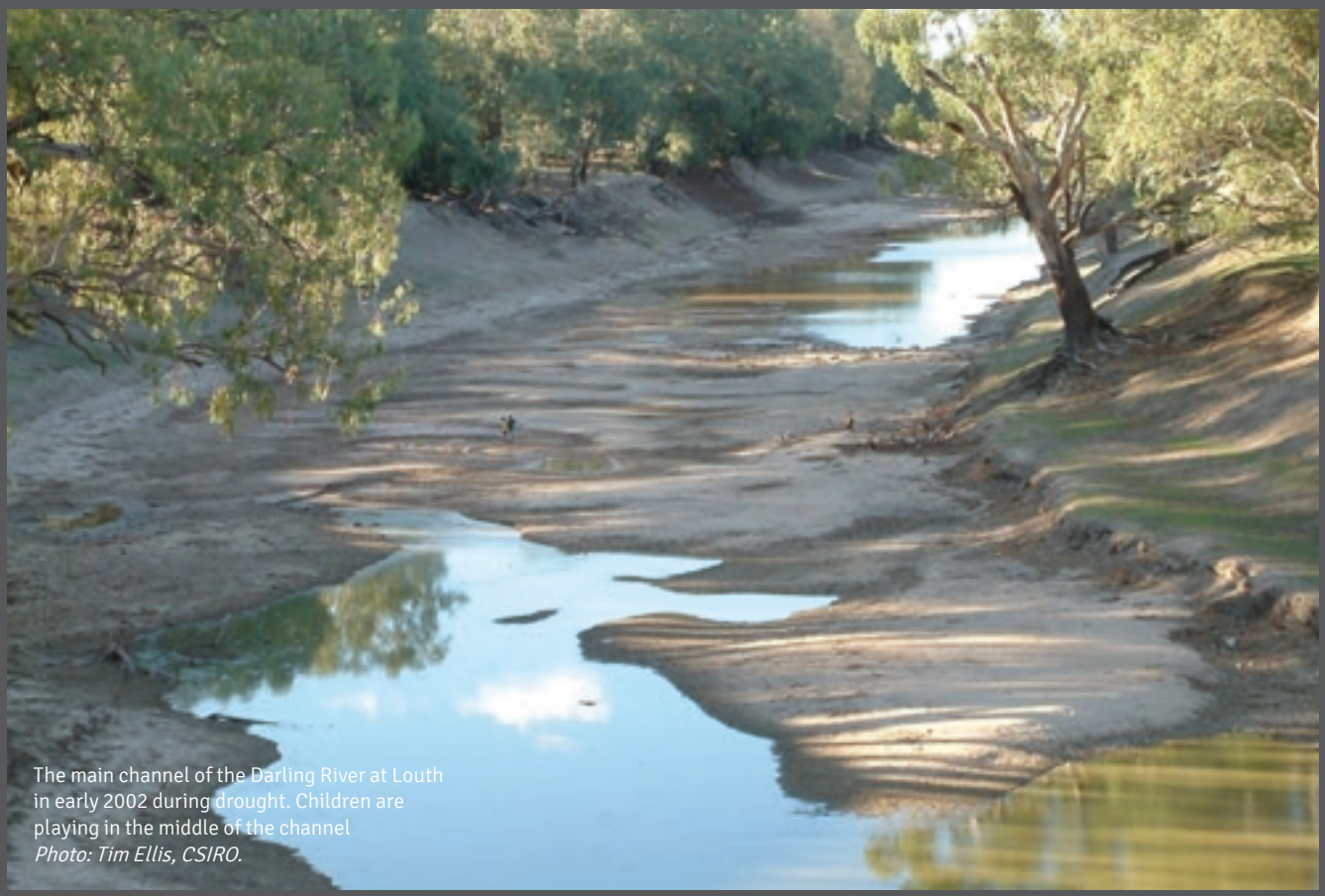
Placing global change on the Australian election agenda

Essays on vital issues that are being largely ignored

Editor Bob Douglas



The main channel of the Darling River at Louth in early 2002 during drought. Children are playing in the middle of the channel
Photo: Tim Ellis, CSIRO.

The views expressed in these essays are the views of the individual authors and do not necessarily represent the views of Australia21.

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Foreword

Australia21 is a non-profit body that seeks to develop new insights into complex issues important to Australia's future. For twelve years we have been bringing together multidisciplinary groups of thinkers, researchers and policymakers to consider issues about the future, ranging from climate and the landscape, our society, and our economy to Australia's place on the world scene.

Our Board has become increasingly concerned that a number of grave challenges are being ignored, bypassed or placed in the "too hard" basket, and that there is no sign of this changing as we head into vitally important national elections.

Accordingly, we have commissioned a series of essays by a number of Australia21 Directors, Fellows, Associates and other contributors, which draw attention to threats arising from global change. These are threats that all Australians will need to manage in the near future, and need to be thinking about now.

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What emerges from these contributions is a somewhat harrowing set of possibilities and probabilities. They are for the most part not featuring in the current political dialogue and most Australians are not being exposed to them.

Australia21's conclusion is that we must find ways to engineer change in the way our social and political structures engage with the future. Most importantly, we must develop a new narrative about human society and its relation to the limited resources of the planet and restructure our economy and society accordingly.

We hope that this series of essays will help to stimulate a constructive discussion between voters and political aspirants from all parties about the kind of Australia we will leave to our children in an increasingly hazardous, globalised and resource-constrained world.

Paul Barratt AO
Chair Australia 21

‘Australia21’s conclusion is that we must find ways to engineer change in the way our social and political structures engage with the future.

Most importantly, we must develop a new narrative about human society and its relation to the limited resources of the planet and restructure our economy and society accordingly.’

Paul Barratt AO Chair Australia21

Preface and Questions for Voters and Political Candidates

The sixteen essays in this anthology have forthrightly identified a range of plausible and serious threats to the future, not only for Australia, but for human civilisation. We may well be accused of catastrophising on a grand scale in drawing these uncomfortable issues together. We also recognise there are enormous un-predictabilities in several of the issues discussed here. But to ignore them or pretend they do not exist is irresponsible and unwise. Humanity's collective failure to take aggressive action on greenhouse emissions has already exposed the coming generation to serious and now apparently unavoidable risks.

None of us enjoys bad and frightening news. In their apparent denial of the realities ahead, our political leaders are behaving like many of their constituents. The community view of the world is largely based on myths and preconceptions that have been learned from our cultures, our education, and our leaders. Graeme Pearman, in his contribution, points to the need for "strategic-ness" in the presentation of climate change messages because of the different ways diverse groups of people respond to frightening news. We all construct an imperfect view of the way the world is and it is perhaps not surprising that the mere presentation of catastrophic predictions by scientists will be coped with in a less than rational way by large segments of the population.

We agree with Pearman and also with Richard Eckersley, who argues the need to pay more attention to the psychosocial dynamics of our situation. Eckersley says that to arouse and mobilise people we will need to relate the big global threats and challenges more closely to people's personal lives and concerns – perhaps especially to their children and grandchildren. Logic alone will not win the day.

Denial is a form of defence that can become more firmly entrenched as the logical case for action becomes stronger.

Steven Cork's paper contains a valuable critical analysis of the assumptions which underpin the way the community and the body politic are responding to the climate change challenge, while Paul Atkins sounds legitimate doubts about whether more dire warnings will make a positive difference to public behavior. Trying to convince others from a position of certainty can actually reinforce a denialist stance. People on all sides defend their point of view and being right becomes more important than learning. Atkins proposes an alternative communication strategy building on the principles of dialogue.

There are also important lessons to be learned from Andrew Campbell's proposals for building a new national environmental literacy. He points to the need for an integrated planning and delivery framework with active community involvement at the local level. There is a major risk that, in being faced with a torrent of climate change data, individuals will feel tiny, impotent and overwhelmed. Campbell believes we must make visible what is currently invisible to most people and make it measurable and transparent.

What it all comes down to is this: continued denial of the seriousness of global threats could result in catastrophic outcomes for all of us. This is not to suggest that we know how to ameliorate all of the threats that are discussed in this volume. But there are well-documented solutions to the biggest crisis facing us on climate change, which our political leaders are less than half-heartedly embracing.

We think political parties should take a long-term view when they frame policies to put to the Australian people. When they propose new policies, they should be expected to explain how sustainable they would be in the long-term, and how they would fit into a longer term context. We wonder whether politicians are acting responsibly when they imply that Australians in full time employment are "doing it tough" -"tough" against what benchmark, exactly?

So, what do we propose? As a response to the concerns raised in these essays, we are posing a series of questions under twelve themes for consideration by voters across Australia, which we suggest they should discuss with all candidates for political office during the coming months:

1. On Greenhouse gases:

What is your assessment of Australia's contribution to greenhouse gas emissions and to the global effort to curtail their growth? Do you believe that we should radically curtail energy production from fossil fuels? If so, over what timeframe? Should we also curtail our mining and export of fossil fuels to other countries? What energy source(s) would you see as most promising replacements for fossil fuels in Australia, and what should we do to encourage rapid uptake? If you do not believe we should rapidly curtail reliance in fossil fuels, please outline your thinking on this matter.

2. On economic management and growth:

How long do you think we can sustain the current approach to economic management in which growth of GDP is required to maintain high employment and accordingly the rate of GDP growth is seen as an indicator of the health of the economy? Do you think we need to develop a more "steady state" approach to economic management, in which we can maintain full employment without rapid growth in the demands placed upon our resources and the biosphere? How (on the business principle of "what gets measured gets done") can we better integrate the health of the environment and measures of human well being, in Australia and globally, into our measures of economic performance and economic "success"?

3. On defence policy:

What is your concept of what the Australian Defence Force (ADF) should be structured to do over the next two decades? Are we spending enough on defence for the ADF to be able to meet your expectations? Are you concerned about the prospect of strategic competition emerging between China and the United States, and how do you think Australia should respond? Do we have the right decision-making processes in place to ensure that we go to war only for the right reasons, and with good prospects of success?

4. On food for our future:

What is your assessment of the prospects of Australia feeding itself in the context of rising temperatures, declining extent and health of croplands, and rising food prices and international famine? What policies would you support to ensure that your constituents will be resilient to what many predict is an imminent global food crisis?

5. On our dependency on oil:

In view of the tenuous state of Australia's oil reserves and the firm likelihood of oil crises in the near term, what policies would you favour to build Australian resilience in this area? Do you think the Government should adopt polices to ensure that we have specified stock levels of fuels and lubricants in-country? Should the Government seek to develop the capacity to produce liquid fuels from non-conventional sources?

6. On prospects for the global economy:

What do you think is the likelihood of another global financial crisis? What should we do to prepare for such an eventuality? What is your assessment of Australian prospects of again withstanding major damage from a collapse in the international economy?

7. On protection against toxins and antibiotic resistance:

What role should government play in protecting the community against exposure to toxins and deterioration in antibiotic sensitivity?

8. On the valuation of services provided by ecosystems:

Do you agree that we should include in our evaluation of proposed developments or changed land use the economic value of the services provided by local ecosystems to human communities and to industry? If not, how do you think we should best protect ourselves from the loss of these services? If so, what role should government play in building the value of these services into our thinking about the economy?

9. On ecological footprints and equity:

Australia's per capital ecological footprint is more than 3.5 times higher than the world resources can sustain in the longer term. How can we reduce our per capita footprint in a way that both assists developing countries and makes limited resources more equitably available to all Australians? In view of the fact that, as in most Western democracies, income inequality among working age people in Australia has been rising since 2000 and that since the mid-1980s income taxes have become flatter and less redistributive, what are the consequences of these changes for Australians and how should we deal with them?

10. On environmental refugees:

What role should Australia play in the accommodation of environmental refugees from the South Pacific and from South-East Asia as sea levels rise? What impact should such refugees have on the numbers taken from other migration categories? How should we best integrate provision for refugees from the results of climate change into our immigration policy?

11. On domestic travel:

Do you think that the rising demand for rapid movement between our major cities can be met into the indefinite future by increasing civil aviation capacity? Can you foresee a time when exclusive reliance on air travel might become a problem or face constraints?

12. On responding to the needs of the coming generation:

Is Australia preparing its younger population adequately for the likely risks ahead as climate change and resource scarcity challenge the conventional wisdom of endless economic growth?

We could of course continue in this vein, however if these twelve question clusters can become part of the political discourse in the lead-up to the election of our next government, this small volume will have served a valuable purpose.

Bob Douglas and Paul Barratt

Climate Change & Resource Scarcity by Ian T. Dunlop

Time to dispense with "Political Realism"

Australia is living in a "Fool's Paradise", ignoring the most critical issues, which will impact upon this country in both the short and long-term.

Weighty reports are being published on our "official" future. Scenarios abound, setting out the impact of differing assumptions on our children and grandchildren. All of which would be laudable were it not for the fact that the critical scenario, of accelerating anthropogenic climate change and resource scarcity, is deliberately ignored – apparently too scary for "political realism" to contemplate.

Extreme weather is accelerating around the world. Science is now able to link such events to long-term climate change trends with increasing confidence.(1) The climate is undoubtedly warming rapidly, albeit that extreme weather, the short-term manifestation of long-term climate trends, is highly variable. It can take the form of excessive heat or excessive cold; it may simultaneously result in drought and floods even within one geographic area.

Simultaneously, growth in both population and consumption has exhausted the biophysical capacity of the planet to meet demand for resources in a sustainable manner, resulting in escalating scarcities, particularly for energy, water and food.

The real climate and resource scarcity challenges are far greater and more urgent than acknowledged by Australia leaders. These key strategic risks are already fundamentally changing our society and economy, yet they are totally ignored in national debate.

The Real Climate Challenge

We have probably passed climatic tipping points in the Arctic, which have the potential to halt human development as we know it. Unexpected changes are also occurring in the Antarctic. The West Antarctic ice sheet, for example, has been warming faster than virtually anywhere else on the planet.

Multiple signs of rapid climate change are also evident elsewhere: *inter alia* ocean acidification, record sea surface temperatures, coral reef disintegration, biodiversity loss, rainforest dieback, glacier melt, record droughts and flooding.

The changes at the poles may seem remote from Australia, but they have enormous impact on the global climate system, on sea level rise, and thus directly impact upon us.

Science has established human carbon emissions as a prime cause.(2) Major changes are happening at the 0.8°C temperature increase we have already experienced relative to pre-industrial conditions, let alone the additional 0.6°C to 3.5°C to which we may already be committed as the full effect of historic emissions is felt. If carbon emissions are not cut rapidly, it will be impossible to prevent catastrophic outcomes.

"Official" solutions to reducing emissions, such as carbon capture and storage, and clean coal technology, are not working and even if they did, it would require decades for them to take effect, time we no longer have.(3)

Current climate policy commitments, if fully implemented, will still result in 4–6°C mean warming, with the Arctic experiencing 10–16°C regional warming – way beyond the official target of 2°C – worsening an already very dangerous situation.(4) This could occur long before 2100.

A 4°C World – 1 Billion People

Australian leaders glibly talk about adapting to a 4°C world with little idea of what it means, which would be a world with less than 1 billion people, rather than the present 7 billion.

Large parts of the world would be subject to extreme drought, with severe impact on food, water and human health, whilst other parts experience intense rainfall and flooding. As the World Bank emphasises 'if we have any sense of responsibility to current and future generations, a 4°C world is to be avoided at all costs.(5)

As a hot, dry continent, the impact on Australia is likely to be severe. It implies a major reduction in the Australian population.

Realistic Targets to Prevent Catastrophic Climate Change

If catastrophic outcomes are to be avoided, on the balance of probabilities the real target for a safe climate is to prevent global mean temperature rising more than 1.5°C above pre-industrial levels, rather than the official 2°C. This requires a rapid reduction of atmospheric carbon concentrations back toward the pre-industrial levels below 350ppm CO_2 from the current 400 ppm CO_2.

For Australia, this will require global emission reductions in the order of 50 per cent by 2020, complete de-carbonisation by 2050 and continuing efforts to draw down legacy carbon from the atmosphere.

It is now inevitable we will overshoot the 1.5°C, and probably the 2°C, targets, but the objective must remain. The cost of this change is in the range 3–5 per cent of global GDP, a manageable amount, but rising the longer action is delayed. The potentially catastrophic cost of continuing inaction would be in excess of 20 per cent of GDP, equivalent to the costs of WWI, WWII and the Great Depression combined, let alone the deaths and human suffering involved.

Resource Scarcity

Our critical resource scarcity is the lack of disposal space to dump the carbon waste from our profligate use of fossil fuels. Other scarcities are also looming.

Cheap conventional oil supply peaked globally in 2005 and has since been stagnant, with Australia's oil self-sufficiency continuing to decline below 50 per cent. Increasing global demand is being met by new high-cost supply from unconventional sources such as tar sands, shale oil, shale gas and coal seam gas (CSG). The rapid decline of existing oil fields globally is not being offset by these new sources, official and media hype about a glorious unconventional oil and gas future notwithstanding. Further, the carbon emissions, and other resource demands of unconventional oil and gas – such as water – are disastrously high. This is reflected in the rapidly declining energy return on energy invested.

Most importantly, the world can only burn less than 20 per cent of existing proven fossil-fuel reserves if catastrophic climate change is to be avoided,(6) which removes any justification for continued development of fossil-fuel resources.

The rush from coal to gas is accelerating warming, not reducing it. Water and food security are acute problems globally,(7) exacerbated by both population growth and climate change. In Australia, the rush for CSG is destroying arable land and water resources, resources which will be of infinitely greater, and more lasting, importance than gas given the likely severe impact of climate change.

What Are We Doing?

Despite 20 years of negotiation, nothing has been done to constrain emissions, which continue to rise at record rates. Given that their full impact is not seen for years to come, this virtually guarantees catastrophic outcomes.

Credit is due to the Federal Government for introducing a Carbon Pricing Mechanism ("Carbon Tax") in 2012. However, the emission reduction targets are ludicrously low compared with the real reductions now required.

There is a total disconnect between the supposed commitment of both major parties, and business, to serious action on climate change, and their contradictory energy and economic policies. In particular, the commitment to continued expansion of the fossil fuel industries, especially coal.

By 2025, the Australian coal industry is planning to more than double coal exports, and the gas industry to quadruple gas exports, when we are already amongst the highest emitters in the world. Yet every new fossil-fuel project now represents death and destruction for communities somewhere in the world, Australia included.

Meanwhile, the Chinese, Indians and other trade partners are in the process of rapidly abandoning a high carbon future, which will leave Australia, within a decade, with a stack of stranded assets in mines, ports and railways, 'beautifully equipped for a world which no longer exists.' – and with severely degraded food production capacity.

Emergency Action Required

Global inaction has eliminated easier options; the only realistic way now to avoid catastrophic climate change, and the disruptions of resource scarcity, is to immediately halt any new high-carbon development and to initiate emergency action by placing economies on a war-footing, to rapidly implement low-carbon re-structuring.

Australia has solutions – enormous ingenuity, low-carbon resources and opportunities – but only if we are honest about the real challenge and initiate our own emergency response. A national conversation is required to trigger this change.

Ian Dunlop is a former 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 a Director of Australia21, Chairman of Safe Climate Australia, a Member of the Club of Rome and Fellow of the Centre for Policy Development.

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A Climate for the Future by Two Young Voters, Vivienne Moxham-Hall and Tom Merrett

As today's generations grow up they know that climate change will be one of the biggest issues to impact on their lives. Significant changes in global weather systems resulting from human induced climate change are forecast. These will have devastating impacts on the way we act, consume and behave. This is an issue that previous generations have never had to think about; it was never of concern to them and it is a matter that they may never have to deal with in the same way that younger generations will.

Climate change is not an issue for politicians and the older generation because it is abstract, it will not directly impact them and it is of immense scale. However, climate change ***is*** an issue for young people because it is real, it will affect us, and change needs to happen now to contain the problem. We know that the current state of consumption and perceptions of "business as usual" are not sustainable.

The problem is, young people do not provide the number of votes to attract political attention and are not included in the decision making process. In the Australian political arena decisions are being made about our future, without asking how the current state of denial will impact on the climate of our future.

The global mindset of climate change denial needs to change. Currently, climate change seems to be the view of the public minority, whereas in the scientific community the majority view is that it is real and it is happening now. This makes reform unpopular, and together with the current political atmosphere has halted progress. Praise must be given to the Gillard Government in taking one small step on the issue by legislating the Carbon Tax. However even this remains threatened by the Opposition's policy to abolish the tax if they gain power at the upcoming election.

This only reinforces the overwhelming public denial and lack of motivation for action on the issue. As Richard Eckersley argues in his essay 'Backs to the Future' the "big deal" is that the problem is actually getting too big. Climate change is a serious issue, which has huge implications for our future well being and way of life – but if we cannot get the politicians in our own country to sit up and pay attention to the climate of our future, let alone that of the world, what can we do but hope that someday in the future we will find a miracle cure for the earth? Richard Eckersley describes the 'appeal of distancing ourselves from frightening global possibilities as we strive to maintain our own personal wellbeing and satisfaction.' A resolution will require a significant shift in mindset triggering a restructuring of the global economy. Big decisions need to be made and these changes will inevitably require a sacrifice, the longer we ignore this issue the bigger the sacrifice will be.

Private corporations and wealthy individuals are exerting increasing impact on government policy through, amongst other means, lobbying and campaign donations. This is having a corrosive effect on democracy worldwide and is evident in Australia from the watering down of the Carbon Tax and Minerals Resource Rent Tax ("Mining Tax"). These factors combined are scaring our politicians away from reforms on the big issues that will have immense implications for future generations.

What's the big deal?

Climate change is a global problem and needs to be addressed by more countries than just Australia. No matter what we do as a nation, countries around the world need to be involved in taking on climate change as an important political issue. Each year, as the problem of climate change gets bigger, both old and young people are ranking climate change as less of an issue. In 2010 young people ranked climate change as the fourth biggest

issue facing our nation. No one acknowledged this appeal for public awareness and political action; the mentality of denial remained both in the political and policy sphere. By 2012 youth ranking of climate change as an important issue facing our nation had dropped to eleventh place.

Australia is becoming increasingly dependent on unsustainable resource industries, showcased by the mining boom, with our nation's leaders taking steps towards further scarring our country's ecological longevity through activities such as coal seam gas extraction. This short-termism stems from the preoccupation of politicians with the growth priority. As Graham Turner says in his essay, 'essentially it is easier for a politician to tell a bigger lie and win more supporters than it is to win supporters by telling the truth.' The truth is, we cannot keep focusing on gains in finances and resources; we live in a finite world that cannot keep up with the demands we keep placing on it.

The truth needs to be told and it is our elected leaders who should be listening to the public appeals for more attention to be paid to climate change. Because it is a big deal.

What we want you to do

The Australian Government needs to focus on climate change policy that creates real solutions and delivers on achievable goals. The looming energy crisis, which will require that we move from an economy driven by cheap, dirty energy to a sustainable and clean future, could be the most dramatic period of change ever seen, surpassing that of the industrial revolution. Revenue from taxes such as the Carbon and Mining Taxes should be utilised to drive policy change, and companies responsible for large amounts of waste must be required to pay for the pollution that they currently dump into our atmosphere for free. A world-wide emissions trading scheme needs to be implemented. This would start the restructuring of the economy by driving investment in a clean future and making alternative energy sources economically viable. Revenue from these ventures should finance change – transforming Australia's approach to energy consumption and creating a sustainable future for younger generations.

Australia should be leading the globe by example by committing to a climate-friendly future and renewable energy. At the same time our leaders need to be engaging other global leaders, showing them that it is not an election loser and that we can all do it together.

Here is the policy we would vote for:

- Take a stricter stance on the Mining Tax and Carbon Tax and channel the money gained from these taxes into renewable energy and products such as:
  - Improved public transport across all major cities
  - Supporting Australian farms and farmers
  - Solar panel infrastructure on public buildings and incentives for Australians to utilise solar energy in their homes
- Global leadership: sitting down with global leaders and initiating a global conference on climate change solutions targeting achievable policy goals that can be enacted by all countries.

This volume of essays addresses an array of big issues with implications for our future that are not on today's political agenda. We encourage you to read every one of them and think about how these problems can be addressed by the leaders of today. What must be remembered is that it is the youth of today who will bear the full force of inaction. Is that the legacy that you wish to leave behind for your children?

Vivienne Moxham-Hall and Tom Merrett are university students at Sydney and Adelaide University respectively. They are Honorary Youth Advisers to the Board of Australia21.

Climate change as a threat to the well-being and safety of the Australian population by Tony McMichael

Amongst today's several major human-induced global environmental changes, the climate system is the most likely source of acute shocks/emergencies within the coming decade. Rapid human-induced warming and the accompanying increase in climate variability are substantially increasing the likelihood of major shocks/emergencies.

Natural climate change during the Holocene has caused many acute shocks to human societies.(1) These events have reflected the complex of natural influences on climatic conditions, including extreme El Niño events, volcanic eruptions and occasional asteroid impacts.

Europe's 'Great Famine' of 1315–1322 CE resulted from the unusual confluence of three consecutive years of severe harvest-damaging weather – food supplies halved and grain prices tripled. The Super-El Niño of 1789–93 had disastrous impacts on health, survival and conflict in several regions of the world (including influencing the food shortages that fomented the French Revolution and the extreme heat, aridity and food shortages that afflicted the Sydney Cove colony in 1790–91, two years after its arrival). Another Super-El Niño amplified the disastrous late-nineteenth century droughts and heavy mortality in South Asia and China.

We are now superimposing the risks attendant on ***human-induced*** climate change and the associated increase in climate variability. There is now coherent evidence of an increase in the tempo and severity of most types of extreme weather events (EWEs) over the past decade.(2) Rich countries like Australia (floods and fires), the USA (widespread drought, Superstorm Sandy) and northern Europe (floods and extreme cold winters due to shifts in wind patterns and the northern polar jet-stream) are clearly not immune. The recent reports by Australia's Climate Commission – The Angry Summer (March 2013): http://climatecommission.gov.au/report/the-angry-summer/) and The Critical Decade: Extreme Weather (April 2013): http://climatecommission.gov.au/report/extreme-weather/) – pull no punches about the underlying influence of climate change on the probability of extreme weather disasters. In the Commission's words:

> *Australia has always been a land of extremes. However, the basic features of the climate system have now shifted, changing the conditions for all weather. We live in a hotter climate than 50 years ago, and this extra energy in the system is influencing many types of extreme weather events.*

The impacts of weather disasters on health and survival are many: deaths, injuries, respiratory ailments, post-event infections, depression, post-traumatic stress disorders, and impoverishment. Within the coming decade this looms as the **most likely** source of a climate-related shock and emergency in Australia – the emergency dimension being heightened by the prospect of several such events occurring at the same time (for which Victoria in January 2009 gave a foretaste: an extreme heatwave coinciding with the outbreak of intense bushfires). Our currently under-prepared health system and emergency services, distracted by current priorities and (regrettably) ambivalent about the importance and health implications of climate change, may quickly find that they are unable to cope with such "multi-headed" shock events.(3)

Meanwhile, we lack knowledge of which regions and sub-populations in Australia are at particular risk (highly vulnerable), especially from EWEs. Some links are obvious: older and frailer people and heatwaves, coastal dwellers and storm surges, remote communities and food safety, communities located on flood-plains and river flooding. A systematic national assessment of sub-group risk profiles under climate change conditions is needed.

Level of public understanding

Beyond the general public confusion over human-induced climate change and ignorance of the scope of the risks to health and survival, there is a particular difficulty in discussing whether climate change causes EWEs. But this is not an "either-or" issue; it is a matter of shifts in probabilities. Scientists should provide a clearer, less guarded, explanation. Did Lance Armstrong's doping schedule ***cause*** him to win several particular races amongst his tally of seven; or did it give a marginal boost to his chance in every one of them?

Our high-profile politicians have largely ducked the issue. At federal level, climate change has become the problem that dare not speak its name. The Prime Minister, Treasurer, Leader of the Opposition and others avoid the term, speaking piously about the tragedy of "natural disasters."

Beyond a few enlightened, even committed, individuals in the State and Federal health sector, there is little awareness within that sector of the potential severity and the urgency of climate change in Australia. Besides, it does not fit the budgetary and political templates.

Preparing for such shocks

The one upside of EWEs, here and overseas, is that they have begun to make clear how far-reaching and disastrous the human and infrastructural consequences can be. This is helping focus minds and raise questions about adaptation priorities, however, it is not happening sufficiently fast or systematically. There is, too, the usual Council of Australian Governments (COAG) blockage relating to whose prerogative and whose costs are at issue in assessing vulnerabilities and undertaking adaptation strategies.

Meanwhile, the longer-term, more fundamental and serious risks from climate change – including those from downturns in food yields, severe water shortages in farmland and cities, shifts in the geography and seasonality of some infectious diseases, and from growing demographic and environmental pressures and potential geopolitical instability in the Asia-Pacific region – are being largely discounted to the future (i.e., to the next generation of bureaucrats and politicians). In other words, the mindset is that less direct categories of climate change impact are unlikely to cause a shock/emergency in the next decade.

Australia's defence sector may now be giving greater attention to this looming risk of climate-related disaster and geopolitical crisis than are other equally connected sectors: environment, health, infrastructure, and others. (4) A strategy report (March 2013) proposed that the defence sector should better anticipate the types of emergency climate-related demands placed on it, and recognize the likely prospect of actual conflict within our region relating to climate change and related environmental disruptions.

How do we proceed?

1. We should use non-oblique language, and not speak euphemistically about weather disasters. They are not merely natural, tragic, economically disrupting, unavoidable, etc. They are a signal that we are entering a high-risk future – over which we are currently forfeiting the chance to achieve an early slowing/arrest of the underlying problem.
2. More scientists, including social scientists (a little tardy to engage in this topic, but now making major contributions) need to be prepared to talk in clear precautionary-principle terms, openly acknowledging unavoidable future certainties. Yes, it may not be as bad as some projections show – but it may also be worse.
3. A groundswell of basic understanding and engagement is essential. Modern governments and major political parties (whether "left" or "right"), beholden to the neoliberal consensus, are too risk-averse and too fixated on short-term objectives. Initiatives such as Canberra's SEE-Change are admirable pace-makers in fostering this bottom-up awareness and engagement.
4. Many secondary school students are keen to engage, especially if the topic is presented as part of their future life and challenge. The point must be made that Green Consumerism is a good place to start, but a dreadful place to stop. Younger Australians should understand the essential role that governments and community organisations must play.
5. By starting now.

Tony McMichael is Professor of Epidemiology at The National Centre for Epidemiology and Population Health at the Australian National University and an international authority on climate change and human health.

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Human dimensions of climate change by Graeme I. Pearman

While much attention has been given to the acceptance or otherwise of climate change science, the real issues are about us:

- how has societal evolution lead to such a high *per capita* demand and ongoing expectations for energy with concomitant carbon dioxide emissions, and
- why is it that we are reluctant, in many cases, to even accept that a risk exists that needs to be managed?

This brief paper presents some impressions of these human dimensions of the issue of climate change. A fuller discussion is provided in Härtel and Pearman (1)

Assessing risk:

The assessment of risk is complex. It involves:

- Assessing the probability of an event happening and weighing this against the level of impact if it does. For climate change this means attempting, in one's mind, to consider the range of potential impacts (water, extreme events, coastal inundation, health, etc.) manifesting themselves at various possible rates and scales over years to decades.
- At the same time, identifying risk involves assessing how probable these events are. This will depend on whether risk is considered from a personal, community, national or international, or indeed "stewardship of the earth's systems" point of view. Someone trained in biology may identify more serious potential for risk from destabilising ecosystems than one trained in physics. The wider community is generally poorly informed or familiar with probabilities to make such assessments and depends on others to suggest what needs to be done; but all will do so with their own shortcomings.
- The power of markets to deliver cost effective outcomes is not in dispute here. But this often ideologically held position delivers outcomes related to relatively narrowly defined sectoral risk/benefits compared with the management of risk/benefits for the whole of society. An oil company may decide on the basis of labour costs, market size, or other factors, that it is in the interest of the company/shareholders to move refining capacity offshore from Australia to South-East Asia. From the community-wide perspective, this means that security of oil supply in Australia (currently reserves are equivalent to approximately 3 weeks consumption) represents a serious risk to industry, transport, personal commuting, jobs, health and emergency services and the military.(2)
- Governments have the responsibility to override what is a reasonable corporate decision by setting market conditions or regulations to ensure community wellbeing. The sectoralised nature of our society (and sectoralised risk assessment) can work against the wider community good (systemic risk assessment). Governments do communities a great disservice in ignoring this risk by favouring an entirely free market system (often mindlessly ideologically) and thus abrogating their responsibility for the interests of the community at large.

Rationality:

Scientists often assume that if they describe the collective views of their colleagues as to what we understand about climate change, rigorously determined from observations, experimentation and theory, and argued rationally, then those views will be accepted by others. But behavioural scientists see rationality as dependent on emotions, prior knowledge and prejudices. What is more, scientists generally think that rational analysis will be conscious. But in fact, rationality is not always in one's consciousness; rather, it often only rises to consciousness with preconditioning.

Shared views by one community sector of what is deemed to be a rational statement may delude it into believing those views are shared by other members of the community. We can conclude, wrongly, that if people do not understand or respond "appropriately" to our rational arguments, it is because we simply have not explained the situation clearly enough or perhaps with enough evidence. Much of the emphasis of science communication at present is on this approach. Yet efforts at conveying climate science, such as through the assessments of the Intergovernmental Panel on Climate Change, might be of limited value because of unshared views of what is rational.

Coping mechanisms:

Climate scientists deliver messages to the community that can hardly avoid being threatening in the potential for global biological or human impacts, to the way we source and use energy, or to our lifestyles (what we currently view as desirable). Whilst the intention in science is usually to simply describe plausible scenarios of the future, the use of threats is not an uncommon tactic in advertising – think about media advertising.

But behavioural scientists are well aware that threats result in a range of different emotions in different people, and what is more, different people have learned to use different coping mechanisms to deal with those unwanted emotions (3) In some cases coping mechanisms might include simple denial of the existence of a problem, scepticism over its existence, or complaints that it is someone else's problem: climate change "is all the fault of Al Gore, or the Chinese, or perhaps the power generators"; it is too hard "so I will ignore it"; "how could mere humans undo the functions of the natural world as big or as powerful as they are?".

The way we are:

Suppose for the moment that only a few per cent of the community are strategic, that is, most citizens rarely cast their minds forward in time to anticipate the nature of the future. What might that mean to the way they accept evidence about a changing world or consider how society might get to some place in the future that is regarded as acceptable; the concept of a sustainable future?

The biologist in me asserts that from the survival point of view it would be advantageous to have the majority of people in society not being strategic; accepting that the way things are is the way they should remain. Biology also suggests that natural evolution invests in diversity/innovation because the world does not remain the same, and the teachings of the past may be inappropriate for the future. So one can ask questions like 'is there any evidence that within our genetics some of these behavioural propensities are fixed?' and 'is there a tendency to dismiss change because of an inherent or learned preference for conservation of the *status quo*?'

People tend to fall into one of two camps; those who believe that the world is just and those who do not. Feinberg and Willer (4) have shown experimentally that both groups, when confronted with non-threatening scientific evidence about climate change, declare an improved confidence in climate science. However, when confronted with threatening scientific scenarios, the just-world believers conclude that their view of climate science has deteriorated, whilst those who did not believe in the just world have an increased respect of climate science.

How many scientists or science commentators know, when presenting facts about climate change to an audience, that the audience might be polarised by these predilections? And if they do, how can the messages be delivered in a way that information may not be denied on the basis that it simply suggests that the world is not just? There is no indication at this point as to how this predisposition arises. Fox *et al.* (5) showed that a single gene was determining the presence or absence of serotonin in our bodies and those individuals having the recessive homozygous short gene for this compound, meaning that its production is deficient, have a much higher propensity to mental disorders and indeed to suicide.

This raises a whole series of questions about whether strategic-ness, conservatism, belief in a just world, or indeed other crude characteristics by which we compare ourselves with others may or may not have some genetic basis. How, in a democracy, can we allow the strategic views of some to override the views of many?

Constructivism:

It is impossible for each of us to gather together rigorous information about the way the world is and to thus paint a comprehensive picture of the world we live in. So what we do is construct this world-view largely based on myths and preconceptions that have been learned from our cultures, our education, our peers and indeed our leaders. It must be regarded as potentially a "non-reality" world, and yet for all of us it is the dominant way our views are formed. We may garnish this picture with technical detail when this is possible, but it remains impossible to draw only on rationally determined descriptions of all aspects of the world.

As John F. Kennedy observed:

> *The great enemy of the truth is very often not the lie – deliberate, contrived and dishonest, but the myth, persistent, persuasive, and unrealistic. Belief in myths allows the comfort of opinion without the discomfort of thought.*

Further words of wisdom come from Gerar Toye:

> *Knowledge comes from learning. Wisdom comes from letting go of what you think you know.*

This constructivism, as opposed to rationalism, dominates our world-views. It is the 'non-reality' world and a major influence on how we, and our policy makers, experience and respond to demands. Even if incorporating knowledge provided by "experts" (scientists, economists, engineers, etc.), this knowledge is often disciplinarily based and narrowly focussed. So despite this knowledge being based on the rigorous application of scientific methods, it can be deceptive if its narrow focus fails to provide a sufficiently inclusive view of the real world.

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Backs to the future: The psychosocial dynamics of the global emergency by Richard Eckersley

When it comes to the potential for mobilising Australians to act decisively on climate change and other global threats, it seems we are going backwards. Polls here and overseas suggest a retreat in recent years in levels of public concern about environmental issues, including climate change and resource depletion.

The reason may be, in part, to protect our own personal wellbeing. This state of affairs underscores the complexity of human subjectivity: what most concerns us is not necessarily a matter of the seriousness of the issues or our awareness of them.

The results of a 2012 GlobeScan poll across 22 countries, including Australia, show environmental concerns have fallen since 2009, reaching 20-year lows for 12 countries with data going back to 1992. (1) GlobeScan Chairman Doug Miller said scientists were reporting that evidence of environmental damage was stronger than ever – but the poll data showed that economic crisis and a lack of political leadership meant that the public was starting to tune out. 'Those who care about mobilizing public opinion on the environment need to find new messages in order to reinvigorate a stalled debate.'

Australian surveys paint a similar picture. Ipsos Research has found that concern over environmental issues has fallen off the agenda over the past two years. (2) Even the extreme weather and related events of the past summer have not translated into a resurgence in concern. In their monthly surveys, the environment dropped in rank from fifth to ninth as one of the top three issues facing the nation between November 2010 and March 2013; amongst young Australians, it fell from fourth to eleventh.

Ipsos has also seen an erosion in concern over climate change in its annual climate change report: the proportion of Australians agreeing that climate change poses a serious threat to our way of life over the next 25 years declined from 59 per cent to 49 per cent between 2010 and 2012. (3,4) Ipsos research manager Jen Brook says this could be partly due to people getting a bit fatigued with how 'serious' the issue is. (4) 'The public are told this is a really important issue that has huge implications, and yet life goes on and the everyday concerns are stronger.'

Specific factors like the global financial crisis, the failures of successive climate change conferences to agree on decisive action, and the influential lobbying against climate change science, would have contributed to this fall in concern. However, there may be broader, deeper shifts in public mood that are feeding into these results.

The 'push' towards disengagement comes from the appeal of distancing ourselves from frightening global possibilities as we strive to maintain our own personal wellbeing and satisfaction with our lives. The 'pull' comes from a cultural shift towards personal lifestyle choices and the pursuit of personal goals and pleasure. Increasingly, the media have become social mechanisms of distraction and diversion, focused on celebrity gossip, sport, travel, cooking, political theatre, crime and comedy.

A Galaxy Poll in January 2013 on Australians' feelings about their lives and the future suggests that they are now more optimistic about the future of humanity than they used to be: 54 per cent said they were optimistic or hopeful about humanity's future. (5) In 2005 the figure was 47 per cent, and in 1988 44 per cent.

On the question of whether quality of life in Australia is getting better or worse, Australians are more pessimistic than optimistic: 24 per cent said quality of life was getting better, 39 per cent that it was getting worse, and 37 per cent that it was staying the same. Global and national challenges might have been expected to produce a downward trend, but our views have not changed much over more than 20 years.

In fact, responses to other questions suggest Australians appear to be feeling more at ease with their lot in life, or at least more accepting of it. We are less concerned today about life's hassles and problems than we were a decade or two ago, and more self-focused. That this shift in attitudes is a defensive strategy to try to maintain wellbeing is suggested by other Galaxy findings that Australians are less satisfied with their lives and less personally optimistic than they used to be.

The findings are consistent with other research showing that, constantly grappling with life's challenges and confronted with a world of serious social, economic and environmental problems, we are striving to adapt and to look on the bright side of life. Market researcher Neer Korn says that life is presented as a glass half empty, but Australians work hard to see it as half full. (6)

> *More and more Australians are determined to revel in the moment and reflect on what they have rather than what they do not have. It's not easy, however, and people say it takes effort and constant reminders.*

There are positives in the current situation. Deep down, Australians want transformational change; they want to live in a different way. In a 2005 survey, Australians were asked which of two ***positive*** scenarios of the future they expected and preferred: one focused on individual wealth, economic growth and efficiency, and enjoying "the good life"; the other on community, family, equality and environmental sustainability. Almost three quarters (73 per cent) expected the former; 93 per cent preferred the latter. (7)

Political activism appears to be growing. In a few short years, AVAAZ, a global campaign network that 'works to ensure that the views and values of the world's people shape global decision-making' has attracted 20 million members (http://www.avaaz.org/en/). In Australia, GetUp!, an independent, not-for-profit, community campaigning group that aims 'to build a progressive Australia and bring participation back into our democracy', has gained 628,000 members (http://www.getup.org.au/).

The lessons from this analysis are that we need to pay more attention to the internal, psychosocial dynamics of our situation, not only to its external, biophysical and economic dimensions. To arouse and mobilise people, we need to relate the big, global and national threats and challenges more closely to our personal lives and concerns, perhaps especially to our children and grandchildren and their futures.

Our immediate, personal experiences count for more, psychologically, than abstract statistics and future uncertainties. (8) People discount global threats for several reasons: a human bias towards optimism (we have overcome problems like this before), perceived uncertainty (there is a history of failed predictions of global collapse, experts disagree), and system justification (a tendency to believe in and justify the way things are, and to not want to change the familiar status quo).

It may be that we will have to wait for a growing accumulation of catastrophes and calamities to make more real and immediate the relationship between the global and the personal. (9) Disasters can be revelatory, and potentially revolutionary. They can bring out the best in us, and connect and empower us; they can also lay bare the social conditions and choices that often give rise to them, delivering a societal shock that makes change possible.

In the meantime, the best strategy may be to keep trying to bring the global emergency, quite literally, 'closer to home': to convince people that even their more personal and immediate anxieties have the same root sources and causes as the "mega-crises" confronting us. A tipping point will surely occur – and better sooner than later.

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A race to the bottom? by Graham M. Turner

More than likely we are already in the early stages of global collapse. Whether unfolding over the next decade or longer, this could involve economies failing, standards of living retreating to those of a century ago, and consequent civil unrest of one form or another. Of course there is a chance that this view is wrong or that somehow we will navigate a way out, though the odds of this are rather small. The rational approach would be to take the likelihood of collapse seriously since the evidence is so strong and the implications are so far-reaching. But there is little evidence we will adopt a rational approach, at least at the national or global level — as amply demonstrated by the history of civilizations-past and our own recent failures at environmental action. This does not mean "abandon all hope"; rather, get prepared at a personal and community level — at least emotionally if not in more concrete ways.

The two most pressing emergencies on our societies and economies are climate change and peak oil, and both are already underway. Compounding these environmental and resource stresses is the obvious fact that we have reached our financial credit limit through spending on rather dubious purchases. Consequently, there is insufficient capital to pay for national and global programmes that could potentially address our real emergencies even if we had the political leadership needed (which of course is the bigger problem).

Peak oil is perhaps the most immediate of our troubles, given that our way of living is dependent on readily available oil. Even very conservative bodies such as the International Energy Agency now acknowledge that the production rate of oil appears to have peaked in the last decade (and hence pre-empted the Global Financial Crisis by a few years). The issue is not about running out of oil per se — far from it, since we are about half-way through global reserves of conventional oil, and we know here are even larger fields of non-conventional oil and gas, such as the much acclaimed shale oil/gas resources in the United States. Rather, these 'stocks' are wrongly and commonly confused with 'flows'.

The core problem is that we are unlikely to be able to get the oil out of the ground fast enough to meet the demand of an ever expanding economy. Typical aspirations of growth mathematically imply that in the next three decades we need to produce the same volume of oil as in all proceeding years combined, and to repeat this doubling act indefinitely. That is not likely to stop us trying, but unfortunately it will divert increasing energy, water and money away from other parts of the economy (as well as increasing pollution). Interestingly, this is the very mechanism that underlies the global collapse in the Limits to Growth "business as usual" scenario, originally modelled in the early 1970's. Forty years on this scenario is still aligning remarkably well with what has actually happened. Alarmingly, the growth in the scenario halts about now and attempts to secure growth simply make the problem worse, leading to economic and population collapse over the coming decades.

Playing out more slowly than peak oil, but faster than most scientists had expected, are the impacts of climate change. The spate of record-breaking extreme events in recent years across the globe would require fantastically small odds for them to be ascribed to sheer bad luck of random weather. This seems to leave no rational choice other than to accept that climate change is underway. But if growth in emissions is left unchecked, violent weather will become the norm rather than the extreme. In this case, adaptation is a fanciful strategy of forever playing catch-up and even emergency responses may be swamped, especially when society is hamstrung by competition for expensive oil.

Public perception of these dire possibilities may not be high overall, and will certainly vary across demographics. Nevertheless, these environmental and resource issues have been in the media for decades, so that there is at least some general awareness that our economies and societies face big challenges. Still, little has been done to avert the crises. This may be for a host of reasons.

One disincentive is likely to be the sheer gargantuan scale of change that sophisticated modelling shows is now necessary to de-carbonise and de-oil, change which is not yet occurring at any realistic level. Every industry would need to advance technologically with unprecedented speed, simultaneously. Family size would have to be restricted. Material consumerism curtailed to something like 1950's levels. And the average work-week reduced to three days by mid-century (to counter the unemployment effects of efficiency and productivity). Technically all possible, but exceedingly unlikely: even ascribing an optimistic 50/50 chance for each component implies about a 1 in 20 likelihood for the collective strategy in which all components are required.

It is tempting from a scientific viewpoint to believe that more information is needed in the public and political domain, that education is the answer. Unfortunately, there are strong arguments for why this might simply be wasted effort.

Research shows that people are inherently and unduly optimistic, even when faced with concrete statistics on things like disease incidence and mortality rates. In the environmental debate, unabashed optimism routinely rears its head in the form of belief in our technological wizardry, despite evidence to the contrary. Unfortunately, blind optimism is an obvious personal strategy when there is a lack of leadership.

And there is a lack of leadership because we are in a "political race to the bottom" as *thwink.org* system dynamics modelling demonstrates. Essentially it is easier for a politician to tell a bigger lie and win more supporters than it is to win supporters by telling the truth — the competing dynamics are biased toward corruption because a bigger lie can always be told whereas there is no bigger truth. There are strategies to counter these dynamics, such as increasing the ability of people to detect lies, but the modelling shows that extraordinary levels of effort and long timeframes are required for rationalism to prevail. Evidently science and logic have a role in exposing falsehoods, but we ourselves must be rational about the limits of our own influence.

In the light of all the evidence about the immense and immediate challenges we face—regarding both environmental/resource issues and social change — the rational course of action is to "prepare the lifeboats" since attempting to change the global ship's course is going to be too little too late. This means the narrative around national or global emergencies might best be directed to those in the community and public life who are willing to listen and to act on building self-reliance at local scales.

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Is Australia Taking the Threat of Global Financial Emergency Seriously? by Ross Buckley

The global financial situation is far more perilous than most Australians realize. Rather than feeling grateful for our good fortune, complaining about how hard we are all doing it has become a favourite pastime. As Joel Fitzgibbon, former Labor Minister, has assured us, "In Sydney's west you can be on a quarter of a million dollars family income a year and you're still struggling". This attitude has become a dominant political narrative.

Yet of course Australians are far more prosperous than ever before. The only thing to have grown faster than our prosperity in the past three decades is our expectations. I grew up in an Australia in which houses were small, cars mostly Australian made and used, and education mostly public. The 'strugglers' to who Fitzgibbon now refers often live in a house two to three times the size of the one they grew up in, drive a new car, and send their kids to private school.

Few Australians seem to realize the full severity of the global financial crisis abroad. Streets in many US cities are filled with derelict homes and shuttered shops. Youth unemployment at 55 per cent in Spain and 60 per cent in Greece means more than half the young people in those countries are not acquiring the skills to lead a productive life.

Meanwhile, there are two major threats to the global economy.

In the United States the continuing political impasse on how the US deficit is to be reduced threatens to render the nation ungovernable. In addition the US Federal Reserve has run a monetary policy that is without precedent. In 2008 the Fed cut short-term lending rates to zero. Ever since, it has engaged in quantitative easing, a term invented so that the government did not have to plainly say it was printing money. The US Treasury has issued $3 billion of Treasury bonds and the US Fed has printed money with which to buy them. Conventional thinking suggests printing money on this scale will result in rampant inflation as the extra money chases the same goods and services and therefore drives their prices higher. To date, this has not happened but no one believes the US Fed can keep to this course indefinitely. At some point, Ben Bernanke is going to have to work out how to cease printing money without cratering the US economy. And no one knows, today, quite how to do this.

In the face of its economic governance and money printing problems, one might expect US share markets to be cautious. However, US share markets are anything but cautious. The Fed's fire hose of cheap money has continued to drive share prices to levels from which the fall might be precipitous and damaging. Meanwhile, the news from the other side of the Atlantic is worse.

Floating exchange rates provide a marvellous adjustment mechanism for economies. When Asia went into crisis in 1997 most economists agreed that Australia's economy would slump following the recession in most of our major trading partners. This did not happen because the value of our currency fell so far new export markets opened up for our goods. It was the ability of the Australian dollar to fall to record lows that kept industry producing and Australians employed. Most Australians only registered the change, with horror, when they went abroad on holidays. When I asked a leading European Parliamentarian in 1999 how the EU was going to manage its respective national economies without the adjustment mechanism of variable exchange rates, he responded, "The same way America does, with fiscal transfers." He meant that America functions as a coherent economic entity by the richer parts of the nation sending money to the poorer parts, precisely as mainland Australia does with Tasmania. It would never occur to mainland Australians to turn off the financial tap supporting

Tasmanians. But the Germans do not feel the same way about the Greeks, the Cypriots or the Spanish.

For a century before Greece joined the Eurozone its export competitiveness was maintained by its currency slowly devaluing against those of its neighbours. It was the same for Italy. The adoption of the Euro meant that this slow devaluation had to cease and either the Greeks, Spanish and Italians had to become as productive as the Germans or they had to start accepting lower actual wages each year to maintain the competitiveness of their exports. The former was never feasible and the latter never politically feasible until enforced of late as austerity policies. The entire attempt to save the Eurozone has rested on imposing austerity, in other words requiring workers in southern countries to accept ever lower wages to bring the costs of businesses in those countries down to levels at which they are again competitive. This is harsh medicine indeed as individuals struggle to live on a fraction what they were accustomed to earning.

The core problem at the heart of the Euro upon its adoption remains to this day. Essentially, a common currency does not work without political union. If Germany was as willing to be as generous with southern nations as the former West Germany was with East Germany upon their reunification, there would be no problem.

So global economic stability rests upon two conundrums to which no one has the answer. The first is how long the US can continue to print money and how it can retreat from and unwind this position in an orderly way. The second is how Europe can overcome the problems of a common currency without real political union.

Meanwhile, Australia sails on prosperously not taking these risks into account. If we were responding to these international risks, we would be taxing our mining companies adequately and we would be charging banks for the government guarantee of bank deposits of up to $250,000.00 and seeking to recapture a proportion of the benefit they receive from the implicit government guarantee of their solvency (as is done in France, Germany and the UK). The borrowing costs of Australian banks are lower because the markets know our government will not allow a major bank to fail. If Australia were to recover say 70 per cent of this benefit given to its banks by way of a levy on them, this would represent a net annual income stream to the nation of some $11 billion.(1) The proceeds of appropriate mining taxation and such a bank levy could then be directed into our education systems and our ailing infrastructure, thereby preparing Australia for the future.

Times are good in Australia right now, they are really very good. If we could understand this, and appreciate how hard times are abroad and how large are the risks facing the global economy, we would be taxing our mining companies and banks appropriately and assuring our financial future. Instead, because the national conversation persuades Australians we are doing it tough, everyone approaches the prospect of new taxes or levies with horror. We will pay a steep price for deluding ourselves that times are hard when in fact they are good, and the Australians most likely to pay this price, and pay it dearly, are our children.

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Ecological Footprints by Bob Douglas

The human species is moving inexorably towards a brick wall of impossibility as an ever growing human population, with an ever growing appetite for non-renewable resources, continues to exploit an ever declining supply of biologically active land and water. Transformative change in the human mindset and the global economy is now essential. Governments will not lead on these issues without concerted action from citizens.

The Ecological Footprint measures the demand that humans are making on nature.(1) It measures how much biologically active land and water a human population uses to support life and a way of life – thus it includes both essential and non-essential elements. This system of accounting also measures bio-capacity, which is how much biologically productive area nature has available across the world to provide these services.

Footprint methodology is well-validated science and is being used nationally and internationally by governments and civil institutions to monitor, in a comprehensive fashion, the human impact on the environment. It measures footprints in global hectares per person. A global hectare is about the size of a soccer field. The 15 per cent of the world population who live in rich countries currently use an average of 6.4 global hectares per person; the 48 per cent who live in middle income countries have an average footprint of 1.9 hectares per person, and the 37 per cent living in poor countries have an average footprint of 0.8 hectares per person. Australia's footprint is about 7 global hectares per person.

For a population of 7 billion people to live sustainably, there is currently enough biologically active land and water for about 1.8 hectares per person, however the available bio-capacity is declining drastically as our human numbers and our individual demands on the environment continue to increase.

Ominously, it now takes the Earth one year and six months to regenerate what the world's human population uses each year. We are maintaining this overshoot by depleting the Earth's resources, increasing greenhouse gases and reducing the stock of biologically active land and water at the very time that human demands for them are increasing. Our environmental overshoot will go on increasing unless we urgently change the way we organize the human world. On our current trajectory the human footprint by 2050 will be twice as great as earth's bio-capacity. We are heading for global eco-catastrophe unless we can very quickly generate transformative change in the human mindset and in the operation of the global economy, and contain the growth in human numbers.

Governments everywhere are acting as though none of this is happening. The British journalist George Monbiot wrote recently

> *In 2012 governments turned their backs on the living planet, demonstrating that no chronic problem, however grave, will take priority over an immediate concern, however trivial. I believe there has been no worse year for the natural world in the past half-century. To avoid another terrible year like 2012, we must translate these concerns into a mass mobilization Governments care only as much as their citizens force them to care. Nothing changes unless we change.*

The good news is that about half of the human ecological footprint is attributable to carbon dioxide emissions. We know how to reduce these, and by weaning our species off energy derived from burning fossil fuels, humanity's footprint could be very significantly and rapidly reduced towards earth's bio-capacity.

The footprint approach broadens our understanding of the environmental problem. It incorporates not only the threat of climate change, but also many of the other destructive things we are doing to the environment on which our future depends. Footprint analysis takes account of the sustainability of our food production and purchases, our manufacturing, our buildings, our transport systems and our energy systems. (2,3,4) By measuring and monitoring the ecological footprint of an individual, household, community, city, business, nation, or all of humanity, we can continuously monitor our pressure on the planet and make progress in reducing it. We can and must learn quickly to live within the resource constraints of a single earth.

So, how should we act?

We should act in whatever ways we can to encourage all Australian governments to:

- Take the footprint crisis seriously, by acknowledging its reality and moving to an emergency footing to reduce Australia's footprint, which is amongst the largest in the world.
- Place a very high priority on renewable energy.
- Build support for expanded research and action to promote sustainable agricultural activities.
- Phase out Australian dependency on fossil fuel-derived energy in the next ten years and consider the merits to the global footprint of ceasing Australian exports of all fossil fuels.
- Maximise resource use efficiency and stop perverse subsidies for water and power.
- Build on the sustainability curriculum requirement in school curricula to endow every Australian school child with an understanding of the opportunities and benefits of responding to the footprint challenge now rather than later.(5)
- Consider legislation to require "footprint labelling" of all manufactured foods and consumer goods.
- Significantly strengthen public transport in all our cities, run in conjunction with a concerted campaign to educate the population about its benefits to our ecological footprint.

Other strategies worth considering

- The need for a daily segment on the national broadcaster, ABC and other news outlets that relates to progress in reducing the nation's ecological footprint.
- Education through schools and the media about the merits of "footprint labelling" of food and other consumer goods.
- The creative use of social media to expand community understanding of ways to avert the impending crisis.
- The need for broader appreciation of the importance of Refusing, Reducing, Reusing and Recycling and consistency across Australia so as to provide the capacity for everyone to engage in all these activities.
- The need for all Australians to understand the costs of burning coal and the benefits of leaving it in the ground.
- The value of informative slogans.
- The role of technology in efficient use of resources.
- The need for feedback systems to monitor progress in our local and regional footprints.
- The need to promote greater understanding of the impact of global and national population growth on genuine wellbeing.
- The unacceptability of a "fortress Australia" approach to these problems. This is an issue in which the whole of humanity will ultimately share.

There is already broad interest in Australian society in renewable energy and the capacity of renewable technology to meet energy demand. We need to engage the community as well as the economists in a reconsideration of the purpose of the economy and its utter dependence on nature. (6) We should not underestimate the power and influence of vested interests in the media and financial institutions against seriously rethinking the perverse incentives in the current economy. The current economic system is on the verge of collapse but there are valid alternative models that could enrich human life everywhere.

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Food and fuel security: huge challenges – but promising solutions by Julian Cribb

Food Scarcity

Food scarcity is emerging as the most cogent risk to civilisation in the 21st century. Though many people and governments still dismiss or belittle the issue, a one-third reduction in world grain reserves and a doubling in food prices over the 2000s are the writing on the wall. (1)

Water and land have become targets of new global "gold rushes", as investors and frightened nations scramble for increasingly scarce resources: an area the size of western Europe has been "landgrabbed", often by force, from its traditional owners since 2001. (2) In the financial centres of the world, speculators sit with their thumbs poised over the "buy" button awaiting the first whiff of instability in food commodities, ready to drive the cost of your weekly grocery bill into the stratosphere.

Serious questions are arising over the security of global oil, water and fertiliser supplies – inputs without which modern agriculture cannot function. (3) The world has spent three decades slashing its agricultural research and training efforts, and cannot quickly rebuild them in a way that will restore productivity globally, before the 2030s. Integration in the food supply chain is driving tens of millions of farmers off their land in all countries, including Australia. And, in the oceans the fish are, indisputably, getting scarcer and harder to catch.

In recent years we have seen how flood, heat, storm and drought can destabilise global and local food production, not just in Australia, but in the United States, China, Russia, South Asia and Africa. Many scientists and global institutions now acknowledge a reduction of up to 50 per cent in food production to be a real possibility by 2100 unless we can adapt food and farming systems to highly unstable weather conditions. Meanwhile there is a global rush into polluting energies like shale oil and gas, which will lock in the very changes that destroy food production, on land and in the oceans.

These are all signs of a world in transition from an era of food abundance to one of food scarcity, with all the economic political and social turmoil, internal conflicts, refugee floods, government failures and wars that accompany such times. Food is the one thing all societies cannot do without – as a Spanish proverb observes: 'There are only seven meals between civilisation and anarchy'. Governments recently fallen in Egypt and Tunisia are testimony to this.(4)

To focus on our own a region, a new report by the Centre for International Security Studies at Sydney University on food security in Asia should send a chill down every Australian spine. It depicts the surging demand for food as Asian populations and megacities swell, the looming scarcities of farmland, water (a billion people now go short), energy, fertiliser and especially fish, the appalling waste of food, the cynical and poor governance, the environmental destruction, the poverty. 'How governments and other actors in Asia respond

to emerging food security challenges at home, has far-reaching consequences for human security and peace and stability of communities and states in Asia and in other parts of the world', it warns. (5)

This is the bit that Australian politicians and policymakers fail to grasp, when they talk about Australia being "food secure". We may have plenty of food – but if parts of Asia starve, we will face security problems of an entirely different order: tsunamis of refugees and collapsing nations in our region, and the conflicts that erupt as a consequence. Also, regardless of its sufficiency, our own food will double or triple in price, driven by globalisation of markets.

It is not the next Australian Government that will have to deal with this issue, but the next 30 Australian governments. Yet the political discourse – if one can dignify the schoolyard abuse-slinging that occurs here with such a term – is all but silent on this, the issue most likely to define our national future in this century. We talk about everything but the real matter.

In its 2012 World Disasters report the Red Cross/Crescent reported that over 72 million people were displaced from their homes by famine, conflict and natural disaster. (6) Three Australias. How many in ten years' time? And where will they travel in their search for food, a home, security? In such a world, slogans like "stop the boats" are meaningless unless we address the issue at its root.

The irony is that, half a century or so ago under the guidance of people like Sir John Crawford, Australia was a world leader in delivering solutions that made people more secure and well-fed in their own homelands. That thinking has long gone. Today we fiddle with a host of "issues" while neglecting the most important of all: having enough to eat for a good life. Even at home, it seems, we would rather turn our land and water over to Chinese or Arab investors or global "resources" companies, than grow food sustainably on it – a decision our children will undoubtedly rue.

Around the world, cities are bursting with new life as "urban agriculture" evolves, at corporate and smallholder scales, on restaurants and hospitals and in smallholdings atop tall buildings. The point about urban agriculture is that it can be largely climate-proof. Yet this is an agricultural revolution Australia seems determined to miss.

In recent decades Australian governments have axed national research programs into energy, land, water and irrigation science, as if these things were irrelevant to our national future.

There is, however, one glint of hope. Enrolments in agricultural science courses in Australia and other countries have suddenly surged after decades of stagnation. Through the global network of the internet young people are awakening to the looming food, fibre and fuel crisis in a way most politicians, bankers, bureaucrats, industrialists and citizens are not.

They at least have seen the future – and are getting ready to do something about it. The big question is whether it will be in time.

The liquid fuel challenge

'Essentially, our society as we know it would cease to function.' The words are those of former Royal Australian Air Force deputy chief John Blackburn in a 2012 National Roads and Motorists Association (NRMA) report warning of Australia's extreme vulnerability to overseas fuel supply disruption. (7)

A few days into a significant Middle-East or South-East Asian conflict, Australian motorists and trucking companies would be immobilised, urban public transport overwhelmed and supplies of life-saving medications would start running out. Within a week, shops would be stripped bare and farmers would have no more fuel for their tractors and pumps.

The reason is that around 85 per cent of Australia's transport petroleum now comes from overseas, as either refined or unrefined product. Our dependency on imported refined fuels will rise sharply with the impending closure of two more domestic oil refineries. In a country blessed with more energy choices than almost any other on Earth, transport fuels are our gangrenous Achilles Heel.

The policy is deliberate, set in 2011 on the basis that Australia should depend on world markets for its oil security, this being the cheapest option. Almost alone amongst 25 Organisation for Economic Cooperation and Development (OECD) countries, we have no national oil reserve, other than what is currently in the tanks of the big oil corporations, transport companies, or local service stations. In reality, we do not accurately know how large are our fuel stocks or who owns them. However audits indicate they have fallen from 310 days in 2002 to 71 days total supply in 2012. But do not be reassured: that '71 days' includes all the fuel which is already ordered overseas and in shipment. It actually equates with 23 days of total national transport energy consumption. On day 24, it's back to horse and dray.

Australian fuel policy is essentially a gamble that there will not be any more oil shocks like those of 1973, 1979, 1990, 2008 or 2012 or any major conflict in either the Middle-East or South-East Asian region which could choke off our seaborne supplies of fuel. As risks go, it is low probability – but very high impact.

For example, it requires roughly 80,000 truck movements per week to deliver Australia's food supplies, most of which would cease within a few days of a serious fuel disruption. Fresh produce would run out in 7 days, dried goods within 9, says the NRMA report. (In reality they ran out in 2–3 days when flooding cut off the Sunshine Coast in 2011, due to panic buying.)

This all begs the question: what intelligent, well-educated, well-planned country could possibly wish to incur such a massive, and entirely needless, risk? And why do none of the leading political parties apparently give a damn?

Algal bio-fuels from our salt-water lakes?

The upside to this appalling blind spot in our national business plan is that there is now emerging a means by which Australia need never risk fuel (or food) insecurity again. We can, if we so desire, be 100 per cent self-reliant in both, forever. Furthermore, it is entirely affordable.

The answer is to grow our own transport fuels right here in Australia, using our largest yet most neglected free energy source, sunlight – and nature's own little oil refineries, algae or water plants. (8)

Various kinds of algae can produce between 60 and 160 tonnes of fresh crude oil per hectare of salt water pond, meaning it would be possible to grow Australia's entire transport fuel needs from an area equivalent to a single large sheep station. Some intensive systems will produce ten times this yield. All you need is sunlight, saltwater and a source of nutrients – like the $3 billion in food we chuck away each year.

Barack Obama thinks enough of this idea to invest $500m in algal biofuel research for the United States Navy and Air Force. Canada has flown an aircraft on pure algal biofuels and airlines like Virgin and Lufthansa have major research investments because they know they cannot entrust their businesses to insecure supplies of fossil oil. More than twenty countries worldwide are currently researching or investing in algal biofuels including China, Israel, India and Brazil. Around Australia a dozen universities and start-ups are experimenting with different approaches to algal biofuels production.

Algal biofuels are renewable and climate-friendly: they can cut national carbon emissions by 15–20 per cent by replacing fossil oil. They will save Australia around $40 billion a year in foreign oil imports, and a fully-developed industry could employ 50,000 people regionally. They can be grown using saline or brackish water too poor for other uses. They can be grown on salt lakebeds, on desert coasts and in floating containers at sea – without impacting on food production or wilderness.

Besides producing transport fuels, algae can also be turned into plastics, textiles, pharmaceuticals, paper and industrial chemicals, potentially replacing another $10 billion in imports. They also produce a major by-product, algal dry matter, which can be used to make human health foods rich in omega-3s, as well as stockfeed for cattle, sheep, pigs, poultry and fish. Indeed, one of the major spinoffs of an algal fuels industry is a $5 billion seafood farming industry, as algae are far better for feeding fish than grains, and have a much lower environmental impact.

In short, algal biofuels offer Australia not only 100 per cent fuel independence and total food security, but a host of new manufacturing, export and import-replacement opportunities. Furthermore, with thousands of family farm enterprises potentially involved in production, it also offers us the prospect of independence from our bondage to "big oil" – the transnational energy giants who dictate so much of our present policy and economy, whether we know it or not.

The greatest asset Australia has going for it is 'photon density' – the fact that we get more free sunlight (thanks to our relatively cloudless skies) than most other countries on Earth. (9)That makes our continent a world-class biofuels province of the future, with a global natural advantage in production at lower cost than our competitors. While some will argue the cost of algal biofuels remains unknown at scale, the figure of $42 a barrel claimed by one Australian-based enterprise offers cause for optimism. And more research will certainly bring costs down.

Energy and food security forever, thousands of new regional jobs, enterprises and exports, billions in trade balance savings, a big cut in greenhouse emissions and a new way to recycle waste – what have we got to lose by giving it a go?

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Genuine Ecosystems Services Thinking and Action Will Avert Environmental Emergencies by Geoff Gorrie

In my view, one of the surest means of avoiding an Australian or a global emergency, or at least significantly reducing the probability of it, is to adopt an ecosystems services approach to dealing with environmental issues.

It simply means being sensible about the real needs of mankind arising from the utilisation of ecosystems and prioritising those needs in a systematic and ordered fashion. This approach provides a "level playing field" which sees the needs of mankind, such as the production of food, fibre and other services, properly balanced against the needs of environmental quality and biodiversity conservation associated with the maintenance of the health of the various ecosystems. A comprehensive exposition of the concept of ecosystem services is presented in the Australia21 2012 Report 'Discussion Paper on Ecosystem Services for the Department of Agriculture, Fisheries and Forestry.'(1)

Many ecosystem services are not valued in our economic system and are mostly bunched together as 'externalities'. We do need to embed ecosystem services into our national psyche and thereby into our economic system at large. Ecosystem services need to be brought into the mainstream of economic thinking in Australia.

I am continually frustrated by the lack of take-up of ecosystem services frameworks in government policy development and program administration at all levels – Federal, State, Territory and Local. Of late, there seems to be a growing trend towards including some overarching "'grand'" statements about the importance of ecosystem services but, as you move from the policy through to program and project implementation, these "'good intentions'" seemed to have disappeared altogether.

To implement a sound ecosystem services framework, we have to abandon "silo thinking". We must use multi-disciplinary approaches to issues – this is in line with the way Australia21 attempts to operate. Issues have to be viewed through different lenses – economic, social, environmental, scientific, technological, behavioural, psychological etc. This inevitably means that teamwork and partnerships are needed to tackle the issues facing mankind in general and Australia in particular.

Environmental groups do not, and should not, have a monopoly on sage advice and knowledge in relation to environmental issues. The point is that we need contributions from all stakeholders; there are farmers, fishers and foresters who are very well practiced in sound environmental custodianship and such practitioners should be part of partnerships that are put in place for the purpose of implementing ecosystem services frameworks.

Australian agriculture has survived over the years because the industry has invested heavily in innovation, mainly through specialist research and development corporations funded in part by the Federal Government, State agricultural departments and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). At present, agricultural productivity growth appears to have stalled or almost disappeared. A more sustained investment in innovation is required and, in line with the previous point, there needs to be an integration of the disciplines to provide a more "whole of system" solution.

Another frustration I have is that we never invest properly in measurement. Frankly, we do not know the status of our natural resources and ecosystems, even after several years of State of the Environment Reports and National Land and Water Resources Audits. We do have some idea but we need a comprehensive picture.

We mostly commence our measurement after the event if we do any measurement at all. This means we have not developed proper benchmarks to determine if we are making progress with ecosystem health or if we are falling behind – the popular perception is that we are falling behind but often this is just that – a perception, not a scientifically based measurement.

Even in some situations where we do attempt to measure, the measurement itself becomes hotly disputed and all our efforts go into arguing about the measurement, rather than focussing our efforts on plausible solutions and simple implementation.

We should be prepared to think in terms of 'what nature can do for us' in a measured and balanced way. This should encourage open and constructive discussion about the full range of environmental benefits in a disciplined manner. The mere fact that some relative values are attached to the various ecosystem services does not mean that the environment has been 'handed over to commercial interests' as some argue. It simply means that all stakeholders can engage in discussions to identify ways to avoid inappropriate actions, which may arise without a systematic approach to the services provided by ecosystems.

There are only a small number of initiatives involving active ecosystem services implementation in Australia. Some of these initiatives are really partial land stewardship activities and do not extend to the full framework for ecosystem services. Some have evolved from the concept of 'resilience' – which interestingly seems to be much better understood and accepted than the concept of ecosystem services.

With land stewardship, there is a tendency to delve deep into issues like 'duty of care' and private benefit which takes our attention off the "main game". Efforts should be made to define 'duty of care' in terms of legal responsibilities and regulation, landscape function, solar absorption, energy efficiency and the provision of habitat for biodiversity above and below ground.

Beneficiaries of ecosystem services are everywhere. Communities, farmers, miners and land managers benefit from the economic value of their food and fibre and the resources which are extracted through agricultural and mining operations, the health of the soil, the quality of the water, pollination and landscape quality.

We need to use the ecosystem services framework as an environmental governance mechanism to move Australia away from experiencing a local environmental emergency and, thereby, prevent Australia being a contributor to any emerging global environment emergency.

While the population issue is not as acute in Australia as other parts of the world, a very good discussion of population issues is available in Steve Cork's 2010 paper 'Ways Forward in the Population and Environment Debate'.(2)

I have a number of questions that need to be answered before we can move along the path of the widespread adoption of ecosystem services frameworks in Australia. These questions include:

- Who should take the leadership role in this important initiative?
- How to reliably bring all the right "players" together in an integrated framework?
- Who is responsible for which elements?
- Can the public sector and the private sector work positively together on the implementation of ecosystem services frameworks?

- Can we establish 'markets' around ecosystem services?
- Exactly what should we measure?
- How can we avoid being accused of simply subsidising agricultural production?
- How do we get environmental non-government organisations to fully recognise the contributions of all stakeholders?
- How can we be certain that we are being consistent across all ecosystems?
- How do we promulgate success?

These sorts of questions must be addressed as we begin our journey down the ecosystem services pathway.

In conclusion, my simple message is that we can avert an environmental emergency in Australia and globally, or at least reduce its probability significantly, if we do the following:

1. Adopt ecosystem services frameworks for the development and implementation of environmental policies and programs.(3,4)
2. Avoid "silo thinking" by adopting genuine multi-disciplinary approaches.
3. Genuinely engage all stakeholders in partnership relationships within ecosystem services frameworks from the outset.
4. Rely on good science and innovation as heavily as possible.
5. Measure and monitor the status of our ecosystems.
6. Adapt our approach as a result of our measurement.
7. Remain dedicated to effecting changed thinking and action.

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Time for a cold hard look at our defence and foreign policy by Paul Barratt

Providing for the nation's defence is one of the fundamental responsibilities of central government. It classically requires the capacity to think over decadal time-scales, to bring disparate and apparently unrelated issues to account, and to detect underlying trends that have the capacity to change the national security landscape.

Yet there is perhaps no area of public policy in which there is a greater gap between the requirement for astute long-term thinking and the short-termism of what we see in practice.

The nation faces a deteriorating security environment. Strategic competition in the Asia-Pacific region is increasing. By means of a disastrously ill-judged "war of choice" in Iraq, our major ally the United States (US) has demonstrated the limits of American military power, gravely reduced its international standing, and impoverished itself in the process. Climate change and competition for water and food security will set up new pressures and new refugee flows, especially in our heavily populated region where many people depend upon small-scale cash-cropping or subsistence agriculture. "Peak oil" and competition for necessary energy supplies add another portfolio of issues to be considered. The growing economic strength of countries in the "Third World" is changing the geopolitical landscape. The BRICS (Brazil, Russia, India, China and others) are beginning to draw some firm political lines in the sand.(1)

There is little sign that anyone in Government is "joining the dots" on these apparently separate but closely linked issues, and political parties of either persuasion continue to make lazy assumptions about the willingness and will of our major ally to come to our assistance if our national security is threatened, and the conditions under which it would do so. We must be prepared, while nurturing the alliance, and all of our defence relationships in the region, to make a much stronger effort, and develop much more capacity, to act independently and self-reliantly.

Pursuant to the lazy thinking about the alliance, we have a habit of committing to "wars of choice" (Vietnam, Afghanistan and Iraq) alongside our major ally on the assumption that this will be beneficial to our long-term national security, without adequate consideration of:

- The end-state we are trying to achieve, the prospects for success, and indeed what "success" would look like. This is a vitally important matter: the consequences of failed military operations are dire, both for the local population and for the occupying forces.
- Whether or not the war is legal under international law, conditions that are satisfied only by a United Nations Security Council resolution or a clear and immediate requirement for self-defence.
- How the war will be fought at a strategic level. There is no doubt about the capacity of the US to apply overwhelming military force. What the history of the last ten years in Iraq has demonstrated, however, is that the application of overwhelming military force in the initial onslaught is the easy part. The hard part is managing a successful occupation, militarily and politically, in the face of the resistance that will inevitably develop, and preventing the occupation forces from having to go into a counter-insurgency role.(2)
- How the war will be fought at a tactical level. For example, Australia is a signatory to the United Nations Convention on Cluster Munitions; our US ally is not. Ostensibly at least we regard these weapons as horrendous, but we will be fighting alongside an ally that considers them an indispensable part of its armoury.

- Human rights abuses. Human rights abuses occur to some extent in all conflicts but they seem to be part and parcel of the US way of conducting counter-insurgency operations (read: military occupation). Everyone is familiar with the disturbing pictures that came out of the notorious Abu Ghraib prison. As Ian Cobain's 1 April 2013 report in *The Guardian* about human rights abuses at Camp Nama reveals, Abu Ghraib was neither an isolated, nor the worst, case.(3) Do we really want to be a part of wars conducted on this basis? Do we think such behaviour is an ingredient of a successful military occupation or counter-insurgency? Similar questions apply to the rapidly growing US penchant for assassinating supposed insurgents by means of drones, with the attendant civilian casualties and potential to generate a backlash amongst the local population.
- The extent to which wars like Vietnam and Iraq are a product of the US political system rather than objective assessments of national security threats to the US.(4)

Regarding the selection of engagements to which we should commit, and the decision-making process, the Howard Government's decision that Australia would participate in the invasion of Iraq is a case study in how not to do it:

- In the absence of a United Nations Security Council Resolution specifically authorising the use of force in the circumstances at the time, the invasion was illegal and the Secretary-General of the United Nations subsequently said as much.
- It seems almost certain the Australian public was lied to about when a decision was taken. The Prime Minister insisted right up to the eve of the invasion that no decision had been taken, but we were deeply involved in US planning for the war and it seems almost certain that a firm commitment had been made to the Americans by July 2002 at the latest.
- We were even deceived about when Australian military operations commenced.(5)
- Parliament was deceived as to the intelligence that was available, and its quality. On 4 February 2003, the Prime Minister told the House of Representatives, 'The Australian government knows that Iraq still has chemical and biological weapons and that Iraq wants to develop nuclear weapons,'[(6)] and in a later speech he referred to 'Iraq's continued support for international terrorism,' conjuring up the spurious link to al-Qaeda.
- The subsequent inquiry into the performance of the Australian intelligence agencies, led by former Department of Foreign Affairs and Trade Secretary Phillip Flood, found that the evidence for Iraq's alleged Weapons of Mass Destruction (WMD) program was 'thin, ambiguous and incomplete' – hardly a satisfactory basis on which to commit the nation to armed conflict.

Having committed itself to participate in an illegal war based upon dubious evidence, the Government dissembled about what the objective was. Was it about WMD, or was it about regime change – denied before the invasion but now relied upon as the major "good" to flow from the exercise?

And having committed to putting young Australians in harm's way for the purposes of this endeavour, the Government seems to have concerned itself not at all with whether it contained the necessary ingredients for success.

The Australian public needs to be much more vigilant about the circumstances in which the Australian Government deploys the Australian Defence Force (ADF), and for what purpose. This vigilance is unlikely to become habitual while a decision to send troops remains the prerogative of the executive — that is, Cabinet, meaning in practice the Prime Minister and a very small group of key ministers — an arrangement which means that a decision, once taken, can be acted upon without significant debate. Vigilance is much more likely to develop if we embrace the republican notion, one which seems fitting also for a constitutional monarchy, that the power to make war should be vested in the legislature. In any polity founded on the principle that power flows from the people to the state, rather than from the state to the people, the spectacle of the executive clinging to the ancient privileges of the sovereign is both an anachronism and an anomaly.

It is not good enough for the citizens of any modern democratic state to accept from their politicians deceitfulness about the state of affairs we face, nor the deployment of the nation's youth on ill-defined missions for reasons that have more to do with party-political advantage than protection of the nation's security, either in the short or the long run. If the public does not insist upon higher standards from its politicians, it will have only itself to blame if the sad experiences of Vietnam, Afghanistan, and Iraq are repeated in some future conflict.

Thus while it is not possible to be prescriptive about how the Government should deal with the range of threats and contingencies that might emerge, it is possible to be prescriptive about how we should make future decisions about deploying the ADF into armed international conflict. We must avoid the dangers of small group decision making inherent in the current situation, where the power to deploy is the prerogative of the Executive, and place this power firmly in the hands of the Parliament.(7)

More generally, to prepare ourselves for an uncertain future within a changing geopolitical landscape, we need to conduct a root and branch review of the entire basis of Australian foreign and defence policy, in which all of our traditional assumptions are tested for their relevance to the future, and the findings which result are actually acted upon. We gain a great deal from our close relationship with the world's leading military power, but we need to recognise that our interests are not identical and we need a much more mature debate about what we can expect from the alliance and how to manage it to our own best advantage.

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2. See commentary to this effect by Australian counter-insurgency expert David Kilcullen on a recent ABC 4 Corners interview with presenter Kerry O'Brien – transcript on ABC website at http://www.abc.net.au/4corners/stories/2013/03/25/3720567.htm
3. See "Camp Nama: British personnel reveal horrors of secret US base in Baghdad" at http://www.guardian.co.uk/world/2013/apr/01/camp-nama-iraq-human-rights-abuses
4. In the 4 Corners interview referenced above David Kilcullen commented:

If you look at American military history in particular, and you take – you start the clock running around the Mexican War in 1846, there's a very consistent pattern in US military history of the US getting into a large or long counter-insurgency or stabilisation operation about once every 20 to 30 years for that whole period since the middle of the 19th Century – not just Vietnam but a whole bunch of stuff that happened in the Caribbean, the Philippines, the frontier.

There's this very consistent pattern of about once a generation they get into a conflict like Vietnam.

So I think there's something that's deeply hidden in the way that the United States relates to the rest of the world that tends to lead Americans and their Western allies into these kinds of operations on a regular basis.

Recent books bearing out this thesis include Paul Pillar, *Intelligence and U.S. Foreign Policy*, Columbia University Press, 2011 and Rachel Maddow, *Drift: The Unmooring of American Military Power*, Scribe 2012 (Australian Edition, with Introduction by Paul Barratt).

5. In a media conference on 20 March 2003 Prime Minister Howard stated 'I think it's appropriate that today marks the first indication of our active involvement.' In fact Australian Special Forces had been in operation in Western Iraq since 18 March, 30 hours before the ultimatum that Saddam Hussein and his sons should leave the country, or face military action, had expired. For details see the carefully researched paper on this subject by former diplomat Tony Kevin, first published in September 2004, at http://www.tandfonline.com/doi/abs/10.1080/1035771042000260101

6. House of Representatives Hansard, 4 February 2003.

7. Distinguished Australian military historian Robert O'Neil summed up the dangers of the current system very eloquently in the final paragraph of his 2009 submission on the *Defence Amendment (Parliamentary Approval of Overseas Service) Bill 2008 [No. 2]*

   In the past, especially in the cases of the Vietnam, Iraq and Afghanistan wars, the decision to commit forces was taken by a small group of ministers, in which the Prime Minister played a dominant role. In such a small group, inhibitions based on concerns about the major ally's capacity to fight effectively and win within a period of a year or two (if perceived at all) can be easily swept aside by the desire of the Prime Minister, Foreign Minister or the Cabinet at large to remain close to whoever is the US President at the time of deciding. Also in this system of decision-making, broader issues such as the morality of the commitment, which was clearly a major public issue in the cases of Vietnam and Iraq, are relatively easy for the Government to ignore or set to one side. The small group setting also makes it easier to believe faulty intelligence reports, or even to dismiss them where they are inconvenient for the government's preferred policy. Australia's decisions on commitment to any of these three conflicts would almost certainly have been improved had the proposal been debated in both Houses of the Parliament'.

   The submissions relating to this legislation may be found on the Parliament House website at http://www.aph.gov.au/Parliamentary_Business/Committees/Senate_Committees?url=fadt_ctte/completed_inquiries/2008-10/dapaosb08/submissions.htm. Dr O'Neill's submission is No. 5 on the list.

Security is the absence of *In*security by Rita Parker

'Absolute certainty is the privilege of uneducated minds and fanatics'

Cassius J Keyser

The future is unpredictable. The relative certainties of the bipolar Cold War period and uni-polar environment of the 1990s no longer exist. There is now a different, multi-faceted, interconnected global environment, which includes a broader range of actors, complex issues, uncertainties and insecurities.

Today there is a range of potential challenges arising from multiple sources. They highlight the non-linear nature, interconnectedness and complexity of our globalised world. New thinking and action are needed to survive future shocks and challenges to the security of Australia, its people and their well-being.

Sources of Insecurity

Threats from non-state actors – terrorists, people smugglers, pirates, computer hackers – and hazards arising from non-human sources – biological and chemical, climatic and environmental conditions – have the potential to present real security challenges. Issues relate to food and energy security, health pandemics, bio- and chemical weapons, climatic events and natural disasters. Other sources of *in*security are associated with the effects of failed or failing states, extremist ideologies, economic instability. The probability of Australia facing one or more of these challenges in the coming decade is very real.

Environmental factors can act as a threat multiplier or provide an opportunity for non-state actors to exploit. In effect, a natural hazard could reach a tipping point and become a security threat. Increased competition for natural resources and natural disasters can increase violence and armed conflict leading to humanitarian crises. (1) Anthropogenic, environmental and health threatening conditions can result in unregulated population migration and influence political decision making for example, the way Australia deals with different types and causes of migration and different types of refugees, as well as the way irregular and illegal migrants are treated.

It's Complex

Levels of uncertainty and vulnerability are related to the degree of control we feel we have to deal with a serious threat to our well-being. Our perception of security changes with the circumstances we face and the quality of information we have available about the immediacy of a threat and its wider implications. The effect of non-traditional security challenges extends beyond state-centric boundaries to include economic, social, health, energy, societal and political areas.

These issues present a different set of analytical challenges than more traditional threats targeted primarily at nation-states. Increasingly political leaders and international institutions understand the probability of a serious shock in the form of a non-traditional security challenge. However, the complexity of such issues is less well understood, such as the security implications of an environmentally induced disaster. The Fukushima Daiichi nuclear disaster in Japan in March 2011 following the Thohu earthquake and tsunami, resulting in over nineteen thousand people dead or missing, had far reaching security concerns around the globe as well as economic and political consequences.

One year after the disaster only three of Japan's fifty-four reactors were operating, following Japan's decision to take its nuclear reactors off-line, yet Japan has no domestic fossil fuel resources. Its withdrawal from the nuclear sector, together with an overall winding down of the nuclear industry in the United States, Germany and elsewhere signals a significant transition in the geo-political balance of power as other nation-states including India, China and Vietnam, plan to increase their nuclear power capacity. This example highlights the complexity and implications of just one set of environmentally induced circumstances across a range of policy areas as well as for human security and the well-being of individuals.

Current Strategies

The nature of non-traditional security challenges means they transcend national boundaries, they are often sudden and unexpected with a high impact. Sometimes they can also be interwoven with, or related to, traditional security threats.

Australian has largely followed the leads of the US and UK regarding policies and strategies. However, the policy rhetoric is not always underpinned by policy strategies that strengthen systemic structural components and effective response mechanisms. Risk assessments by policy makers and their subsequent policy solutions are not always consistent. Perceived threats to Australia's sovereignty and border security are one such example. Borders have been hardened to deter irregular migration rather than addressing the systemic cause. Such policies simply shift the threat to another part of the system, and the risk remains.

Planning and resilience have featured as policy strategies including for individual sectors. The latter have largely focused on 'critical' areas such as infrastructural elements – power, water, health, transport, communication, and banking. However, vulnerabilities exist regarding non-critical areas upon which critical ones depend.

The development of plans for a wide set of possible conditions, including some which may be unlikely but which could result in significant harm if they are not anticipated, is a recognised strategy and can helps counter uncertainty. However, plans are effective and reliable only if they are proven. They need to be tested so that improvements can be made and capabilities developed – until lessons are acted on, they are simply lessons observed. (2)

Future Action

The low predictive nature of non-traditional security challenges and shocks increases *in*security and uncertainty. Resilience and social inclusion can counter uncertainty and enhance capabilities to cope with future shocks. Developing the resilience concept would mean moving from a reactive state *through* a proactive state to one which anticipates potential security threats and challenges. Adaptive capacity incorporates the capability to identify early cues and would reflect a learning system and a transformative capacity that is, acting on the cues and learning lessons. Resilience would help to reduce *in*security.

The non-linearity of future shocks from non-traditional sources requires a multi-dimensional strategic response which incorporates structural and governance elements, and engages a wider audience to build social capital, societal security and wellbeing.

There is a pressing imperative to develop a national narrative by providing clear information to the Australian electorate to increase awareness of the range of issues, which can affect Australia's security. It would also lead to further development of policies and skills to address serious threats to human survival and wellbeing arising from non-state actors and from non-human sources.

A narrative should promote the dual strategy of national and societal resilience whereby multi-faceted structural elements and governance integrate with societal capacity and capabilities to build social capitals towards resilience. However, this should not mean shifting responsibility onto individuals and communities. Instead it should mean sharing responsibility through mutual obligation in which Australian 'wellbeing is not the state of individual bodies, but of bodies in society'. (3)

While absolute certainty is an impossible goal, reducing uncertainty and *in*security can increase Australia's security and wellbeing for its people into the future.(4)

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The threat to human and planetary wellbeing from chemical and antibiotic overuse by Julian Cribb

1. Toxic chemicals

While climate change has grabbed the media and policy limelight there is another, far larger, human impact on ourselves, on Planet Earth and on all life in it.

Humanity currently produces more than 83,000 different chemicals, a third of which are known or suspected of causing cancer, mutations and birth defects and most of which are toxic.(1) Current global output of chemicals is around 30 million tonnes a year; an industry, which the United Nations Environment Program (UNEP) says will be worth $6.4 trillion by 2020, and will triple in size by 2050. (2)

This makes the world output of toxic or carcinogenic chemicals around 1.4 kilograms per person a year globally, and 5.6 kilos in the United States. Australia's exposure is probably somewhere in between the two. To put this in perspective, it contrasts with 2.5 kilos per head per year Vietnamese rural people were exposed to during the Agent Orange phase of the Vietnam War (and which is now documented as having killed or maimed 400,000 people and deformed half a million babies). (3)

What is new about this, apart from the sheer scale of chemical output, is the discovery that man-made substances are now pervasive throughout the Earth System and are moving relentlessly round the planet in water, air, soil, animals, fish, food and trade. Scientific studies have found toxic man-made chemicals from the stratosphere to the deep oceans, from the peak of Mt Everest (where fresh snowfalls are too polluted to drink, by Australian standards) to the remotest of Pacific atolls, from the Arctic to the Antarctic. Industrial chemicals are now being routinely found by researchers in birds, fish, mammals and other life-forms which have never had any contact with humans, as well as in our food chains. (4)

Testing shows that almost every individual is now a walking contaminated site. The United States Centers for Disease Control, in a regular survey, is finding certain industrial 'chemicals of concern' in the blood of 90–100 per cent of the American population. (5) The Environmental Working Group (EWG), a United States non-governmental organisation, reported the finding from independent tests of 414 industrial toxins in 186 people ranging in age from newborns to grandparents. (6)

In a further disturbing piece of research EWG found 212 substances, including dioxins, flame-retardants and known carcinogens in the blood of new-born babies, who had been contaminated while in the womb. Tests from China to America to Europe have discovered similar industrial toxins and pesticides in the breast milk of nursing mothers. Groundbreaking Australian research has found that even when dead and buried, people re-release their toxins back into groundwater and the environment, giving them back to future generations.

Chemicals now reach people in the air they breathe – especially indoors where they are surrounded by volatile chemical vapours from plastics and furnishings – the food they eat, the liquids they drink and things they touch. Groundwater beneath most of the world's big cities is now so polluted as to be undrinkable, scientists have found. The UNEP estimates 4.9 million people die and 86 million are disabled yearly by chemicals directly making it one of the world's leading causes of death (far exceeding diseases like malaria) – yet this does not include cases where chemicals are implicated in common diseases like cancer or heart disease. (7)

At the same time hundreds of new chemicals are being developed and released worldwide without health, safety or environmental testing, says the UNEP. At least 1317 nano-chemicals have now been commercially released, without health testing (8) – a development that

risks repeating on a larger scale the asbestos tragedy now claiming an estimated 43,000 lives a year. Yet regulation has so far succeeded in banning only 21 out of 83,000 chemicals (9), in a handful of countries – and this has not prevented their illegal use. The chemical industry is rapidly moving out of the developed world and into developing countries (especially in Asia) to escape the law, regulation and costs.

The planet is also now immersed in billions of tonnes of toxic waste released by the mining and energy sectors, coal especially. (In Australia, for example, coal pollution is estimated to kill four times more people than motor vehicle accidents.) The global electronics sector alone produces 40 million tonnes of highly toxic e-waste a year, which is now being found in the food chain.

Aluminium processing has so far generated 3 billion tonnes of 'red mud' and a recent study of the world's top ten miners found that together they released 180 million tonnes of toxic tailings into rivers and lakes a year. (10) Around 120 million tonnes of elemental nitrogen and 9 million tonnes of phosphorus are released by agriculture and transport into the world's waters annually, where they have caused 479 'dead zones' to appear. (11)

It can thus be seen that the release of carbon into the atmosphere is, in fact, a modest fraction of the combined human chemical assault on the planet.

Doctors are reporting many unexplained new diseases, especially in young children, as well as dramatic increases in previously uncommon diseases like Alzheimers, Parkinsons, various mental disorders and cancers, whose upsurge is being increasingly linked by medical science to multiple chemical exposure. For example, a recent United States report links Bisphenol A (BPA), a chemical found in plastic drink bottles and almost all people, with increased heart risk.(12) The toxic effects of most of the 83,000 chemicals in use today remain unknown, their thresholds undefined – and more seriously still, the impact on human health of chemical mixtures remains completely unknown to science. Yet everyone encounters chemical mixtures, every single day.

It took half a century of argument for regulation of tobacco, a product that kills half its users, to reach today's limited effectiveness: from this it can be seen that the chance of restricting tens of thousands of individual chemicals globally by regulation alone is therefore "Buckley's".

Possibly the only thing that can prevent the worldwide poisoning of humanity and all life is consumer refusal to buy polluting products or to tolerate babies being born pre-contaminated. If there is a solution it lies in the power of ordinary consumers, parents and shareholders to reject all products and processes that have not been certified as free of known toxic or carcinogenic by-products. This would have to extend to import bans on goods from unregulated industries in poorly-governed countries. Thus the solution must lie in rapid worldwide education of ordinary citizens about the scale of the risk to their lives they incur from the present production system that serves them – and the market discipline which their concern can impose on the suppliers of toxic goods, services and processes. While this may seem a tall order, the growth of the internet and social media in particular makes the transmission of information, ideas and action amongst consumers around the planet at light-speed feasible – and a pan-human response possible.

The world has been aware of chemical pollution since Rachel Carson published *Silent Spring* in 1962, but has regarded it as a limited issue, restricted to particular sites, chemicals or user groups. This is no longer the case: it is now universal and represents a challenge at the species level. Chemicals and minerals are valuable

and extremely useful things. They do great good, save many lives and much money. But all this may be for nothing if the current uncontrolled, unmonitored, unregulated and unconscionable mass release and planetary saturation continues.

Most people know it is not a good idea to foul the place we inhabit: that lesson must now be applied in the case of these invisible substances, before universal and irreversible harm accrues to life on Earth.

2. Danger of pandemics of antibiotic resistant organisms

In the recent, alarming words of Britain's Chief Medical Officer (13) antibiotic resistance should be ranked with terrorism as one of the major threats to society.(14) Equally concerned, the World Health Organisation (WHO) made the issue the focus of World Health Day 2011, warning that inaction today will lead to many deaths in the future.(15) In barely two generations, modern society has simply forgotten how many people used to die from coughs, cuts, and general injuries. Nowadays we take it almost for granted that we will survive surgery – whereas patients in the pre-antibiotic era usually made out their wills. The prospect of Australian life expectancy – currently about 82 years – sinking back towards 56 years, where it was in the early 20th Century, is real.

In the words of WHO Director-General Margaret Chan:

> *Unless we solve the problem of antimicrobial resistance to drugs, we will be facing a post-antibiotic era where things as common as a strep throat infection or a child's scratched knee could once again kill.*

Many infectious diseases may one day become uncontrollable and could rapidly spread throughout the world, WHO says.

These are not trivial warnings, yet Australia appears indifferent to the need to play its part on combatting this global menace. A study, Culture of Resistance, by Kerrie Tucker for The Australia Institute(16) finds that little effective action has been taken since an expert committee made 22 recommendations back in 1999.

The irony of the tide of antibiotic resistance now bearing down on us is that, like obesity and diabetes, it is a consequence of our quest for cheapness, convenience and self-gratification. Like the food issue, it means that many will "die by their own hand" – albeit unintentionally – without understanding the role their consumer habits have played in their demise.

Antibiotic resistance is Darwinian evolution in action. If you kill 99.99 per cent of the bugs that cause an infection with an antibiotic, the ones you do not kill have a very good chance of being resistant to the drug, multiplying and passing it to other microbes in little gene satchels. The result is the superbug, a partly or totally resistant brute now infesting our hospitals and – it is feared – our livestock farms in ever increasing numbers and species.

Around 80 per cent of our national antibiotic consumption is routinely fed to healthy pigs, poultry and feedlot cattle ostensibly to prevent disease,(17) but really because it causes them to grow faster. In other words, like the European horsemeat scandal, the antibiotic shower to which modern meat is subjected is a direct result of the pressure applied to supermarkets by consumers for cheaper, more convenient food, and the industrial systems devised to supply it. While superbug infections from animals to humans are not yet common here, cases are starting to emerge. However, as our food is not regularly tested for superbugs, nobody knows the extent of the threat.

Likewise the patient's perennial plea to doctors "C'mon doc, give me an antibiotic for this sore throat – I can't be sick for work/sport/holiday" lays the ground for mass deaths in the future, as over-prescribing accelerates the rate at which the bugs learn to resist more and more antibiotics. What many people do not realise is that there have been no new classes of antibiotic released anywhere in the world in over a quarter of a century: we are, essentially, stuck with those we have got.

Multiple drug-resistant infections used to be something Australians brought home from overseas trips to dodgy destinations. 'Rather scarily in the last year or so we've started to see Australians coming in with multi-resistant infections where they haven't travelled at all,' Professor Lindsay Grayson of Melbourne University told the ABC,(18) Several big hospitals have recently found their intensive care and other units contaminated by superbugs.

If you catch a superbug like methicillin-resistant golden staph your chance of dying is currently about one in 4 or 5, according to the Medical Journal of Australia. However, the actual number of Australians whose demise is due to superbugs remains unknown, or else is being kept very quiet: the WHO records 'no data' from Australia (along with other Third World countries). In Europe an estimated 25,000 people die every year and in America, 90,000 people. Extrapolating from the United States data, there could already be as many as 4,400 Australian annual fatalities – or around three times the current road toll. Hopefully the actual number is far lower due to better hospital hygiene here. But it gives a clear indication of what lies ahead if we do not start to take this deadly threat more seriously, and of the urgency of establishing proper national surveillance.

According to The Australia Institute most of the factors listed by WHO as drivers of drug resistance are present in Australia. They include: inadequate national commitment to a comprehensive and coordinated response; ill-defined accountability and insufficient engagement of communities; weak surveillance and monitoring systems; inappropriate use of medicines, including in farming; inadequate infection prevention and control practices and insufficient research. Faced with a choice between risking the lives of consumers and risking the profits of the food industry, Australian governments appear to prefer the former.

Beating antibiotic resistance is not simply a health issue. It will require co-operation across the board from consumers, parents, the food industry, farmers, chemical companies, drug companies, pharmacists, Federal and State government departments, hospitals, doctors, nurses and patients. Above all it involves the public: if we fix the regulations but do not change our mindset as consumers and patients, we will fail to fix the problem and thousands will die needlessly as a result, including a great many babies and children.

Several generations ago most Australians were taught to wash hands, use handkerchiefs when coughing or sneezing and not to spit in public, to prevent the spread of infectious disease. Not only are those lessons now fading, making ours a less hygienic generation than the previous two, but we are storing up infinite trouble for future Australians by the way we eat and consume medical antibiotics. Do we really have the right to gamble with the lives and longevity of our children and grandchildren? If ever there was a case for a national public health action and awareness campaign, this is it.

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An urgent need to address our assumptions, and their risks, in open, respectful and objective ways by Steven Cork

Why do we have so much trouble having a rational, society-wide dialogue about future risks and opportunities and, on that basis, taking appropriate action? Numerous analyses of failed civilisations reveal three consistent trends: failure to anticipate future change, failure to be watching for emergence of threats, and failure to respond appropriately once they have emerged. So why do we have so much trouble even taking the first step of considering future risks seriously? I suggest that the reasons are obvious and the solutions are clear. Putting those solutions in place, however, requires that we, as a society, address some fundamental aspects of human nature that have been exploited by those who seek to delay dialogue and decision-making.

In his scenario for the future of the world to 2050, Jorgen Randers despaired that decisive action would be delayed by the inability of powerful western nations to resolve the gridlock between opposing ideological positions. (1) Earlier, philosopher John Ralston Saul had suggested that an age of decision-making based on evidence, which had been emerging since the days of Voltaire in France, had been in its decendency throughout the latter part of the 20th Century and was likely to be replaced by a rise in ideology as the basis for debate. (2) The disciplines of psychology and behavioural economics have revealed the irrationality of human decision-making and how vulnerable we all are to cleverly used words and images in the framing of issues. (3)

A natural human reaction to complexity and uncertainty is to form simplified mental models of the world and to only process information that is consistent with those models. (1) Today, we see political parties and business interests in the USA, the European Union, Australia and other western countries employing sophisticated understanding of human thinking flaws to, at best, advance their own ideological beliefs and, at worst, confuse citizens so that open and constructive dialogue and rational risk management is impossible. Added to this, the media has used the same sophisticated techniques to sell its products and has added to society's confusion and inability to take action.

The solutions to this state of affairs are obvious and, conceptually, simple. Leaders in disciplines contributing to strategic thinking and foresight have emphasised the need to address the different beliefs, values and worldviews held within societies, in respectful ways that seek not primarily to decide who is right or wrong but to explore the basis for assumptions and their implications in multiple possible versions of the future. (4. 5) An important component of this dialogue should be to identify which assumptions are most critical or "load-bearing". (3)

As an example, Box 1 identifies 10 assumptions that seem to be contributing to current debate about whether urgent action should be taken with respect to climate change and environmental degradation. In this table, I include assumptions that I disagree with as well as ones I agree with. Many others could have been added. I give my assessment of the evidence for or against the assumptions and the risks of ignoring the assumptions, as an example of how making assumptions and our interpretations of them explicit can provide a basis for constructive dialogue and strategic testing of critical assumptions.

I argue that this sort of assumption-analysis should be entered into by thought-leaders in Australia (and globally) so that our efforts can be targeted at those assumptions that are most critical to managing our risks and opportunities. The process should be managed by trusted representatives of society, and the deliberations should then be communicated openly and transparently to society in ways that allow all Australian's to understand the issues and make informed decisions about which policies and actions they wish to support. These issues are too important to be dealt with using the sophisticated psychological manipulation that has become part of everyday life. It will take bold and altruistic leadership; which might or might not come from our politicians.

Once our assumptions have been examined, and we understand one another's beliefs, hopes and ambitions, we can proceed to consider multiple possible futures for Australia in rational ways, but that is another process best left for another essay. (2)

Ten common assumptions relating to whether urgent action to address climate change and land degradation is warranted

Assumpwtion 1
A free-market driven transition to new economies will be less disruptive to human well-being than a transition mediated by market interventions

Evidence

Highly contested amongst economists. There is currently a public debate, for example, between economists who think those threatened by global financial unrest should be allowed to fail and those who think that interventions should be made to correct market failure. In relation to addressing global environmental challenges, this assumption argues that markets will eventually recognise resource scarcity, while opponents of the assumption argue that this market response will come too late to avoid loss of key non-renewable resources that are not substitutable or to avoid human suffering.

Risks

The risks of ignoring this assumption are very high, and there are considerable risks in either accepting it or rejecting it. For example, if we proceed as if the assumption is true then even if markets eventually allocate scarce resources efficiently, there is a high chance of substantial human suffering and inequity in the meantime. On the other hand, if we assume the assumption is false then we risk not getting the benefits of market forces to bring about change and we risk the potential perverse outcomes that can accompany government intervention in complex processes. There is an urgent need to move beyond ideological stances on economics and towards strategies that recognise that both extremes of theory could be wrong and right in parts.

Assumption 2
Continued economic growth (based on consumption of renewable and non-renewable resources) is essential for human well-being

Evidence
Still a central assumption of treasury departments in the Western world, but increasingly contested by many economists.

Risks
Very high risk that the drivers of climate change, land degradation and human suffering will be maintained or enhanced.

Assumption 3
Decoupling consumption from economic growth is possible (i.e. economic growth is possible without increasing consumption of non-renewable resources)

Evidence
Strong evidence from research and community action but there is uncertainty about how decoupling might be applied at society-wide scales.

Risks
Some argue that moving too quickly towards decoupling will threaten economies, employment and human well-being. Others argue that failure to move in this direction will have the same effects but they will not be planned for or controllable.

Assumption 4
Average global temperature is increasing and will continue to do so for the foreseeable future

Evidence

Very strong consensus amongst informed scientists. Counter evidence relates to suggestions of a global conspiracy by scientists (see below).

Risks

Given high scientific consensus that global warming is occurring and that the impacts are likely to be catastrophic in some places unless current drivers of warming are addressed, the risk of ignoring this assumption should be placed in the highest possible category in any objective risk analysis (arguments about both costs and benefits of warming over different time scales should be considered objectively).

Assumptions 5
Conclusions about increasing global temperature are based on fabricated data, dishonest interpretation of evidence, and a global conspiracy by scientists

Evidence

There has been no convincing evidence of a conspiracy produced, but this issue is fraught by different perceptions and beliefs. Alternative interpretations of the evidence for warming lack scientific credibility. There is evidence that at least some of these assertions are deliberate attempts to confuse the public for corporate gain. (6)

Risks

If we accept that some hold this view due to honest scepticism, we should still consider the risks of acting on this assumption (i.e., doing nothing to address warming) versus potential risks of taking action to reduce carbon emissions. This consideration relates to other assumptions about potential impacts of action on economies and human well-being.

Assumption 6
Climate change will affect local rainfall and other aspects of weather in major, but uncertain, ways

Evidence
Scientific understanding of the implications of rising average temperatures on rainfall patterns at local scales is sufficient to suggest with high confidence that patterns will change and are likely to become more extreme in many places, but understanding is insufficient to allow precise predictions.

Risks
As above (Assumption 4), the risk of not taking this assumption very seriously (i.e. both considering its implications and seeking further knowledge) is very high.

Assumption 7
Climate (average temperature) change can be contained by reducing emissions from human activities

Evidence
There is broad consensus amongst scientists that a major proportion of climate change is being caused by human activities is high. Some advocates still contest this evidence (see Assumption 5). Some argue that the financial and social costs of reducing emissions are greater than the benefits. Evidence is emerging that these costs need not be prohibitively high and are likely to be far less than the costs of inaction.

Risks
A risk of ignoring this assumption is that the potential opportunity to reduce major human suffering could be missed. This is a key area for open and respectful dialogue to explore the real costs and benefits. Referring to risks of inaction discussed above, resolution of this assumption should be given the highest priority.

Assumption 8
Dangerous climate change and land degradation require action very soon

Evidence

There is emerging evidence that "safe operating limits" of global biophysical systems are being breached in several respects and approached quickly in others. Defining these limits remains a topic for debate amongst scientists, but there is agreement that this debate is crucially important if future risks are to be assessed and addressed.

Risks

The risk of ignoring this assumption is high because, if it is correct, then the opportunity to reduce human suffering will be missed (see Assumptions 4–7).

Assumption 9
Technologies will emerge to address climate change and land degradation issues without requiring major changes to current industrial practices

Evidence

Techno-optimists cite the many advances in technology in the past and the many examples of human ingenuity overcoming past problems. Counter arguments question whether past success necessarily predicts future success and whether innovation will happen fast enough to avoid major human suffering.

Risks

The risk of ignoring this assumption is that insufficient investment will be made in developing new technologies. The risk of relying too much on this assumption is that there will be inadequate action taken to relieve human suffering while transitions to new technologies occur. There is ample evidence that societies, including modern wester ones, tend to ignore such challenges until it is too late for orderly policy responses and that the transition is likely to be disorderly and socially disruptive.

Assumption 10
There is a need to transition from oil to new sources of energy

Evidence

The assumption that availability of affordably-extracted oil has peaked has been hotly debated in the past but there is now broad consensus that a transition to new sources of energy must be made. Debate continues about how quickly this transition needs to occur and what the pathways might be (e.g., coal, gas, renewables).

Risks

Lack of clarity around this assumption is a major risk for Australia and the world, because it impinges on most of the assumptions discussed above. Apart from the fact that carbon emissions from energy production are seen as major drivers of climate change and land degradation, the disorderly nature of the debate about energy transitions is leading to social disruption over issues like mining for coal seam gas, and the ongoing use of coal as an energy source.

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Even when facing a global change emergency, suspend judgment and listen by Paul Atkins

How well are our national conversations working for us? Are they helping us anticipate future challenges and act to prepare for what is ahead? Adversarial debate typically focuses on asking 'who's right?'. Asking 'what works to achieve what we most care about?' offers more promise.

Humans have changed the atmosphere, oceans, global biogeochemical and hydrological cycles, soils and ecosystems, all of which bring current and anticipated impacts on human lives (e.g. health, food production, resource use, energy sources and demands and more). Together this is referred to as 'global change'.(1) Is there a developing emergency due to global change?

This question can easily lead to adversarial, debate-based interactions, with a focus on 'who's right?' We are not short of international and national assessments, and global warnings to humanity from international experts, including most Nobel laureates. (1) Surely assembling the very best and most compelling scientific evidence for clear and immediate dangers is a powerful way to motivate action? Certainly, such evidence has inspired people around the world to learn more and change to create a future in which our descendants thrive. When immersed in these communities of hopeful change agents, whether in professional or citizen roles, I see that people care and change is possible.

I also see the opposite. Strong positions based on scientific evidence and attempts to convince others from a position of certainty can reinforce an adversarial stance; people on all sides defend their point of view and "being right" becomes more important than learning. How then can we discuss our concerns for the future in a more useful way?

In my experience, the most effective exchanges are those where people discover they welcome having their positions changed, and they are open to a wider range of options, decisions and actions. Such exchanges come not from trying to persuade, convince and establish who is "right", but from a genuine intention to listen to and work with all perspectives. Well-established principles of dialogue are a good place to start: (2)

1. Decisions are not required.
2. Suspend judgement.
3. Be honest and transparent.
4. Build on others' contributions.

These principles are designed to help us step back from our ingrained tendencies to defend ourselves and our positions. Many baulk at the first principle: decisions are not required? Surely what is needed are immediate decisions and actions? Yes, but without dialogue, immediate decisions and action tend to produce unstable solutions such as our current carbon pricing systems. If decisions and actions seem impossible or unworkable, dialogue can unlock the situation.

Dialogue is most useful for finding shared purpose. For example, parties in disagreement about whether human-induced climate change is occurring or not can find that they have shared concerns about dependence on coal exports and coal fired electricity generation, or a transport system that subsidises individual car ownership. Dialogue lays vital groundwork for decisions and actions, especially if there is deferred or unstable decision-making on an important issue. Dialogue also helps when decisions and actions go awry. For example, I mediated a volatile situation for a local sustainability group that had coordinated a bulk purchase of household solar hot water and photovoltaic systems. It was a group of like-minded people who had decided what to do

and had committed to action, yet careful dialogue was needed to navigate unforeseen circumstances when international financial shocks jeopardized the initiative.

Successful dialogue depends on the behaviour of those participating. The following behaviours are particularly helpful in dialogue settings (and good dialogue settings reinforce these behaviours): (3)

1. Mindfulness: an open, curious, non-judgmental awareness that welcomes multiple perspectives. It includes empathy and emotional self-regulation: being in the presence of difficult emotions without falling into defensive behaviours such as avoidance, despair, denial or false optimism.
2. A focus on values and purposes rather than pre-specified end points. Going straight to advocating positions and solutions often bypasses opportunities to identify the values underpinning the conversation. Shared values (e.g. peace, good health) are found more readily than shared solutions and provide useful common ground in difficult exchanges.

The most direct way to promote mindfulness is to practice it ourselves. Individuals who bring mindfulness to a situation create an environment for others where their views are valued, multiple perspectives can thrive and learning can occur. If the language of certainty, alarm or emergency triggers an adversarial stance, all these aspects of mindful communication are weakened; it makes it harder to find common ground and novel ways to navigate the situation.

As individuals we can notice when this is happening and switch from adversarial debate to mindful dialogue, recognising we wish to bring people together rather than reinforce unhelpful divisions. And here it is important to note that we can be open and respectful of other perspectives ***without agreeing with them***. Simply being in the presence of someone who is willing to hear different points of view without immediate judgment creates a powerful experience for the person being heard. That experience builds trust, respect and openness to change.(4)

Of course it is not just up to individuals. The context in which conversations take place determines whether dialogue will thrive. Our media and Houses of Parliament set a powerful context where attempting to initiate dialogue is currently risky. I have been struck by the generosity, goodwill and openness I see in community dialogues. Dare we imagine that such conversations might also be possible in the media and corridors of power? If debate is not working so well for us, what changes might we be willing to institute to encourage and support dialogue as the basis of our national conversations?

I am aware that my suggestions can be heard as naïve or utopian. Maybe those judgments will prove to be correct. But I would rather state these hopes and be proved wrong than not express them for fear of ridicule. Our current forms of national conversation appear not to be working to generate the fundamental changes that other essays in this volume suggest are needed. Shifting from debate to dialogue will require commitment to behaviours often 'considered too "soft" to be taken seriously in the cynical public arena. They are: visioning, networking, truth-telling, learning and loving'.(5) To the extent that we make such behaviours illegitimate in our public conversations, we deny that which makes us most human: our ability to imagine, and cooperate to achieve, a better future.

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   - http://www.planetunderpressure2012.net/pdf/state_of_planet_declaration.pdf

   The Millennium Ecosystem Assessment (http://www.maweb.org), International Panel on Climate Change (IPCC) climate change assessments (http://www.ipcc.ch/) and recent publications on global change and the 'Anthropocene' (e.g. http://www.igbp.net/4.d8b4c3c12bf3be638a8000897.html and http://www.anthropocene.info/) provide important background information on the global change context.

   Within Australia, useful assessments include:
   - State of the Environment reporting (http://www.environment.gov.au/soe/index.html)
   - State of the Climate (http://www.csiro.au/Outcomes/Climate/Understanding/State-of-the-Climate-2012.aspx)
   - Integrated analyses of social, environmental and economic interactions and consequences in Australia (e.g. http://www.csiro.au/Outcomes/Environment/Population-Sustainability/BalancingAct.aspx, http://www.isa.org.usyd.edu.au/, http://www.cse.csiro.au/research/futuredilemmas/, http://www.ecosystemservicesproject.org/)
   - Reports to the Prime Minister's Science, Engineering and Innovation Council (PMSEIC), including recent reports on food security and carbon-energy-water intersections in Australia http://www.innovation.gov.au/Science/PMSEIC/Pages/PapersandPublications.aspx
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Resilience needs a sense of community, a sense of place by Andrew Campbell

We do not need a crystal ball to tell us that the probability of a serious shock or emergency occurring in Australia in the coming decade is high, given what we have seen over the last decade.

Other articles in this series argue eloquently that even bigger shocks are likely, that the imperative for change if we are to build resilience is compelling, while lamenting an apparent myopia amongst the populace and a lack of visionary political leadership.

I do not want to elaborate on those points.

Rather, I'd like to fly some kites in proposing strategies that might help to build resilience at a local community level, and in so doing create the political space and energy for new forms of leadership to emerge at all levels.

My contentions are that:

- Rapid, often surprising, on-going environmental change will challenge governments and industries, and stress communities.
- Many responses (proactive and reactive) will need to be worked out at regional and local levels. Successful, durable implementation of tough decisions depends on community support.
- This requires environmentally literate and capable delivery frameworks at local and regional scale, involving community leaders and engaging grassroots volunteers.
- A sense of place and a sense of community, are important elements in building resilience. This must start at a local level.
- 'Joined up' government has to become much more than a slogan. Compartmentalised, fragmented approaches, across and within jurisdictions, will continue to fail dismally. The 'converging insecurities' around energy, water and food, amplified and compounded by climate change, require an integrated planning and delivery framework, rural and urban, with active community engagement.
- Integration across multiple issues involving multiple stakeholders is difficult.
- But it is arguably easier at a local community or district scale than it is at regional or State/Territory levels, and it is more difficult again at national or international scales.
- A big risk with the torrent of climate change data is that individuals feel impotent in the face of something that seems overwhelming, or as Graeme Pearman observes, we are adept at finding ways to ignore or dismiss data that conflicts with our worldview.

If I was granted one policy wish it would be to improve the environmental literacy of the entire Australian population — helping people to read, understand and act on changes and trends in the world around them.

Australia is renowned internationally for innovation and excellence in environmental education and community engagement through initiatives like Landcare, Waterwatch, Coastcare and so on. These programs remain valid and still involve many thousands of people, but they are tired and have had no strategic attention over the last decade. Their links to science and to the education curriculum are patchy and threadbare.

The old mantra about "measurement becomes management" is true. We accept the need for good economic data without question, but seem to think we can respond sensibly to complex environmental challenges in the absence of good, fine-grained data.

We need to make more visible, what is currently invisible to most people, and we need to make it measurable and transparent. Further, we need to engage as many citizens as possible in doing so, in ways that are scientifically rigorous. This is doable, in Australia more than in most countries.

New mobile technologies and the internet mean that we can now gather and share environmental data more easily, quickly and cheaply than ever before.

Households with prominent, user-friendly energy meters or water consumption meters linked to online portals, are more likely to change their behaviour, especially when consumption is linked with intelligent pricing mechanisms.

We need to think creatively about how to hard-wire such mechanisms throughout society. It should not be piecemeal, but a whole of government approach from pre-school to old folks' homes.

Done well, it would engage innovative Australian small businesses working in the sustainability sector across climate, water, energy, green building, farming systems and so on.

It would help to re-position Australia internationally in the climate debate and generate export opportunities. It would develop generations of people better equipped to understand the world around them and to take practical steps to improve things.

The overall monitoring and evaluation system is in terrible disrepair across the federation. We are unable to link environmental expenditures with on-ground impacts. We are poor at pulling all the disparate areas of knowledge together so that lessons can be learned more easily (and remembered) across the whole system.

An **Australian Environmental Literacy initiative**, easily delivered using resources already committed, could have ten core, interlinked elements:

- Reinvigoration of community-based landcare;
- Consolidation of long-term resourcing and support for regional or catchment management groups mandated to take an integrated approach across land use planning, land, water, energy, biodiversity, pests and weeds;
- A schools-based environmental education initiative within the national curriculum;
- A national land literacy initiative, drawing together, expanding upon, and providing national support and coordination for all the community-based citizen science voluntary 'watch' programs;
- A national clearinghouse/innovation centre for analytical tools, metrics and technologies such as sensing, metering, telemetry and mapping systems, that would help schools, community groups, industries and governments at all levels to track their own sustainability and resilience dashboards online;
- A single national system to monitor the status of and trends in the condition of natural resources like biodiversity, soil, land and water;
- Long-term funding for the Terrestrial Ecosystem Research Network (TERN), with its core scientific infrastructure based on a network of long-term plots, transects and sentinel sites for monitoring environmental change at a continental scale and supporting research.
- Linked closely with TERN are two key national facilities:
- An eco-informatics centre that works with States and Territory agencies and other data custodians and providers to consolidate both existing and new data into much more accessible and tractable forms;
- An Australian Centre for Ecological Analysis and Synthesis (ACEAS) that brings expertise together to synthesise and analyse data generated through all of the above mechanisms to frame options for policy and other audiences.
- A dedicated national research investor, broker, manager and coordinator mandated to work across land and water management, energy and food, as recommended by the Productivity Commission in 2010.

For each of these elements, a great deal of preparatory thinking has been done, keen and knowledgeable stakeholders are ready to go, and State and Territory officials are largely onside. There is enough money already in the system to do most of it. What is needed is national leadership, an overarching vision based on a coherent narrative, and a COAG agreement to get the federal machinery working cohesively rather than in the current state of fragmentation, amnesia, adhockery and confusion.

If we can sustain an integrated package like this over multiple electoral cycles, governments, industries and communities would find it easier to make and to implement the difficult adaptation and mitigation decisions that lie ahead. Residents, voters and consumers would be demanding action rather than resisting or postponing it, creating a fertile seedbed for new political leadership.

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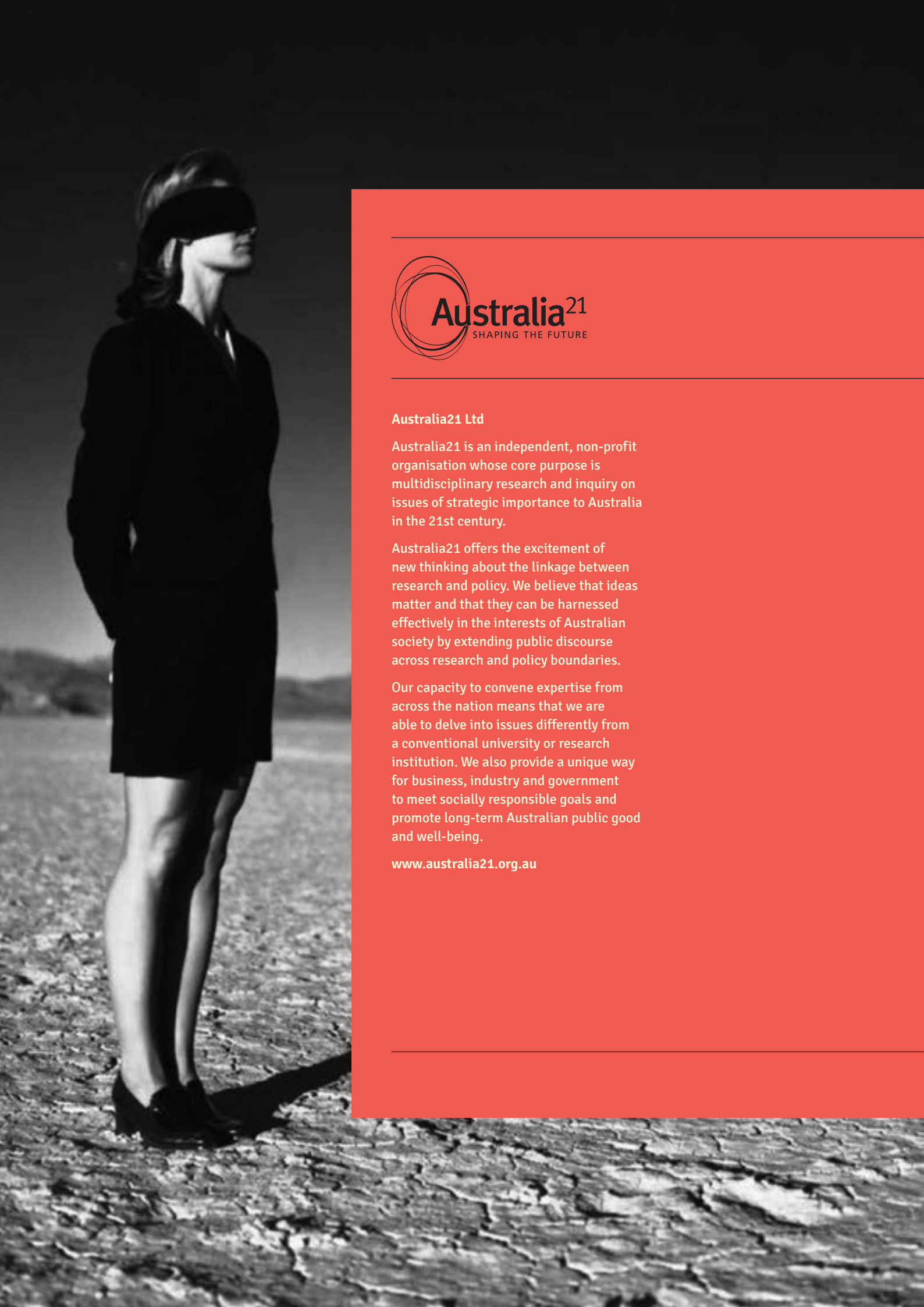
‘Australia is living in a Fool’s Paradise, ignoring the most critical issues, which will impact upon this country in both the short and long-term.

Weighty reports are being published on our official future. Which would be laudable were it not for the fact that the critical scenario, of accelerating anthropogenic climate change and resource scarcity, is deliberately ignored – apparently too scary for political realism to contemplate.’

Ian Dunlop. Former petroleum and coal industry leader.



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