Federal government and is barely acknowledged by the new government; it is arguably the biggest issue Australia will have to contend with in the next decade.

Oil prices are now dropping as we move into recession and demand is destroyed. It is possible that increased oil discoveries will result from the exploration triggered by current high prices, but new production will take time to materialise. Further, we are witnessing rapid depletion in some of the world's major oil reservoirs, such that new production will struggle to offset the decline in existing production. Some forecasters suggest that we may see a net oil supply decline of around 50% by 2030^v, others maintain there will be no problem for some years ahead even with rapidly increasing demand^{vi}. Suffice to say the IEA having been an optimist until very recently, in addition to the cautionary comments mentioned already is now undertaking an urgent review of world oil supply, to be published in their 2008 World Energy Outlook in November.

The general oil price trend is probably upwards, subject to the extent and depth of recession. So any respite from high oil prices is likely to be temporary and it is misleading to pretend otherwise. We should be preparing for that eventuality now, not playing King Canute in futile attempts to turn back the global tide with fuel excise or GST adjustments — although King Canute was wiser than we often give him credit for, in that he sat on the beach to demonstrate to his courtiers the nonsense of the policies they were advocating!

We actually need higher oil prices to wean us off the use of oil and to encourage alternatives. This may seem hard, but unless we face up to this reality quickly, the problem will become far worse. There is certainly a case for assisting those most exposed, to ease the transition to a world of expensive energy, but it should be via specific targeted measures, not with across-the-board attempts to drop petrol prices which are miniscule in relation to the size of the problem.

Passing the peak raises the question of who gets the available oil? Solutions range from:

- Letting the market take its course, the preferred route of most economists, which conveniently skirts around the traumatic societal impact of recession or depression arising from high energy prices, and the potential for the creation of failed states as developing, and possibly some developed countries are increasingly forced out of the market.
- The “Washington Consensus” of sending in the marines to secure supply. Recent experience in Iraq suggests this is hardly a sustainable alternative.
- A global mechanism for equitable sharing of available oil, for example an Oil Depletion Protocol, akin to the Kyoto Protocol for carbon emissions. Indeed, the IEA was created in 1973 for exactly this purpose, to assist the OECD countries in allocating oil during the first oil shock. This time the problem is far greater, but we have handled similar situations in the past and we will probably have to resort to allocation mechanisms again, despite the protests of the market economists!

Australia is particularly vulnerable. We are around 50% self-sufficient in oil, declining rapidly unless new discoveries save the day. We rely on long supply lines from Asian refineries for around 85% of our daily use, offset by high exports. We do not comply with the requirements of IEA membership to maintain a 90 day net import strategic petroleum reserve, relying instead on operational stocks and just-in-time delivery. The cost of our oil and gas imports is now close to twice our oil & gas exports, with high coal exports saving the day.

But as if peak oil was not enough, there is another problem — global warming and the need to radically reduce our carbon emissions from fossil fuel use, probably to completely decarbonise the economy by 2050, far more than is being admitted politically. This will itself raise fossil fuel energy prices as carbon is properly priced, via mechanisms such as emissions trading, to reflect its environmental cost.

There are solutions to these converging issues, but they take time to implement, and we should have been planning for this, years ago. We did not do so and we are now facing the consequences. Some obvious responses, for example increased coal consumption, or coal conversion to liquids as Martin Ferguson recently proposed, are carbon emission-intensive and, in the absence of carbon capture and storage, which is still unproven for large scale application, would be extremely detrimental to solving global warming. The two issues are inextricably linked. Hence the need for consistent and holistic policy to address the integrated problem.

So what would that policy look like?

First, an honest, public, acknowledgment by the government and business leaders of the real challenges we now face.

Second, urgent education campaigns to inform the community and gain support for the hard decisions ahead.

Third, establish an emergency, nation-building, response plan to place the economy on a low-carbon footing, minimising the consumption of oil, akin to a 21st Century version of the 1950's Snowy Hydro Scheme, but much bigger and broader, or the Marshall Plan which reconstructed Europe post-WW2.

The components would be:

- A major focus on energy conservation and energy efficiency;
- Large scale conversion to renewable energy;
- Major investment in efficient public transport, rail, bus, cycling etc and an immediate halt to investment in freeway and airport expansion;
- Rapid phase out of high carbon emission facilities such as coal-fired power stations unless safe carbon capture and storage can be introduced within 10 years;

- Urgent introduction of high-speed broadband to minimise travel and improve communication efficiency;
- Continued investment in low-emission technology;
- Rapid reform of the tax system to remove perverse incentives which encourage oil use and carbon emissions.

We face major changes to our lifestyle. It is not just high oil prices and global warming, but the very question of the sustainability of humanity on the planet as population rises from 6.7 billion people today to 9 billion in 2050, all aspiring to an improved quality of life. New technology will undoubtedly come to our aid but that will not be enough — our values must also change. Conventional economic growth in the developed world will have to be set aside in favour of a steady-state economy where the emphasis is on non-consumption and the quality of life rather than the quantity of things.

There will be far more focus on local food production, opening up new opportunities for rural areas, cities will be re-designed using high-density sustainability principles to avoid urban sprawl, and integrated with public transport to minimise energy consumption. Work centres will be de-centralised. Rail, powered by renewable energy, will become a major transport mode for both freight and high-speed passenger traffic. Air travel will reduce unless new technology develops jet fuel from, for example, bio sources, and even then emission constraints may limit its use. The internal combustion engine will disappear in favour of electric vehicles for many applications. Cycling and walking will become major activities for both work and pleasure — obesity and diabetes will decline!

The challenge is enormous, but rather than a disaster, it is the greatest opportunity we have ever had to place the world on a sustainable footing, for what we are currently doing is not sustainable. We must not waste this opportunity, but it needs far

bolder and broader thinking than we are seeing at present. In particular, we need to understand the resilience of our economy and society to major shocks; we may well have to fundamentally restructure our energy system, and economy, in the face of acute oil shortages.

Which raises the question of the ability of our democratic system of government to implement such change. It will require statesmanship of the highest order, a quality sadly lacking nationally and globally. Debate is urgently needed on alternative forms of government to ease our transition to a resilient and sustainable future.

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2.5 Personal resilience: A pro-active positive education approach to resilience

John Hendry

Abstract

The central purpose of education is to enable every person to grow to an understanding of self in the context of a web of relationships; to be humane and to deal positively with life's tribulations while leading a meaningful and peaceful life. This requires a transition from dependence through independence to interdependence. Children who demonstrate resilience, tend to have strong cognitive abilities, self-efficacy, faith and a sense of meaning, talents that they and others value and a sense of humour. The skills they need to acquire during the educational process are emotional awareness and regulation, impulse control, a sense of hope, flexible and accurate thinking, empathy, and trust in their connections with others. The challenge for educators is to build these elements into the curriculum.

"What every parent wants desperately is for their children to transcend whatever difficulties they will inevitably confront in life and thrive." To thrive one must generate a positive to negative emotion ratio of at least three to one (for individuals).

Problems will be faced in every aspect of life by children, young adults and adults. To move from being dependent on others (usually adults) to partial dependence, to independence to interdependence as the child grows to adulthood requires an equivalent resilient set development. The capacity to move confidently from the dependent stage of human and social existence through to the "complex to

manage" interdependent stage is established intrinsically by each individual. Extrinsic influences exist; however, the capacity to cope is very much a personal (intrinsic) thing. The establishment of this confidence to make positive decisions is really what resilience is about.

There are times when survival is an essential and important goal for such 'survival skills' present as the base for the positive beliefs tied essentially and eventually to thriving. Reflection, living in the moment rather than trying today to live tomorrow, is an important realisation in establishing the wherewithal to lead a positive and empowered future. The search for identity is at the essence of being human, and it is within this search that the true skills parents want their children to possess (to manage the tribulations life presents) are discovered, considered, learned, developed and woven into a 'life strategy' to do better than cope, to thrive. Ancient and learned cultures describe, and recognise one important aspect of this maturation process as 'a rite of passage' and have constructed 'markers' on this passage where public celebration and recognition is given to boost the confidence of the learner.

These events mark for each individual a step in confidence. This confidence establishes a positive belief in capacity, a positive mental attitude nurtured by supporters through acknowledgement of effort and progress towards interdependence, the end goal. It is necessary, in this journey, to recognise and appreciate the darker sides of life, the more challenging aspects of this progress path. The main negative emotions of fear and anxiety focus attention on discovering the nuances and complexities of the challenges;

however, once these are acknowledged and understood it is then necessary to establish a positive and strategic approach (a resilient approach) to these challenges, to leave 'the negative emotions' behind.

The way forward to a positive future where one can take charge in the context as it presents, and thrive, is directly tied to character strengths and the positive emotions which inform the individual that all is possible to manage and it is possible to thrive. One critical element to this is 'to keep all in perspective', to live in the real rather than the fanciful world. The real living context must be understood and it is this understanding that provides opportunity to develop skills and strategies to take one beyond the existing context to what may be a more desired context, if such is the want.

The aim is to become interdependent, to move from the "I" to the "We". Humans live in families and these are found in the family, in the School, in the workplace, in clubs and in social settings. 'Families' are defined by belonging. The sense of belonging, or attachment, to a family or a number of families is essential. Such attachments are based upon trust. Trust is based upon respect, kindness, forgiveness and an unconditional purpose of giving to others. The worth of the contribution is critical for the "We" rather than "I" determines the honour of the relationship and the security found therein. Trust in others and their trust in you underpins positive human existence. The actual universal values found in each person's character strengths should guarantee a confident and positive journey through dependence, independence and on into interdependence.

Character Strengths

1. Wisdom:

- Curiosity
- Love of learning
- Judgement
- Ingenuity
- Emotional intelligence
- Perspective

2. Courage:

- Valor
- Perseverance
- Integrity

3. Humanity:

- Kindness
- Loving

4. Justice:

- Citizenship
- Fairness
- Leadership

5. Temperance:

- Self-Control
- Prudence
- Humility

6. Transcendence:

- Appreciation of beauty and excellence
- Gratitude
- Hope
- Spirituality
- Forgiveness
- Humor
- Zest

The ability to think flexibly and accurately, to understand oneself emotionally and one's emotional profile, to cultivate the capacity to change one's emotional reactions, and to reach out to others every step of the way is essential. The skills needed to successfully navigate the journey from dependence to interdependence can be learned and developed through practice. Those (children) who demonstrate resilience often demonstrate five descriptors:

1. Strong cognitive abilities;

2. Self-efficacy;

3. Faith and a sense of meaning;

4. Talents that are valued by self and others; and

5. Sense of humour.

The actual skills possessed by resilient individuals are:

1. Emotional awareness and regulation;

2. Impulse control;

3. Optimism (a sense of hope);

4. Flexible and accurate thinking;

5. Empathy;

6. Self-efficacy; and

7. Connection to others.

The teaching of these skills and the strategic and honourable deployment of these skills is possible through the scaffolding framework of Positive Psychology supplemented by further self discovery through meditation. The study and application of character strengths, positive and negative emotions, the allied and promoting processes of reflection found in meditation (and allied activities), the understanding of the power of altruism, of the fundamentals associated with the values found in all world faiths all combine to present a quality 'life curriculum' to enable all to progress through life challenges from being dependent on others to being alone or independent of others (an essential stage of knowing the self) to interdependence where others jointly work with you to enable life to flourish. (How we treat others determines how others treat us.)

The inoculation against the negative emotions ruling life is possible. Such inoculation does mean that each will have acquired the skills needed to employ strategically, and appropriately, the character strengths (moment to moment, in life). This then will enable all to navigate to interdependence, to understand, appreciate and contribute to being human, to cooperate, to not seek advantage in relationships and to give unconditionally to others. This does lead to contentment where pleasure, engagement and meaning in life come together to establish a more peaceful repose where flourishing is possible.

Geelong Grammar School is doing this by teaching resilience and the tenets of positive psychology through the study of emotion and character strength plus developing in each student the capacity to adopt positive resilient life strategies, ie. the appropriate applications of strength to life challenges in the moment. It has asked the real question (of schooling), perhaps found in the opening paragraph, of every parent, what do you want for your child? The response is "a good well managed and happy life where a sense of contentment abides". John Keats, a leading English religious educator, in a lecture titled 'Clever Devils and How to Avoid Them' referred to a conference

that took place on 20th January 1942 when a group of fifteen men gathered at Wansee in Berlin. They were to plan the "final solution"; we now know this as the Holocaust. Amongst them were several PhD's and a theology graduate. A number of these were products of Christian Schools; some were the sons of clergymen. Here is a letter from a holocaust survivor:

*Dear Teacher,
I am a survivor of the concentration camp.
My eyes saw what no man should witness:
gas chambers built by engineers;
children poisoned by educated physicians;
Infants killed by trained nurses;
Women and babies shot and burned by
high school graduates;
So, I am suspicious of your education.
My request is: help your students
become human.
Your efforts must never produce
learned monsters,
Skilled psychopaths, educated Eichmanns.
Reading, writing, arithmetic are important
only if they serve to make our children
more human.*

The real purpose of education is to enable each and every person grow to an understanding of self within the context of family, (in every sense) to be humane, to be able to positively deal with life's tribulations in a moral and positive (resilient) way, and to live with meaning a peaceful life. This is achieved by living the life journey from dependence, through independence to interdependence with confidence, dignity and with respect for all other humans (and living things), to move from the "I" to the "We" with kindness and forgiveness of and to others. This can be taught.

2.6 Biosecurity

Prof Stephen Prowse

Abstract

Biosecurity is a community responsibility with wide ranging implications for health, trade and tourism. Human, animal and plant health are inextricably interlinked. Considerable progress has been made in recent years in building essential linkages and networks to handle the unexpected emergence of new pathogenic agents and the dissemination of old ones. State and commonwealth agencies are central players in this endeavour, and the recently created Australian Biosecurity Intelligence Network and the Australian Biosecurity System for Primary Production and the Environment are building resilience into the way we will respond to future threats. But trained personnel and the way information is shared will be central elements that will determine our national capacity to respond adaptively to threats in the future.

Biosecurity means different things to different people. In essence, it is the processes, programs and structures we have in place to protect people and animals from the adverse economic impacts of emerging disease entry and spread.

In the broadest sense, biosecurity has pre-border, border and post-border dimensions and includes public health, livestock health, plant health and wildlife disease. Biosecurity also has both research, operational and policy dimensions. The sector is complex with a broad spectrum of stakeholders.

Biosecurity — who is involved?

Biosecurity is a community responsibility with many individuals and groups playing a role. State and Commonwealth Governments working with key stakeholders in agricultural industries and the public health sector establish the broad framework. Operational responsibility lies with Commonwealth and State Government agencies working closely with CSIRO and industry/government agencies such as Animal Health Australia and Plant Health Australia. Other stakeholders such as environmental groups also play an important part. The activities are supported by research providers such as universities, research institutes and biosecurity cooperative research centres.

Biosecurity challenges

Scientists work in an increasingly complex and technologically sophisticated environment. They need to consider a wider range of factors than ever before if their work is to be effective. Increasingly, trade and other policy considerations need to be taken into account.

Despite improved mobility and communications, researchers in the biosecurity community often do not know where to turn to for collaboration and information. Researchers are expected to be generalists, crossing a range of disciplines and sectors. Thus rapid access to information and expertise becomes critical. Platforms for collaboration exist within specific research disciplines but numerous gaps inhibit them from operating effectively 'across discipline'.

Further, the connections and linkages between organizations involved in biosecurity research remain sub-optimal with minimal sharing of data outside personal contacts.

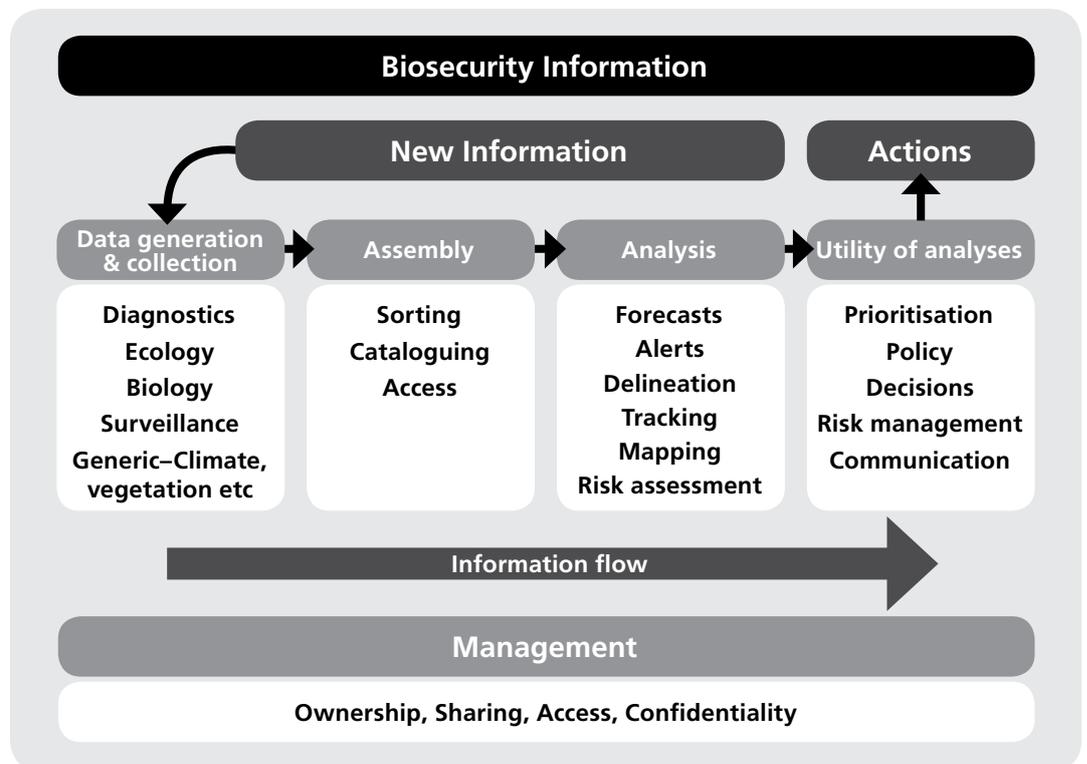
In the biosecurity sector, a wider range of skills are being developed and technologies adopted. These include biotechnology, epidemiology, disease modeling, GIS and mapping, social sciences, risk analysis and predictive modeling. These tools and technologies are critical parts of contemporary research and often generate and use large amounts of information.

The information can be in many forms and come from many sources. As an example, in the animal health sector the information includes laboratory results, property data, livestock identification and movement data, spatial data, climate information, vegetation data and feral animal data.

This information frequently lies within different hands and in different forms. At present, the individual researcher needs to discover potential sources of information and plot a course that will enable that information to be shared and most effectively utilised. This is particularly the case across disciplines where the personal relationships are less well established.

As an example, it may be that human health authorities notice an upsurge of a particular zoonotic infection as a result of medical surveillance systems. The animal health community becomes aware of that concern and must ask whether this is a result of a change in the behaviour of the disease agent. Perhaps there is a wildlife reservoir of this disease or perhaps wildlife have a new vulnerability to it.

At present any initiative to harness all of this information, to analyze the results and to research novel approaches must take a very precarious path. There is likely to be a disjuncture between those with a vested interest in the disease and those who need information to make decisions. New biotechnologies and information technologies have led to the need for a new paradigm in connectivity, and information collection, management and analysis. This is outlined in the figure below.



Biosecurity trends

Increased Emerging Infectious Disease risks

Disease emergence is the result of a complex interplay of many factors, including economic, social and scientific matters. Risk factors can be considered from the perspective of wildlife, livestock and human disease. The destruction and manipulation of ecosystems has enhanced the risks associated with wildlife disease. Habitat loss and movement of wildlife has altered the spread of disease from wildlife to livestock and humans as the patterns of contact change.

The impact of climate change remains to be elucidated though it may be expected to have a variety of effects on disease agents, hosts and the environment. As an example, the recent movement of bluetongue virus into Northern Europe has been attributed to changing vector distribution that has in turn been attributed to climate change.

The risk of the entry and spread of infectious disease in human populations has been exacerbated by increased urban population density and global travel. Cultural and social factors such as the slaughter and consumption of wildlife in wet markets also make a significant contribution to this risk. Increasing wealth has also meant an increase in demands for animal protein. This has resulted in changing production systems with increased intensive animal production. This is often accompanied by poor development of appropriate infrastructure and quality control to support such production systems, again increasing the risk of adverse events including emerging infectious diseases (EIDs). The global movement of animals and animal products may also contribute to increased risk of disease events and the magnitude of the impact of an event. The rapid transboundary movement of severe acute respiratory syndrome (SARS) and H5N1 avian influenza demonstrated how disease can move throughout the world. SARS was clearly spread by the movement of infected people. The contribution of legal and illegal movement of poultry, wild bird migration and inappropriate vaccine usage to the spread of avian influenza remains to be determined.

The biology of disease causing organisms is also a critical contributing factor. Changing environments allow increased opportunities for evolutionary change and the emergence of variant organisms. For example the high levels of variation in influenza virus make this a difficult disease to control.

Consolidation of biosecurity activity

State governments in Queensland, Western Australia and Victoria are bringing together biosecurity activities across plants, insects, animals and aquaculture sectors. However, the difficulties in developing effective and functional linkages between animal/wildlife/environment and human health remain.

Perhaps the best example is in Queensland where the government is developing a Health and Food Sciences Precinct (H&FSP) in Brisbane which will bring together animal health and production scientists, public health scientists and food scientists to create a vibrant knowledge centre for health and food. This Precinct, comprising about 700 scientists and support staff, will be a centre of excellence focusing on improving quality of life through advances in healthcare, medicine, food security, biosecurity and nutrition. The key design driver is the integration of existing human health sciences with animal and food sciences to develop a one health approach to health and disease research.

Co-locating complementary animal, food and human science will exploit opportunities for collaborative and whole of life cycle (environment, food, animal, plant & human health) research, capitalise on sharing resources, scientific equipment, new and emerging generic and specific technologies and maximise diagnostic capacities in human-animal disease surge situations.

Scientists from across the sectors have been proactively involved in the design of the facilities as well as the development of collaborative projects.

Collaborative research ventures

The Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease (AB–CRC) and the National Plant Biosecurity Cooperative Research Centre were established to improve Australia's capability and capacity to respond to emerging infectious disease outbreaks. The primary focus has been on zoonotic and exotic pests and diseases. These ventures act as a focus for collaborative research activities that bring together researchers across different agencies, jurisdictions and sectors.

Reduced resources and a shift in responsibilities

Over the last decade we have seen increased pressure on resources in the biosecurity sector and in some areas, a shift in responsibility from government to an industry sector. In the agricultural sector this has resulted in the formation of Animal Health Australia (AHA) and Plant Health Australia (PHA). These organisations are Government/industry partnerships that manage disease control programs. The companies foster a collective approach to disease management and response. An important element of the outbreak response process has been the development of agreements that define the way in which outbreak costs are shared between Government and industry. This provides a level of confidence in responding to a disease outbreak.

'One health' approaches

'One health' seeks to improve the health and well-being of all species by enhancing cooperation and collaboration across the public health, environment and livestock sectors to combat emerging infectious disease threats. The concept of 'one health' has been developed as a result of an increased understanding of the factors leading to the emergence of zoonosis and recognises that human and animal health are inextricably linked.

Building resilience

Enhanced planning

Following outbreaks of foot and mouth disease and mad cow disease in the United Kingdom and other countries, and bird flu and SARS in Asia, the Australian Commonwealth and State Governments and industry have undertaken numerous planning and simulation exercises. These exercises have been important events in helping identify biosecurity response needs and set priorities. One key and common element in all the exercises and simulations is the need to improve information management.

Broader responsibility in community

The trend to broaden biosecurity responsibility will continue with increasing industry involvement in disease surveillance and in the management of outbreak responses. These significant behavioural and cultural shifts will improve our ability to respond to disease outbreaks.

Improving biosecurity information infrastructure

A significant challenge faced by all sectors is to get the right information to the right people in a timely manner to allow them to make the best evidence-based decisions. In order to address this issue the Australian Biosecurity Intelligence Network (ABIN) has recently been established with Australian Government funding.

The purpose of ABIN is to develop biosecurity information management infrastructure, including a shared workspace that allows individuals and groups to collaborate across sectors and jurisdictions, sharing information and tools. The key outcome of ABIN will be a national biosecurity collaborative platform that enhances biosecurity research, surveillance and response capability.

A policy approach — AusBIOSEC

A policy initiative aimed at achieving a common approach to improved biosecurity has been developed by the Australian Commonwealth Government together with the State Governments. AusBIOSEC (Australian Biosecurity System for Primary Production and the Environment) is a framework of common principles and guidelines to enable biosecurity arrangements to be applied consistently across Australia. The aim is to connect all biosecurity activities being undertaken by the Australian Government, state and territory governments, industry, landholders and other key stakeholders in primary production and the environment. The key outcome is the improved management of pests and diseases that have a negative impact on the environment, livestock or public health.

The scope of this work encompasses the entire biosecurity continuum and includes managing pests and diseases of terrestrial, freshwater and marine environments that could be harmful to primary industries, the natural and built environments, and public health. It also covers everything from prevention and preparedness, emergency response to ongoing management of established species.

Improving capability and capacity

A critical element of our national response capacity is an appropriately sized workforce with adequate skills and capabilities. Training programs to enhance the skill base and the level of skills are undertaken at multiple levels. These include professional and para-professional training, training in universities and training producers in disease response procedures. Such programs are developed and managed by AHA, PHA and the biosecurity CRCs. A critical element of this is to develop a “surge” capacity to mobilise the trained people in the face of an outbreak.

Conclusions

In the biosecurity sector we must expect the unexpected. No one could have predicted the outbreak of SARS in 2002 which spread to 27 countries, infecting 8273 people and caused 775 deaths. Hence resilience lies in a better ability to deal with the unexpected and unknown. This is achieved through training programs to increase capacity and improving the use of technology. Improved career paths for professionals in the sector are required. Perhaps the most significant trend that will continue is a more participatory and collaborative approach to disease control and management. While the unexpected will always be a challenge, an increased attention of forecasting will also be important. Improved information management will contribute to improved forecasting and risk assessment that assists in setting priorities and in resource allocation. These processes will improve our ability to address risks associated with known diseases.

Australia has made substantial progress over the last decade in building disease response capability and capacity. This has been achieved in the face of pressure on resources. The maintenance of this resource will require ongoing attention to ensure that Australia remains resilient to address the disease challenges of the future.

2.7 Pandemic preparedness and resilience

Em Prof Bob Douglas

Abstract

Pandemics of disease can result from a range of previously known, or newly evolving pathogenic agents. They can decimate large populations, destroy businesses, immobilize armies and spread fear across society. If combined with other economic, resource or armed threat, they can impair the very survival of society. Australia has been preparing for a likely influenza pandemic for some years and a whole of government approach is planned. To enhance the resilience of our pandemic preparedness, we need to review our constitutional arrangements, bring the community into the planning process and expand the scenarios to cope with other causal agents and multiple contemporaneous threats.

Introduction

Pandemic is the word used to describe an epidemic of disease that occurs over a wide geographic area and affects a substantial proportion of its population.

Resilience is the ability of a human community or other complex system, to absorb disturbances so that it retains its essential characteristics, its function and its identity (1).

A society or community that is resilient to pandemics is one that will, respond to the disturbance produced by such an event while retaining its central functions over time, emerging functioning and intact, from the onslaught of a disease which infects, maims, kills or threatens the well-being of very large numbers of its inhabitants.

The term pandemic can refer to infectious or non-infectious diseases; the timeframe during which the pandemic affects the population can range from days to years, and the impacts on the human population can range from high death rates, to massive

absenteeism, to disability, overcrowding of hospitals and swamping the capacity of health professionals and/or supplies of life-saving drugs.

Under certain circumstances pandemics can impair profitability and decimate businesses, destroy the effectiveness of armies, incapacitate schools, kill community leaders, contaminate water supplies, make public transport facilities dysfunctional, confine people indoors and spread fear across society.

When such an event occurs even in a previously stable and well adjusted society, the impact can be very disruptive, threatening the breakdown of societal norms and institutions. Where a pandemic arrives in company with other destabilizing forces such as armed conflict, economic depression, poverty, food or resource shortage and environmental stress, it could threaten the very identity and survival of that society.

Globalization, the quadrupling of the human population in the past hundred years, the transport and communications revolutions and the confluence of climate change and peak oil, make the probability of a compounded scenario in coming decades, disturbingly high.

The threat of a global pandemic amongst humans caused by a strain of avian influenza that is decimating many bird flocks around the world has galvanized governments into developing plans to mitigate against an avian flu pandemic if and when the virus mutates sufficiently to be easily transmitted from human to human.

A large international effort is now committed to linked national and international pandemic preparedness plans. Vaccines and specific antiviral drugs are being stockpiled; intelligence systems are being developed to give early warning of the arrival of the pandemic; public health, education, media, and national security bodies are being briefed and prepared for such an event. Lines of command and decision points are being clarified and the community is regularly informed about progress of the avian flu epidemic in bird flocks and the extent to which it has infected humans.

But there are many other candidates for a global pandemic that we already know about and others that could, like HIV come upon us, unprepared. The pandemic threat is much more than the threat of avian flu and it calls for a broad examination of the factors which will enable Australians to respond creatively to disturbances that we cannot at present predict or anticipate.

Black death, Swine flu, HIV/AIDS the African viruses and smallpox

Writing of the epidemic of “black death” (plague) that swept the world in the mid fourteenth century, and is generally assumed to have killed between one third and one half of the populace, Robert of Avesbury (2) wrote:

“Those marked for death were scarce permitted to live longer than three or four days. It showed favor to no-one, except a very few of the wealthy. On the same day, 20, 40 or 60 bodies, and on many occasions many more, might be committed for burial together in the same pit.”

The swine influenza pandemic of 1918–1919 was a global disaster. It killed between 20 and 40 million people, more than had died in World War 1. More people died of influenza in a single year than in four-years of the Black Death from 1347 to 1351. In 1976, the specter of 1918 loomed large when the re-emergence of the swine flu virus in an army population was seen as a threat to the entire United States population. Public health officials initiated a mass vaccination campaign, but the anticipated pandemic failed to occur.

The world is currently in the throes of a slow burning pandemic of HIV/AIDS. In large areas of the developing world, the pandemic is producing massive dislocation of families, large numbers of orphans and infected adults who will progressively die a slow lingering death unless they receive specific anti-retroviral treatment. In other countries like Australia, the HIV threat was faced squarely in the 80s and a range of counter-measures have confined but not eradicated the threat.

Many viral agents, including a group of viruses that are at present confined to Africa such as the Ebola virus, Marburg fever virus and Lassa fever virus are believed to have the capacity to generate pandemic threats to humans. A number of these agents are transmitted from animal reservoirs and could cross to humans in a variety of ways.

There is also a plausible possibility that terrorists could obtain access to laboratory supplies, and spread agents such as smallpox virus which was eradicated from human populations in 1979 and to which the human population would now be very vulnerable.

Australia’s pandemic influenza preparedness

Australia has had for a number of years, an influenza pandemic preparedness plan that reaches into all aspects of Australian government and will be triggered by intelligence from sentinel surveillance activity across the world and coordinated by the World Health Organization. Seen originally as a problem to be managed by the health care system, the plan (3) recognises that pandemic preparedness must be co-ordinated at the very highest levels of national and international administrations. A “whole of government approach has been instituted and government agencies such as the Department of Families, Housing Community Services and indigenous Affairs have an excellent web page on “Building resilience through business continuity and pandemic planning.”(4)

The Australian action plan appears to deal competently with those logistics which are predictable. It concentrates almost exclusively on pandemic avian influenza occurring in a country which in other respects is assumed to be operating on “business as usual”. Because it emanates from government what the Australian preparedness plan cannot question is the controlling and dominant impact of economic efficiency and risk aversion that are inherent in all Australian bureaucracies and which are often in conflict with resilient systems. All of these In addition to media blame calling and fear mongering would inevitably come into play when a pandemic strikes.

Building resilience into pandemic planning

Resilient complex systems are diverse, connected, open, able to respond quickly, have reserves on which to draw and can benefit from overlapping institutions and functionality in systems above and below them. A resilient system at the state level derives its resilience from connections and flexibility at the scales above and below the state.

This raises the nature of the relationship between states, territories and local government in Australia and the capacity for a coherent national response to the unexpected. Many agree that Australia is currently over-governed with these three levels of government and within each of them, multiple silos of responsibility. Ultimately, we will need to pay serious attention to constitutional reform if we are to build a society that is capable of adapting at short notice to the pressures of a pandemic.

But short of such reform, here are some ways we could better enhance resilience and prepare Australians for the pandemic hazards that almost certainly lie ahead.

1. Call a national pandemic planning summit which brings civil society from across Australia into a planning exercise that expands ownership of pandemic planning from government to the community at large, and from avian flu to a broad suite of pandemic scenarios.
2. Develop a series of "Hypotheticals" in communities across the nation where community leaders are encouraged to experiment with the ideas for managing catastrophe in their community. For example, "how would we cope with an 80% attack rate and a 50% death rate from the release of small pox virus in our town or city?"
3. Involve the community (perhaps starting with high school students) in an open discussion about who should be the first recipients of limited supplies of life-saving drugs and prophylactic vaccines in their school and community.

4. Develop some realistic media productions about what makes some societies able to adapt and transform in response to catastrophic events while others spiral into chaos as occurred in New Orleans following Hurricane Katrina.
5. In discussion with schools, hospitals, churches and small businesses, develop "first aid community plans" for what to do if 40% of the population suddenly becomes seriously ill with a highly contagious infectious disease.

Some will find these suggestions at first glance unduly alarmist. Yet we are now fully adjusted to the notion of preparing the whole community to be able to undertake cardiopulmonary resuscitation (CPR) and to deal with minor personal emergencies.

The likelihood that we will need to deal with the catastrophic effects of a pandemic in our own lifetimes is now probably greater than the likelihood that most of us will need to carry out CPR.

Understanding the nature of the threats and being prepared to deal with them is one way to dispel fear and build resilience.

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2.8 Resilience of ecosystems and social-ecological systems

Dr Steven Cork

Abstract

We can apply much of what we have learnt about the adaptive cycles and resilience of our disastrously declining natural ecosystems to understanding the operation and resilience of complex systems that involve the interactions of humans with nature and some of the systems devised exclusively by humans. Resilience is not desirable for its own sake; we need to ask “resilience of what to what?” Resilience in social-ecological systems requires diversity, connectedness, openness, capacity for quick response, reserves of resources, and overlapping institutions, so that issues do not fall between the institutions and any issue does not rely on just one institution for a solution. Efficiency is often the enemy of resilience.

The concept of resilience as applied to ecological systems

People have always had an intimate relationship with nature. Early humans relied totally on the natural environment for food, water and shelter. It also was a source of spiritual stimulation and a source of potential diseases, pests, adverse weather, predators and other risks. In our modern world we tend to think we are less connected with nature, partly because we are less aware of it than early humans were and partly because we think we can control it. However, we are arguably more reliant on it now than ever because we have exceeded its ability to sustain the World's human population,⁴⁵ and because we are learning that our interventions more often than not have reduced the resilience of ecosystems (their ability to absorb disturbances and maintain their essential functions and structures).

Although humans have always been part of ecosystems, now more than ever our decisions and actions are major drivers of ecosystem processes. This essay, therefore, considers resilience of linked social-ecological systems rather than ecosystems alone.

Resilience is not a new concept. For centuries managers of land or other resources have thought about what spare capacity of needed to deal with risks and surprises. Engineers build office blocks or bridges to not just stand under current conditions but to maintain their structure and function in the face of possible extreme storms, earthquakes, and loads. But there has been a tendency in modern society to seek “efficiency” by removing duplication and spare capacity, which has potentially eroded the resilience of society and the ecosystems on which it depends. The modern preoccupation with efficiency and “command and control” management has meant that resilience is a topic that is overlooked and poorly understood.

Over the past two decades there has been increasing attention to understanding and defining resilience in social-ecological systems. Much of this research has been drawn together by the Resilience Alliance, whose web site is a good place to start to understand current thinking in this area (www.resalliance.org).

Several conclusions emerge from research on resilience of ecological systems:

- A system can be generally resilient (i.e. able to absorb a range of disturbances) or specifically resilient (i.e. resilient to certain disturbances).
- Whether or not resilience in an ecological system is desirable or undesirable to humans depends on whether we would like to see the functions and structure maintained (i.e. the system is meeting our needs) or not (i.e. we would like to move the system to a different set of functions).

⁴⁵ As the World's human population and consumption of resources has grown, it has required a greater and greater proportion of the Earth's surface to meet our needs. It is estimated that sometime in the 1990's human needs for a decent life exceeded the total capacity of the Earth, meaning that an increasing proportion of the human population now is unable to live a decent life. We are now on our way to needing a second world to support all human life (WWF, 2006. Living Planet Report. WWF Global Footprint Network, Zoological Society of London).

- These systems are complex and adaptive (i.e. they contain many more inter-linkages than we can comprehend with simple cause and effect models and the rules by which the systems work change as the system adapts to change).
- In such systems, change does not occur at a constant rate. They tend to go through phases of slow change until the conditions are right for a period of rapid “threshold” change after which the systems’ functions and structures are different and might not be able to return to their original conditions. One example includes the slow rise of salty water-tables in many Australian landscapes due to removal of the trees that once kept water tables much lower. Once the salty water get within about 2 metres of the surface its rate of progress dramatically increases and landscapes appear to become saline almost over night. Another example is loss of soil nutrient and carbon recycling and plant recruitment processes in landscapes. The structure of vegetation and litter in most landscapes determines how well they retain water, seeds, nutrients and other resources. Once a critical loss of this structure is passed, landscapes rapidly lose functionality, start to “leak” resources, and fail to support the species that would otherwise have sustained the system⁴⁶.
- Both social and ecological systems go through cycles of building up and breaking down linkages. In what has been described as “adaptive cycles” these systems tend to grow rapidly, accumulating resources, species, ideas, and ways of doing things. They grow in complexity until they reach a point at which that complexity starts to cause stagnation. Sometimes disturbances like fire, floods, drought, diseases, revolutions, loss of key leaders, economic crises, or wars move the system back into its less complex phase and sometimes they cause it to break down and reorganise into a different system. Both outcomes can be desirable at different times and in different circumstances.
- The process of constant and variable challenge from disturbances that happens in nature tends to retain multiple species that can perform essential functions under different conditions⁴⁷. In this way, natural systems have changed in many respects over time but have continued to find ways to utilise the air, water, and soil nutrients that are their fundamental resources.
- A major issue of concern in the modern world is that humans have dampened the processes of disturbances on both the natural and human-made environments, causing loss of diversity of form and function among non-human species and loss of diversity in thought, skills and outlook among humans. This means that when a challenge arises there are fewer potential solutions on offer.

Resilience of what to what?

Resilience thinking poses many questions about the relationship between humans and nature, including:

- When and where is resilience desirable and when is it not?
- What functions and structures do we want from our social-ecological systems (and can we even answer this question)?
- How much resilience is enough?
- What sorts of shocks and surprises might we need our social-ecological systems to be resilient to?

These questions can be summed up in the question: “Resilience of what, to what?”⁴⁸.

One attempt to answer this question has been to identify a set of so-called “ecosystem services” that are the benefits that humans get from ecological systems. These benefits include regulatory services, like regulation of water flows in rivers, regulation of water tables, regulation of pests and diseases and regulation of atmospheric composition, provisioning services, like provision of food, clean water, fibre, building material, pharmaceuticals,

⁴⁶Tongway, D J and Hindley, N L.2004. *Landscape Function Analysis: procedures for monitoring and assessing landscapes*. CSIRO Sustainable Ecosystems, Brisbane.

⁴⁷Walker, B., Kinzig, A., and Langridge, J. (1999). Plant attribute diversity, resilience, and ecosystem function: The nature and significance of dominant and minor species. *Ecosystems* 2, 95–113.

⁴⁸Carpenter, S. R., Walker, B. H., Anderies, J. M., and Abel, N. (2001). From metaphor to measurement: Resilience of what to what? *Ecosystems* 4, 765–781

cultural services, like maintenance of spiritual, educational, and recreational values, and underpinning services, like maintenance of soil fertility, creation of soil, and maintenance of genetic diversity.

Defining the benefits that people expect from ecological systems helps us consider the first part of the question above, that is “resilience of what?”. Addressing the second part of the question (“to what?”) requires us to think about the future. At the moment we are consumed with thoughts about how climate might change and how much oil is left in the World. Climate change in particular will have important direct impacts on ecosystems. But the decisions that humans make to deal with climate change, energy and other issues will have at least as great an impact as the physical changes themselves. Hence, the suggestions later in this essay for achieving greater resilience in Australia’s social-ecological systems are largely about bringing better thinking to the consequences of decision making.

Trends

Detailed assessments of trends in the state of Australia’s ecosystems can be found in the State of the Environment Reports by each State and by the Australian Government and in publications such as the National Land and Water Resources Audit⁴⁹. These assessments report major declines of species in many parts of Australia, although detailed data are available for only available for some high-profile groups like birds, mammals, fish, some reptiles and amphibians and some groups of plants. Very little is known about most invertebrates (insects and other animals without a backbone) and microorganisms and fungi, including the many species responsible for nutrient cycling and other soil processes.

But what does this tell us about the resilience of these systems and their ability to keep producing ecosystem services? There are several indications that both could be reaching dangerously low levels, possibly approaching threshold changes:

- It was estimated in 2001 that 39 per cent of Australia’s 85 bioregions have more than 30 per cent of their ecosystems described as threatened.
- Clearing of vegetation has already turned large areas of Australia’s agricultural land saline and much more is poised to turn saline in the near future.
- Water flowing from many catchment areas for Australian cities requires extensive filtration to meet quality standards, whereas some catchments, like that for Melbourne, produce much higher quality water because of good vegetation cover.
- Appropriation of water for human use in southern Australia has reached a point where shocks like drought force us to make serious trade-offs between ecosystem functions, economic growth, and perhaps even basic human welfare. This sets off a vicious cycle where favouring economic growth undermines the ecosystem underpinnings of that growth, while favouring ecosystem function means some temporary loss of economic growth (although it probably means greater real prosperity in the long term).
- Habitat for birds, mammals, reptiles and other animals as well as plants, fungi and invertebrates in the sheep-wheat belt of Australia has been reduced substantially since the arrival of Europeans⁵⁰. As climate change threatens to change temperature, rainfall and other determinants of where plants and animals can live, many will be unable to move because the habitat they need does not exist in the new climatically suitable areas. The interaction of climate change with habitat fragmentation is likely to affect processes like pollination of native plants and crops by native insects, birds and mammals (thus reducing yields), natural control of pests and diseases by

⁴⁹ www.nlwra.gov.au

⁵⁰ Cork S, Sattler P and Alexandra J 2006, ‘Biodiversity’ theme commentary prepared for the 2006 Australian State of the Environment Committee, Department of the Environment and Heritage, Canberra, <http://www.deh.gov.au/soe/2006/commentaries/biodiversity/index.html>

native insects and birds, erosion control by native vegetation, regulation of stream flows, water runoff into streams and storages, and water infiltration to soil and water-tables. It will also affect a range of cultural services provided by ecological systems, including provision of a sense of place for Australians.

Most of Australia's ecosystems have changed considerably since the arrival of European people. They also had changed substantially under the influence of Aboriginal people before that. From a resilience perspective one might ask "are Australian ecosystems different functionally and structurally than they used to be?". The answer to this question depends on what we think the essential functions and structures of these ecosystems are. For example, although many species have disappeared, we could argue that most Australian ecosystems still perform the same set of functions with many of the same sorts of interactions among species as they used to. On the other hand, some would argue that an agricultural or urban landscape is fundamentally different from a forest of a native grassland or wetland.

This is where it is important to consider what we expect from ecosystems and how we define "function" and "structure". There are currently many views on these issues but little dialogue to help Australians understand one another's different viewpoints.

What can be done?

Resilience in social-ecological systems requires diversity, connectedness, openness, capacity for quick response, reserves of resources, and overlapping institutions, so that issues do not fall between the institutions and any issue does not rely on just one institution for a solution.

One enemy of resilience is partial policy and management solutions that do not consider the important systems linkages at the right scale. Simplistic responses to habitat fragmentation, such as planting trees of any sort anywhere in the landscape (which was one response in the past), risk not only failing to provide new habitat but also

compromising other ecosystem services like water runoff and pest control. Solutions to habitat decline need to consider the types of species that used to be in landscapes and the functions they performed. They also need to consider the ways in which those landscapes have changed, which might mean that the same species will no longer survive there. Most importantly, we need to understand and address the underlying processes that continue to drive decline, even after tree clearing has ceased. In many parts of Australia's agricultural landscapes, for example, the conditions for germination of new seedlings of existing native plants no longer exist and this must be addressed before progress can be made towards restoration of the functions of these landscapes.

Governance systems that involve people who live closest to environmental change as key decision makers are more likely to detect and respond to change quickly than centralised governance systems far from the sites of change. Australia has made moves towards "regional models" of governance in recent years. There have been successes but many improvements have been suggested (including in other essays in this volume).

Perhaps the biggest challenge for rebuilding resilience in Australia's ecosystems is that something needs to be done urgently before many landscapes pass through thresholds and become something other than what we would like them to be. Urgent environmental action usually means some tradeoffs with economic growth. An underlying driver of future habitat decline will be climate change, and there is a raging debate about how to bring about urgent action to reduce emissions of greenhouse gases while managing impacts on economic growth. It will be important that Australian decision makers do not fall into the old trap of imposing command and control solutions to environmental challenges,⁵¹ but seek solutions that encourage diversity of function, structure, and ideas in both the ecological and social systems so that both parts of the system are able to generate a range of potential solutions.

⁵¹ See Walker, B. and Salt, D. (2006). *Resilience Thinking: Sustaining Ecosystems and People in a Changing World*. Island Press, Washington, D.C. for examples of how this has failed in ecosystems around the World.

Reducing expenditure on research into the extent and nature of decline in Australian ecosystems (there is still very little support for ongoing data collection to support State of the Environment Reporting, for example) and limiting training and job opportunities for environmental scientists is a trend that is likely to reduce resilience rather than build it. Local governments, who are the coal face of environmental decision making, struggle to be able to afford environmental officers and if they find the money they struggle to find qualified people to fill positions. Universities and other research organisations are being constrained by funding models to address only the issues that are apparent today. History shows that this approach does not generate novel solutions to future problems. Similarly, the current tightly controlled process of policy development by politicians and their advisors discourages new thinking about possible alternative policies and fails to make use of the potentially huge amount of talent existing in public servants and others who could contribute to policy development.

A lesson learned in the past is perhaps worth remembering. The failure of the 1961 invasion of Cuba by the USA (the Bay of Pigs invasion) is a text-book example of “groupthink” in which rapid consensus decision making was encouraged and alternative solutions ignored.⁵² In the subsequent Cuban Missile Crisis, US President John F. Kennedy invited outside experts to share their viewpoints, and allowed group members to question them. He also absented himself from meetings to avoid implied pressure, and encouraged diverse thinking in many other ways, even dividing the decision-making group up into sub-groups to break the group cohesion. The peaceful resolution of this crisis is attributed to these resilience-building measures. In my view, such measures are under-employed in development of environment policy at present, although this publication is a step in this direction.

2.9 Security, prosperity and resilience

Allan Behm

Abstract

The concept of security is changing. It now has as much to do with clean water, reliable food supplies and individual and community wellbeing as with the ability of the state to protect its sovereignty against threats from other states. Prosperity and security now go hand in hand and neither is achievable without the other. In the 21st century, national security must transcend defence and law enforcement systems to include resilience and social inclusion, the protection of rights and the promotion of values. To see terrorism as an attack on the state is to misconceive it: terrorism is really an attack on the values that unite the community in common purpose. A key resilience challenge for Australia is to build these changing concepts of security into our national governance.

Since Federation, “security” and “prosperity” have existed in entirely different chapters of the national political lexicon. The Treasurer, together with the industry Ministers, have been responsible for delivering prosperity, while the Defence Minister, with the occasional assistance of the Foreign Minister and the Attorney-General, has been responsible for delivering security. And neither the twain have met, except to the extent that security makes prosperity possible and prosperity makes security affordable. Yet there is a growing realisation that security and prosperity are inextricably linked, since neither is achievable without the other.

⁵² Janis, Irving (1972). *Victims of groupthink; a psychological study of foreign-policy decisions and fiascoes*. Boston: Houghton, Mifflin. ISBN 978-0395140024. OCLC 539682

For the most part, Australian security policy has reflected a concentration on the principles advocated by the so-called “Realist” school of international relations, articulated principally by Hans Morgenthau in his monumental *Politics among Nations: The Struggle for Power and Peace*. While Morgenthau did not devote much time to a systematic consideration of security — he was much more preoccupied with “power” — it is clear that the basic premise on which his analysis depends (apart, of course, from the assumption that there is always a rational basis on which international power relationships are struck) is the enduring nature of the Treaty of Westphalia in defining the relationships between states.

To the extent that he does refer to “security”, Morgenthau appears to accept that security means “the defence of the frontiers as... established by peace treaties”.⁵³ This essentially defines security in terms of the absence of threat against the territory or the sovereignty of the state. In other words, security is the ability of the state to maintain its power. This remains the critical consideration in all Australian statements concerning national security.

It is becoming increasingly clear, however, that “security” comprehends something far more fundamental and compelling than the ability of the state to protect its sovereignty against threats from other states — important though that is to the safety of the citizens. It is not, of course, for the state to squander the lives of its citizens in its own protection: it is for the state to maintain the legal consensus that underpins the protection of its citizens’ rights and to provide the economic and social infrastructure that enables the community to generate social capital. Security has as much to do with clean water, reliable food supplies, opportunities for children, freedom from ethnic or racial violence, the ability to live a fulfilling life: in other words, individual and community well-being. While, at one level, this emerging concept of security may be comprehended as freedom from threat, it actually has more to do with the creation of opportunity,

prosperity, resilience and well-being. A critical consequence of this changed sense of security is that the majority of citizens in 21st century democracies want freedom *from* military service rather than freedom *through* military service.

The past decade or so has seen the beginnings of a “paradigm shift” in the global approach to security — a shift that is yet to be detected in Australian security policy. National security has begun to include more basic concepts of values and rights — concepts that have not thrown over the need for states to be able to protect themselves against aggression, but have rather expanded the basic connotation of security to accommodate human security concerns. Security as a function of the power of the state to protect itself has progressively expanded to incorporate the basic need for personal and community well-being in a world where threats from states are diminishing while threats from other sources are increasing.

This evolution was captured nicely by Francisco Aravena, writing in 2002, when he noted that “a conceptual transition is taking place from a Cold War perspective that visualized an enemy expressed in strongly military actions carried out by a state, to a post-Cold War perspective in which threats are diffused, the weight of military factors has diminished and many of the threats appear not to be linked to state actors, and even not to be linked to any particular territory”.⁵⁴ Aravena went on to say:

Four substantial elements need to be emphasized in today’s security landscape:

- International security extends beyond its military components;
- International security is transnational, global and interdependent;
- International security is produced by a plurality of actors, the state is no longer the exclusive actor; and
- International security in the twenty-first century has enlarged its agenda and demands that actors work together.⁵⁵

⁵³Hans J. Morgenthau, *Politics Among Nations: The Struggle for Power and Peace* (New York, Alfred A. Knopf, 4th edition, 1967), p. 399.

⁵⁴Francisco Aravena, *Human security: emerging concept of security in the twenty-first century*, Disarmament Forum 2, (UNIDIR, 2002), p. 8.

⁵⁵*Ibid*, p. 9

It would be wrong to suggest that Australia now needs to replace its traditional concept of security with one that focuses exclusively on values and rights. Rather, what Australia needs to do is to expand its understanding of security to include the management of pandemics, criminality, pollution and environmental degradation, the creation of human and social capital, the expansion of institutional and other arrangements that enhance social equity, and the recognition that resilience and social inclusion are of greater significance in maintaining and enhancing national security than are defence and law enforcement systems of themselves. In this context, it is important to recognise that social inclusion is eroded and community cohesion is undermined when the rule of law is in any way compromised. It is a paradoxical that a scrupulous adherence to due process offers a better defence of social inclusion and community cohesion than does the creation of arbitrary exceptions in the name of “national security”. In other words, adaptability, flexibility, resilience and legality are the new hallmarks of security, as they are of economic prosperity.

In the emerging world of the 21st century, prosperity and security go hand in hand. Security will not be guaranteed by a clinical preoccupation with military threat (and/or its absence) and freedom from crime while more devastating possibilities — with potentially greater costs in terms of human lives and national treasure — progressively dominate the national and international consciousness.

For governments, this creates a new set of challenges. Whereas, during the 20th century, governments of all persuasions looked to “hard power” (that is, military capabilities) to assert their authority, to protect the nation against attack, and to promote their strategic interests, the demand of the 21st century will be to develop the appropriate forms of “soft power” that at once realise the security aspirations of the community while constraining those circumstances in which “hard power” might be required.

The so-called “war against terrorism” offers a salutary lesson in this regard. The military capabilities and doctrines developed to ensure victory in any possible war against an aggressor state have already proved themselves to be largely irrelevant in the fight against those groups that resort to a form of asymmetric warfare (terrorism) to promote their cause. They do this either to penalise those states that pursue policies against the interests of such groups (for instance, the liberal democracies, whose basic support for the value and freedom of the human individual flies in the face of the theocratic absolutism of radicalised Islam) or to force concessions that would have the net effect of undermining liberal democracy itself. Random acts of violence and terror simply cannot be prevented by air strike, tanks and prolonged military occupation. Indeed, all that air strike, tanks and military occupation seem to succeed in doing is to sap the strength and resolve of the nation that deploys forces, and provide the rich, sludgy soup of anarchy that provides the perfect incubator for terrorism. As General Petraeus has begun to demonstrate in Iraq, “search and destroy” has to be matched against “hearts and minds”: negotiation with the enemy is just as important as the annihilation of the enemy’s hard core.

For the basic problem is that, like security, the very concept of terrorism is misconceived. It is seen as an attack on the state when it transparently is not: it is an attack on the values that unite the community in common purpose and joint endeavour. It is hardly surprising, then, that a misconception of the nature of terrorism invokes an entirely inappropriate form of response — military force. This is, after all, the old security paradigm: where armed violence is employed against the state, the state retaliates with armed force, because it is the only entity that is constitutionally empowered to do so. But the response actually exacerbates the problem, because the aim of the terrorism is to provoke an over-reaction, thereby eroding whatever support the community might have for legitimate military force.

As Philip Bobbitt has noted in his most recent essay on the subject, since the emergence of modern states during the Renaissance the world has been divided into *states of consent and states of terror*. States of consent derived their legitimacy from the consent of the community given freely and renewed frequently — consent that can be withdrawn. States of terror govern through oppression of the people, and their regimes do not cede power freely⁵⁶. Terrorism is the weapon of choice when the aim is to prevent states from operating on the basis of popular consent. Consequently, as Bobbitt notes, “the threats we will soon face are such that we cannot afford to lose, yet to win we must reconceive victory; now that war must aim at victory newly conceived, we must change our ideas of what counts as war: the new warfare attacks innocent civilians because it challenges rights and opportunities, not nationhood or wealth or territory; finally, war is changing because states go to war on behalf of their legitimacy and the basis for legitimacy is changing”.⁵⁷

For Australia to position itself both to shape the emergent strategic environment and to deal with the stresses of the coming decades it will need a “whole of nation” approach that posits security in terms of national prosperity, and *vice versa*. To this end, government will need to give policy expression to what it understands “national security” to be. And, for its part, the community needs to understand the nature of the attack on values, and needs to accept that an appropriate response is not to apologise for what Australia stands for but to promote those values. To achieve this, it also needs a “whole of government” approach to security policy that integrates “soft” power initiatives with “hard” power capabilities, and recognises that the drivers of national prosperity — education, infrastructure investment, health and the growth of social capital — are central to any evolved concept of national security.

This will demand a high degree of convergence within the Australian community on what constitutes “security”. The inclusion of a rights and values-based approach to security, going beyond

traditional preoccupations with sovereignty and territorial integrity, means that, in addition to the traditional functions of law, defence and foreign relations, critical government functions such as economic management, health, education and community services have a legitimate place at the national security policy table. This imposes some exciting demands on governments. The traditional silos between the departments of state must be demolished. To advance competing defence and foreign policy agendas, for instance, is as self-defeating as it is delusional and wasteful. Yet, such has been the Australian practice for the past three decades or so. But if the barriers between departments are counter-productive, so also are the barriers within departments. These need to be radically overhauled if government is to be in a position to offer holistic security policies.

Central to that overhaul must be the establishment of processes that recognise a single point of accountability — wherever that is best situated bureaucratically. It would be the responsibility of that position to consult all who should be consulted, to canvass all the issues fairly, dispassionately and professionally, and to produce clear and implementable recommendations that are the personal responsibility of the official preparing the advice.

The complexity of modern government might suggest a significantly more radical approach. It is imperative that Governments generate the kinds of analytical and policy tools necessary to deal with the sorts of discontinuities that will characterize the emerging national security environment (everything from pandemics and global warming to political chaos and social instability in neighbouring states). Such discontinuities have an immediate effect on national prosperity. To this end, governments need to consider how best to liberate the considerable intellectual resources that reside in universities, industry, business and the corporate world, as well as the public services. This is not simply about the “outsourcing” of policy advice (an action not likely to be recommended by the current generation of public service leaders).

⁵⁶ Philip Bobbitt, *Terror and Consent: The Wars for the Twenty-First Century* (New York: Allen Lane, 2008), p. 182.

⁵⁷ *Op. cit.*, p. 236.

It is about increasing the number of parties to the national security conversation — providing not only “contestability”, but also, and more importantly, creativity and imagination. This is a big “ask”, though the Rudd Government’s 2020 Summit was at least a partial recognition of the problem.

Government must also invest in its capacity for long-term strategic thinking. This is an area in which Australia’s performance has been woeful, part of a chronic underinvestment in intellectual capacity that distinguishes the Australian economy as a whole. The current professional development fads — with their emphasis on MBAs and Company Directors’ courses to improve public sector “management” (to the extent that it is not an oxymoron!) — fail to come to grips with the desperate need for expertise in the substance of public policy, not just the management of program and project delivery.

As the traditional approach to national security expands from a concentration on the power of the state to include the rights of its citizens to live rewarding, fulfilling and prosperous lives, so national security policy becomes an artifact of a successful, inclusive state built around the growth of social capital and national well-being. This, in turn, poses another basic challenge: the development of a robust framework for national governance that supports the national security and prosperity programs but remains independent of the cyclical changes of government.

The first Rudd government has a unique opportunity to re-formulate a national security policy. The challenge is to develop a new security logic that addresses the emergent strategic discontinuities, the huge shifts in power balance, and the new threats to national well-being that reside in the complex cocktail of nationalism, ideological competition, terrorism, pandemics, global warming, and the growing prospects of a global competition for energy and water. National prosperity is the key to a sound national security policy.

2.10 Education — revolution or resilience

Robert Lewis
Jim White
Wayne Chandler

Abstract

The purpose of education is, as it has always been, to initiate the young into those aspects of our culture on which their (and our) humanity depend. We are in an era of unprecedented challenge and change, but in spite of rhetoric about an education revolution, the national education system on which the future resilience of Australian society depends, shows no signs yet of changing from the now outmoded “factory” educational model. There is not yet a shared bipartisan national vision for the new education system and the three year electoral cycle means that key priorities for education one year can be off the agenda the next.

“The purpose of education in the 21st century is exactly the same as it was in the 19th and 20th centuries, that is to initiate the young into those aspects of our culture upon which their (and our) humanity depends”.
Chris Woodhead (1).

This definition has been accepted by Australian governments of all persuasions. A resilient Australian education system has been founded on a number of key characteristics.

- A commitment by all governments to the notion of education for all, which has developed in its scope and inclusivity and provided education in all locations from the one teacher bush school to the metropolitan areas. There was recognition that some students needed additional support, including those with disabilities, students from non English speaking countries and more recently Indigenous students. The resilient nature of this approach is readily seen as emerging challenges were addressed as they arose.

- The Whitlam Government was able to make provision for wider access to tertiary education.
- More recently access to technology has been a major focus taken up by all sides of politics.

However, Paul Keating (2), in an address to the Melbourne Writers Festival on 23 August 2008 said, "We are living through one of those rare yet transforming events in history, a shift in power in the world from West to East. For 500 years Europe dominated the world; now, for all its wealth and population, it is drifting into relative decline". Jim Wallis (3) talks of three Global Awakenings in History and believes that the world may be seeing the beginning of a fourth. Tim Flannery (4) presents a frightening picture of our future if as a global society we are unable to change the way we treat our planet. If we are to bring about the necessary change in human behaviour we need to have a worldwide concerted effort based on educating our society in what needs to be done and how.

The World Bank has accepted the proposition that the alleviation of poverty in developing countries is dependant upon education, not just literacy but the education of the whole person.

We are in an era of unprecedented change, both in its scope and in its speed. This same resilience, founded on manageable, incremental change, may well prevent Australia from adapting to contemporary challenges. In January 2007 the Australian Labor Party (ALP) launched its paper *"The Australian Economy Needs An Education Revolution"* (5). The paper identifies that "we need to set ourselves a new national vision for Australia to become the most educated country, the most skilled economy and the best trained workplace in the world" Unfortunately, the paper fails to outline any plans or strategies as to how this will be achieved.

Since the ALP's election to government The Hon Kevin Rudd, Prime Minister and The Hon Julia Gillard, Deputy Prime Minister and Minister for Education, have made many speeches and announcements concerning the education revolution. Far from "revolution" these statements have strengthened the status quo.

Dr Jim McMorrow, (6) author of a review commissioned by the Australian Education Union, a former senior ALP adviser and education consultant in national and NSW governments, says in his report: "The Rudd Government has inherited a set of arrangements for schools' funding that is lacking in rationality, integrity and transparency. Given the absence of any simple political remedies for dealing with these flaws the Government has opted to avoid disturbing the arrangements so early in its term of office. It has, therefore, accepted most of the Howard legacy and defaulted on policy reform in the medium term".

Ross Gittins (7) comments "Kevin Rudd promised us an Education Revolution that would bring us better schools, universities and technical colleges and so more of the highly skilled, better paid jobs we need to prosper in a more competitive world. But, not to worry, that would not involve interfering with the Howard government's scheme for making grants to the public and private schools". Gittins continues "The state education bureaucracies and their unions have their own reasons for continuing to resist federal pressure to publish performance indicators. But Rudd is giving them valid argument that his competition is biased against them. That's the kind of problem you strike when you pursue *change without change*".

Is the "Education Revolution" simply more political rhetoric, in the tradition of past Prime Ministers and Premiers who have seen education as a convenient "flag pole" from which to hang their flag? (Bob Hawke — The Clever Country, Bob Carr — The Education Premier).

The 20th century model of Australian education was a refined model of 19th century schooling. The fact that the model has survived, long past its use by date, is indicative of its resilience. Despite its past achievements major issues remain, for example:

- National Investment in education in Australia has not been keeping up with the rest of the world and has slipped by 7% since 1995.
- The “public education” versus “private education” debate is debilitating and detrimental to the education of “All” children in the nation.
- Compulsory education is based upon a “factory production model”, in buildings that are increasingly costly to maintain, not conducive to modern learning and largely inaccessible to the majority of the community for the majority of the year.
- Teaching is not seen as a preferred career and faces a crisis of self confidence and low public self esteem.
- Three or four year political terms prevent long term planning and increase unnecessary intervention as every “New Minister” tries to “make their mark”.
- An ageing general population means that education is not seen as a “Number 1 Priority” for the electorate.
- Entitlement to education is a fundamental human right, however, many of our less fortunate, less able, rural or remote students do not have equal access to this right.
- Skill shortages are almost at crisis level in many professions and trades and our productivity growth has been steadily falling despite “good” economic times.

Education in the 21st century will be vastly different to that for which our current education system was designed. “Schools must ensure they remain relevant to their

students’ future life, and there is rather too much evidence that they are failing in this regard” Hawkes (8).

A number of trends can be identified that will drive education in this century, Dawkins (9), Caldwell (10), Wallis (3), Frey (11) and The Productivity Agenda (12) indicate that:

- A transition from teaching to learning with students learning anytime, anywhere and anything, with flexibility and at a pace comfortable to them on topics that are relevant to them. Teachers will transition from topic experts of known facts to guides, facilitators and coaches where “Imagination is more important than knowledge” (Albert Einstein, in 12).
- Exponential growth of information, the technology to access, interpret, manipulate and communicate it, and the application of this information and technologies to care for, sustain and develop the living planet.
- An increase and diversity of places where we come into contact with the rest of the world and where we learn, encompassing whole of life experience.
- A transition from a society of consumers to producers, where there is a real need to participate in creating, recording, interpreting and communicating history, current events, facts and news e.g. “You Tube” and “My Space”.
- The shift from West to East and Australia’s place as a 20th Century Western Culture with a 21st Century Eastern population and position.
- A transformation from a regional to a world citizen as the pace of change mandates that we produce faster, smarter, more capable, more flexible and more adaptable human beings (Frey 11). Current systems prevent this from happening. “We have to educate for what we can’t imagine”. (Bill Gates in 12).

- Changes in demand for education, with education as a traded service for the whole of life and from throughout the world. Educational franchising; corporate training; distance learning; greater business and industry involvement in Vocational Education and Training; privatisation and market economy forces, will all shape a new definition of education. Education is a service that people will require all their life and therefore everyone will demand an entitlement and access to education.
- The role of government will be more sharply focussed on education for the public good and it will set priorities, establish funding structures and build frameworks that facilitate this in a full range of environments which have the authority to deliver a world class education with appropriate accountability.
- Education will be a means to change which is as unprecedented as it is unpredictable.
- There will be no “typical” student, however our current “5 year old” will mix in multi cultural, multi faith settings; have a strong focus on the Asia Pacific; access the world economy; be concerned with humans’ impact on the environment; access nano-technology and genetic engineering; colonise space; farm the sea; be more imaginative and flexible learners; consider the earth as a living organism to be nurtured not exploited; and structure work and career choices to fit lifestyle. Beare (13).

The paper “The Productivity Agenda — Education, Skills, Training, Science and Innovation” (12) produced as a result of the Australian 2020 Summit (April 2008), provides a thoughtful foundation for debate to take place. In its ambitions, themes, challenges and ideas well constructed statements give rise to hope:

- We need to prepare our young people to be flexible workers as they will change occupations many times throughout their lives and increasingly operate as part of global production and knowledge systems. A true education revolution is needed if Australia is to stand in the world as a smart economy.
- Education must foster creativity since it is one of the greatest contributors to productivity in the 21st Century.
- We need to seriously re-examine the governance system around education, at all levels, which are presently undermining effective education and creating enormous wastage.
- We must re-think funding structures to encourage flexibility.
- We must take innovative approaches to training and education.
- Long term planning must be encouraged.
- We need high aspirations and expectations for all our children.
- We need to move on from the old paradigm of “public” .v. “private”. People have a right to choose where they study, we must accept that there are many ways we can educate people in Australia and they should be valued and we must concentrate on developing every Australian to their full potential to enhance individual worth, social capital and the “public good”.

The continuing lack of a national vision for education may mean that the current education system, which has relied upon a slow rate of change and ad hoc management of that change, may flounder. Clearly the development of a shared vision for education in Australia is essential. Peter Senge (14) notes “You cannot have a learning organisation without a shared vision. Leading educationalist Michael Fullan (15) supports this notion. “Structure does make a difference, but it is not the main point in achieving success. Transforming the culture — changing the way we do things around here, is the main thing”.

While Australian Governments have been able to demonstrate a commitment to education it has lacked a strategic perspective, focusing instead on short term political gain. This has resulted in unsustainable priorities, a lack of co-ordination and fiscal waste. As political parties seek to provide a political alternative the change process is often confined to a three year cycle. Key priorities one year can quickly be off the agenda when a Government changes. The rapidity of change in today’s world makes it an imperative that a unilateral approach is taken to strategically position Australian education to adapt to emerging challenges. If this is not done the resilience of Australian education cannot be assured.

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Section 3 — Conclusions

3.1 Concluding remarks

Dr Lynne Reeder

Resilience thinking provides a perspective of how systems work and how they work under pressure. As has been referenced in this volume, one of the main tenants of resilience is the 'ability to build and increase the capacity for learning and adaption', and most would agree that these are necessary skills for organisations and individuals at this time.

The financial, environmental and social challenges facing the global community at the present moment require that individuals, communities, companies and governments, and the ecosystems that support them, have the traits and attributes to be and remain resilient.

Within this context it is important to note that resilience is not a variation of risk management — approaching policy planning and development from a resilience perspective, provides a proactive approach to the complex and uncertain policy context facing us today.

The papers in this publication attest that building resilience will not happen without an informed intent to develop measures of resilience, to anticipate and plan for future shocks, and to retain healthy levels of personal, organisational and societal functioning.

The international initiatives already underway are alerting us to the fact that the concepts developed within resilience thinking can be applied to a range of organisational systems, including corporate and government.

Applying resilience thinking will be particularly useful in addressing one of the major current policy challenges, i.e. how to best achieve integration across a range of portfolios or business units. Highlighting the flexibilities and the cycles on which systems function can be very useful when attempting to bring portfolio systems together. The value of resilience thinking informing a systems approach is that it can assist individual systems to determine what level of integration (i.e. collaboration/full integration) is both desirable and possible.

The essays and introductory chapters in this document are written to initiate the Australian dialogue on the contribution of resilience thinking to the strengthening of policy development, and through that to the enhancement of the resilience of Australia.

3.2 Notes on contributors

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Nicholas Gruen is trained in history, statistics, law, education and economics and has published internationally on a range of issues including economic liberalisation and fiscal policy architecture. He has been an advisor to two Federal Ministers, been appointed to the Productivity Commission where he completed five inquiries as an Associate and two as a Presiding Commissioner. He leads Lateral Economics and Peaches a discount finance broker and is a substantial contributor to Australia's thriving blog scene, a board member of the government agency Sustainability Victoria, and chairman of Online Opinion. He has a regular column in the Australian Financial Review and is occasionally published in The Age, the Australian and Crikey.

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John Quiggin is a Federation Fellow in Economics and Political Science at the University of Queensland. He is prominent both as a research economist and as a commentator on Australian economic policy. He has produced over 1000 publications, including five books and over 300 journal articles and book chapters, in fields including environmental economics, risk analysis, production economics, and the theory of economic growth. He has also written on policy topics including climate change, micro-economic reform, privatisation, employment policy and the management of the Murray-Darling river system.

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Ian Dunlop was formerly an international oil, gas and coal industry executive. He chaired the Australian Coal Association in 1987–88, chaired the Australian Greenhouse Office Experts Group on Emissions Trading from 1998–2000 and was CEO of the Australian Institute of Company Directors from 1997–2001. He is Deputy Convenor of the Australian Association for the Study of Peak Oil.

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John Hendry is Director of Student Welfare at Geelong Grammar School. John has been a teacher for 40 years and is particularly interested in establishing a more constructive and humane way for all to manage mistake. He has written the Geelong Grammar School behaviour policies based upon Kindness and Forgiveness. His wish is to remove harm and fear as the basic management strategies for behaviour compliance within the community and especially schools. He believes in the fundamental goodness of all people and knows that, at the core, all people are basically hardwired for Kindness.

Prof Stephen Prowse

Stephen Prowse is the CEO of the Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease (AB–CRC) and an Adjunct Professor in the Faculty of Biological and Chemical Sciences at the University of Queensland. The objective of the AB–CRC is to build capabilities to detect, monitor, assess and predict emerging infectious disease threats which impact on national and regional biosecurity (www.abcrc.org.au). Professor Prowse has a background in disease research in humans and livestock with a focus on pathogenesis, and the development of vaccines and diagnostics. Prior to his current appointment he was the Manager for Strategy and Evaluation in the CSIRO Division of Livestock Industries, where he had responsibility for leading the development and implementation of scientific strategy, and for the evaluation of the Programs and projects. In 2001, Professor Prowse was Acting Director of the CSIRO Australian Animal Health Laboratory, Australia's primary emergency animal disease diagnosis laboratory. Professor Prowse is the author of over 100 publications in refereed journals, books, industry journals and on-line. Professor Prowse is a reviewer for various journals and funding organizations and has served on Government and industry advisory and policy committees.

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Wayne Chandler

Wayne Chandler (B.A. Grad. Dip.Ed. M.Ed. Admin. FACEL) is a highly experienced educator who has worked in the Senior Executive service in both NSW and the ACT since 1990. Positions he has occupied have included Cluster director, Director of Education, District Superintendent and Schools Director (ACT). Mr Chandler has led a range of Departmental Portfolio areas including School Review and Development, International Education and Indigenous Education. Mr Chandler's previous positions included teacher, school executive, consultant and a range of Principalships including small rural schools, a Special Education school and large Primary schools. Mr Chandler's contribution to education has been recognised through the award of a Fellowship by the Australian Council of Education Leaders.

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