EPILOGUE

Victoria:
STATE OF THE
ENVIRONMENT
2013

BETTER MEASURES OF PROGRESS

EPILOGUE
BETTER MEASURES OF PROGRESS

DETAILED CONTENTS EPILOGUE

EPILOGUE
BETTER MEASURES OF PROGRESS

In the face of increasing pressures such as climate change and population growth, in this closing section of *Victoria: State of the environment 2013, Science, Policy, People* we make the following observations: our understanding of ecological processes and our protection of ecosystem services would be invaluably served by better measures of human progress and a more sophisticated understanding of social resilience.

More broadly, we hope that the recommendations of this report complement and inform environmental management and sustainability reporting in Victoria and promote a significant strategic shift in the way we approach the interface between the natural world and human progress.

The United Nations Rio+20 summit (Brazil 2012) committed governments to create a set of sustainable development goals (SDGs). Responding to this call from the UN, many governments, NGOs and members of civil society have started to frame SDGs. A well advanced international framework has been developed by Professor David Griggs and a group of eminent scientists. The concepts contained in the framework are useful guides as we consider improving social resilience and supporting the continued wellbeing of the Victorian community.

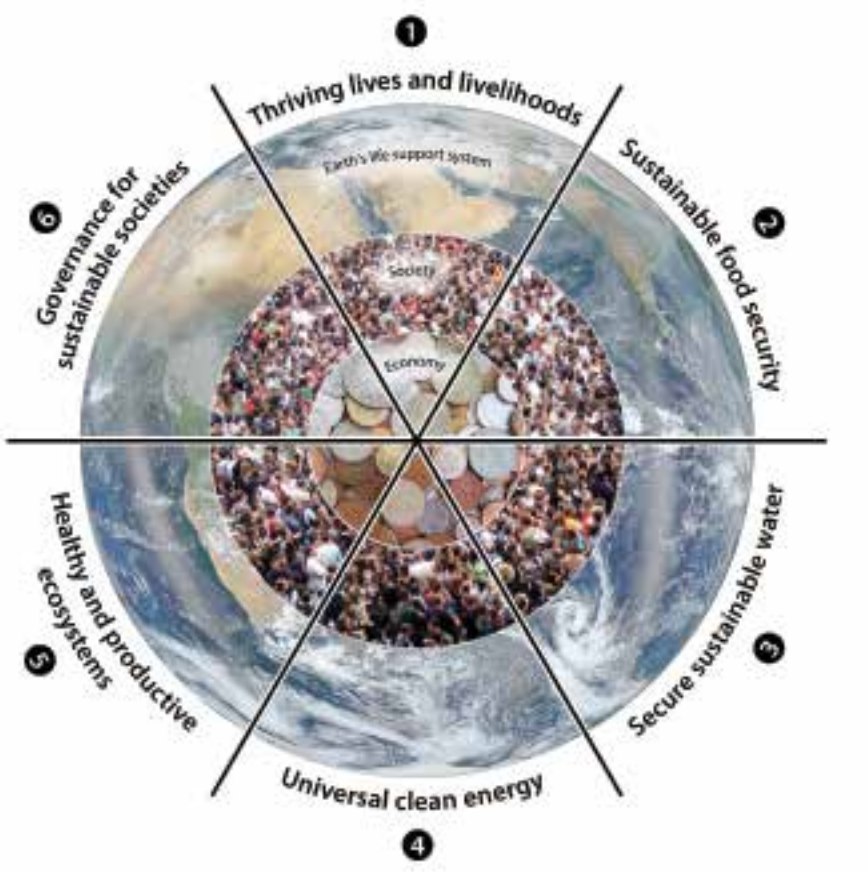

Figure E.1: The Six Universal Sustainable Development Goals cutting across economic, social and environmental domains.*

* David Griggs, Mark Stafford-Smith, Owen Gaffney, Johan Rockström, Marcus C. Öhman, Priya Shyamsundar, Will Steffen, Gisbert Glaser, Norichika Kanie, and Ian Noble. Sustainable development goals for people and planet. Nature, 495: 305-307. (21 March 2013). 2013.

E.1 Measuring Differently

Our key measure of economic growth, gross domestic product (GDP), has in many ways become our default measure of social progress. It is widely acknowledged that growth in GDP, or gross *state* product for Victoria, is not a measure for assessing progress towards a sustainable future. GDP is defined by the ABS as:

> ***'...the total market value of goods and services produced in Australia within a given period after deducting the cost of goods and services used up in the process of production, but before deducting allowances for the consumption of fixed capital. Thus gross domestic product, as here defined, is 'at market prices'. It is equivalent to gross national expenditure plus exports of goods and services less imports of goods and services.'*****

Ever-increasing GDP (beyond a basic threshold) does not translate into additional human welfare. The need to shift away from growth as the only determinant of a development strategy is increasingly being discussed.[1, 2]

Efforts are underway around the world to develop better measures, found in the OECD's 'Measuring Progress of Societies' and the ABS's 'Measures of Australia's Progress' consultation process. These efforts are attempting to develop systems that measure the things that truly benefit society and explicitly maximise, and understand the constituents of, wellbeing.

A leading example is the Canadian Index of Wellbeing.[3] This takes account of eight 'domains': community vitality, democratic engagement, education, environment, healthy populations, leisure and culture, living standards, and time use. Each of these is composed of a collection of 'headline indicators', and together the eight domains provide a composite index of wellbeing. When first released in October 2011, the composite index revealed that quality of life in Canada had increased by 11% since 1994 – much less than the 31% increase in GDP.

Regular reporting of progress against diverse measures of progress is an important step in separating material consumption from improved social wellbeing.

The process of developing alternative measures of progress for Victoria, or Australia, must involve significant community consultation: what kind of society and environment do we really want to live in? This is reflected in the recently launched *Australian National Development Index* and the ABS's *Measuring Australia's Progress*.[4]

The Happy Planet Index[5] ranks Australia well below Costa Rica (ranked No. 1). The index is based on three key metrics: experienced wellbeing, life expectancy and ecological footprint. Costa Ricans enjoy almost identical wellbeing and life expectancy as Australians, but with an ecological footprint 2.5 times smaller than our own.

** http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/930F0CF385EC166FCA257AD8000EE7CA/$File/52160_2012_edition3_v2.pdf

The Australian Conservation Foundation identified eight themes that could contribute to a society that values wellbeing and quality of life alongside economic growth.[6] These were:

- Emphasising measurements of social and individual wellbeing, and ecological health over GDP
- Balancing paid and non-paid work, family and leisure time
- Making cradle-to-cradle manufacturing a reality
- Consuming less and consuming smarter
- Ensuring that the full environmental and social costs are included in the price of goods and services
- Supporting non-profit business models
- Shifting taxes away from productive activity such as income generation and towards pollution and resource use
- Government cost-benefit analysis that includes all aspects of wellbeing.

E.1.1 A new wellbeing index for Australia

Deakin University in Victoria will host the Australian National Development Index (ANDI), a new measure of Australian wellbeing and progress that will advise federal policy development.[7] ANDI was officially launched by Australian scientist Sir Gustav Nossal in August 2013 through the release of a new report from the Australian Council of Learned Academies (ACOLA) and VicHealth.

Called *Australia's Progress in the 21st Century*, the report for the first time provides a scientific foundation for developing an indicator of progress that goes beyond gross domestic product (GDP). Consultation will be undertaken, and Australians will decide on aspirations and goals for wellbeing and progress, and ANDI will measure progress against those goals.

ANDI is part of a growing global movement to redefine how societal progress is measured. The Australian version is supported by Australia's Chief Scientist and the Australian Council of Learned Academies (ACOLA). When established, ANDI will include 12 domains within which annual 'dipstick' readings of progress in areas such as health, Indigenous wellbeing and education will be taken and reported against targets.

E.2 Understanding Social Resilience in Victoria

Over the coming decades, Victorian communities will need to adapt to the hazards of a changing climate: fires, floods and extreme heat. Resilience is necessary to achieve this adaptation while retaining the fundamental character of our communities – in essence, to 'deal with change and continue to develop'.[8]

At the same time, we need to avoid maladaptation – responses that relieve problems initially but exacerbate pressures in the long term by degrading our natural and social assets. There are numerous complex elements that underlie resilience and these are often unique to particular communities. These are factors that influence the vulnerability of populations to hazards, their social cohesion, and their capacity to adapt to repeated shocks. The challenge lies in identifying common factors that can be monitored over long time scales and used to determine the relative resilience of communities.

It is important that the Victorian Government investigates methods that may be used to develop, monitor, maintain, refine and validate consistent metrics of the components of social resilience: vulnerability, adaptive capacity and cohesion. It is important that these measures are used to inform policy and empower communities to make locally relevant decisions in adapting to climate change. In the longer term, robust measures can provide the basis for profiling changes in resilience and for modelling potential outcomes of policy and planning options.

E.2.1 Resilience and disaster response

Resilience has numerous definitions that vary in their nuances. However, resilience can be broadly considered as the ability of natural and social systems to respond, and adapt to, external shocks while remaining within critical thresholds and retaining desired functions.[9]

In Foundation Paper One, *Climate Change, Victoria: The Science, Our People and Our State of Play* we have presented the potential impacts and outcomes associated with climate change. As the world warms, extreme weather events will be more frequent and more intense. The environmental and economic costs associated with natural disasters have been rising steadily and are expected to continue to do so,[10] prompting calls from the Australian business community and others for increased investment to reduce impacts by improving resilience.[11]

It is likely that changes in climate will not be gradual but abrupt.[12] Climate hazards that are expected to increase in frequency and intensity will include bushfires, heatwaves, floods and seasonal drought. This will occur against a backdrop of long-term stressors – such as increased likelihood of multi-year drought, and rising sea level – that act to increase the vulnerability of populations in affected areas.

In Foundation Paper Two, Land and Biodiversity, we discussed the roles we all play in ensuring ecosystem services are protected and maintained.

In Foundation Paper Three, *Water, Victoria: The Science, Our Urban Communities and Our Water Futures* we discussed the risk and uncertainty associated with water availability in our cities and towns, and the work we can and are doing to address this. In the light of circumstances changing we need to work strategically to cultivate environmental, economic and social resilience while avoiding measures that exacerbate these problems in the long term.

The National Strategy for Disaster Resilience (NDRS)[13] characterises resilient communities as:

- able to function well under stress
- capable of successful adaptation
- self-reliant
- having 'social capacity'.

Communities are dynamic and heterogeneous, so any program that seeks to quantify resilience needs to be grounded in knowledge of local conditions. With this in mind, researchers have sought to identify the characteristics that are shared by successful initiatives. Factors that enable resilience[14] and could be targeted by government are:

- Physical characteristics: The assets available to a population, including existing infrastructure and natural assets; emergency infrastructure and strong health and emergency services
- Procedural characteristics: Emergency planning incorporating local knowledge and collaborations
- Social characteristics: Cohesion and inclusion; strong local identity and knowledge guided by local leadership.

Furthermore, an expert review of social networks and psychological effects following global disaster responses and recoveries identified five essential underpinnings for success:[15]

- safety
- calming
- hope
- connectedness
- self and collective efficacy (i.e. confidence, power, capacity to get life back together).

In practice, social resilience has been recognised by governments as an essential component of recovery after several natural disasters here and internationally.[16] The study areas have included:

- Black Saturday bushfires (2009) in Victoria
- flooding in Queensland (2010–11)
- earthquakes in Canterbury, New Zealand (2010–12).

Swift and substantial responses by state and federal agencies focused on coordinating initial response and recovery and improving resilience, even though methodologies varied due to the particular specifics of each community.[17]

A rapid review was conducted by the Victorian Department of Health of the elements that informed a 'community resilience based recovery strategy' after the 2009 bushfires.[18] Connectedness was highly correlated with speed and strength of response.

In 2012, the former National Climate Change Research Facility (NCCARF) updated its research plan for emergency management to reflect the increasing importance of community resilience. Greater priority has been placed on identifying the behaviours and processes that promote community resilience and preparedness.[19] We can hope, therefore, to gain new insights about this in coming years.

E.2.2 Understanding vulnerability and the capacity to adapt

Assessing the relative resilience of populations (or ecosystems) to climate hazards requires a consideration of several factors. Two of the most important are vulnerability and adaptive capacity.

The degree of vulnerability is shaped by both potential exposure to hazards (e.g. fires and floods) and the other stressors that people experience (e.g. poverty or ill health). The capacity of populations to adapt to changing conditions in a sustainable way is the second factor. Assessment of this is complex and relies on accurate estimations of the financial, social and environmental assets available to community members.

E.2.2.1 Vulnerability

Vulnerability of individuals/communities to climate shocks based on socioeconomic status can be assessed using clearly defined indicators. For example, socioeconomic disadvantage is collected and reported at multiple scales over the whole state by agencies such as the Australian Bureau of Statistics (as part of the Socio-Economic Indexes for Areas)[20] and DTPLI (which provides disadvantage data for Victorian towns).[21] Socioeconomic disadvantage is a metric that has been linked to increased exposure to pollution.[22] However, the links between disadvantage and vulnerability to climate hazards are not well understood.

Research has been carried out by Geoscience Australia (GA) for the Bushfire Cooperative Research Centre (CRC) considering the links between social disadvantage indicators and vulnerability following the Black Saturday fires.[23] The indicators considered were:

- young at risk (under 5)
- aged at risk (over 65)
- insufficient English
- not completed Year 12
- need for assistance (e.g. feeding, washing, communication)
- volunteering rate
- low income households
- no motor vehicle access
- new to the region (moved within 1 to 5 years)
- single parent families
- Indigenous people
- public housing
- unoccupied homes.

The Bushfire CRC concluded that no single indicator could be used to identify vulnerability but that a combination of these factors increased a community's vulnerability. Some of these factors are cultural, some physical. A number of them quite clearly suggest the need for better ecological information and public awareness efforts, across socioeconomic and cultural divides.

This work was undertaken using the National Exposure Information System (NEXIS) – a national project being undertaken by Geosciences Australia.[24] NEXIS is a tool for estimating the location of populations and their characteristics. This information can be used to assess exposure to, and impacts of, hazards and will be a valuable tool for emergency planning and for directing programs intended to reduce vulnerability.

NEXIS has been developed to collate and manage the data needed to assess multi-impact hazards and is a valuable tool for providing information to decision makers. The system has been applied after the Black Saturday fires to assess the relative importance of a number of vulnerability indicators. Given that it is combinations of factors that contribute to vulnerability, research of this nature will be valuable in developing monitoring frameworks.

Future development of NEXIS will include projections of spatial distribution and daily activity and this research could be used as the basis for identification and continual assessment of best metrics of vulnerability, risk from climate hazards and adaptive capacity (see below).

E.2.2.2 Adaptive capacity

The factors that contribute to the adaptive capacity of families and communities can be characterised as a product of available skills and knowledge, relationships and social connectivity, and material and financial resources. These assets are underpinned by the resources (food, fibre), services (clean air and water, climate regulation) and value (recreational, cultural and intrinsic) provided by healthy ecosystems.

A strong base of natural assets and ecosystem services is essential for resilient communities. When leading the response to the Black Saturday bushfires, the Victorian Bushfire Reconstruction and Recovery Authority (VBRRA) recognised that community cohesion could improve individual health and wellbeing after traumatic events[25] and made this a focus of its activities.

An assessment of the operation of the VBRRA reported that:

> **'Communities felt they had been brought together and their networks were strengthened after the fires. However, they also believed that over time they would become weaker due to loss of members and resentment against community decisions taken during and after the fires. Nevertheless, community resilience against future extreme events appears to have been successfully built. Participants in the study believed their communities were far better prepared for bushfire events than before 2009.'**[17]

After the fires, the people that had suffered personal losses reported high satisfaction with their perceptions of safety and community.[26] This suggests that affected communities are, at least in the short-term, relatively prepared for future climate impacts.

The Victorian Department of Heath assessed the role of community connectedness in recovery after the 2009 bushfires.[18] It recommended that future strategies should focus on community building. The anticipated outcomes of the community-building recovery strategy would include but not be limited to:

- a lower than expected burden of mental health problems
- a more connected community socially, providing an improved platform for disaster readiness
- a sustained community infrastructure for problem solving and addressing community needs
- the retention of population and amenities
- the restoration of quality of life.

Social cohesion is already measured to some degree in Victoria. The Department of Planning and Community Development (DPCD) began collecting information on the components of community strength in 2001 and last reported on these indicators in 2010.[27] In the context of Victorians' experience of disasters, these indicators informed a framework that was developed to enhance:

- close personal bonding networks of family and close friends
- broader bridging networks generated through participation in education, employment and public life
- governance networks linking communities to decision making institutions.[28]

The data from this framework has been collected, with other state government information on community cohesion, by the Community Indicators Victoria (CIV) web portal.[29] Environment, natural resources and natural capital feature in the growing list of sustainability indicators that underpin resilience at the local and wider scale.[30]

Social connectivity is a vital component in the capacity of communities to adapt to a changing climate, but there are many other factors that require investigation. There is, therefore, a pressing need for research and practical methodologies to gather available information on social connectivity in a community and integrate this knowledge with those attributes contribute to adaptive capacity. Other considerations would include ecosystem benefits and infrastructure resilience.

In essence, it is necessary to quantify the relative strength of all available natural and social assets and use these as a proxy measurement tool for determining the likely adaptive capacity of a community.

One suggested method of achieving this is the 'asset amoeba'.[31] This approach integrates the status of financial and infrastructure capital with social and population characteristics and the natural assets that provide ecosystem services.

Figure E.2: A hypothetical 'asset amoeba' that estimates community capacity in social, natural, human and economic capital to assess overall capacity.[31]

This approach, and others that seek to quantify adaptive capacity as a function of natural and social capital, will need to be assessed for suitability in Victoria. This will require rigorous study of their usefulness across cultural and social settings where, for instance, social equity and access to assets may be widely and unevenly distributed.[32–35]

The issue of data availability will also need to be addressed before assessment tools can be applied effectively. Local councils have recognised a need for information on social indicators such as community cohesion, participation in communal activities, and access to amenities and services. However collection of such information is sparse at best.[36] Improved forms of environmental monitoring are discussed in 5.1 Monitoring and Data Collection.

Regular assessment would allow government agencies to employ disaster response strategies that, to a certain degree, can be tailored to specific communities – thus further allowing communities to participate in their own recovery and protect and encourage social networks. It is important that these strategies are monitored against the criteria for maladaptation (see below).

Findings from this process could be incorporated into long-term planning at state, local government and local authority level.

RECOMMENDATION 34

It is recommended that the Victorian Government benchmark vulnerability and adaptive capacity at a community level.

ATTRIBUTES

The benchmarking will take into account natural hazards associated with climate change and other environmental threats.

Benchmarking will involve:

- **improved knowledge of population characteristics**
- **agreed metrics for vulnerability and adaptive capacity**
- **consistent monitoring over time**
- **evaluation of metrics against actual shocks**
- **comparisons of community responses**
- **periodic review to assess continued relevance.**

Ultimately, consistent and coordinated evaluation of vulnerability and adaptive capacity metrics could form the basis of resilience modelling.

E.2.3 Maladaptation

Maladaptation is defined as: 'action taken ostensibly to avoid or reduce vulnerability to climate change that impacts adversely on, or increases the vulnerability of other systems, sectors or social groups'.[37] It is important that initiatives that are intended to reduce risks adopt a coherent approach in respect of both mitigation and adaptation efforts. It is crucial that planning is undertaken that avoids maladaptation and guides transition to a climate change ready environment.

Maladaptive measures will ultimately decrease resilience producing one or more of the following conditions:[37]

- increasing emissions of greenhouse gases
- disproportionately burdening the most vulnerable, already disadvantaged by social inequity[38]
- imposing high opportunity costs
- reducing social, cultural and economic incentives to adapt
- imposing path dependency.[39, 40]

It is important that adaptation programs be evaluated using these criteria to avoid pitfalls, allowing measures that truly increase resilience to be pursued. Improved methods of assessing relative vulnerability are critical to avoid maladaptive measures that affect communities disproportionally. As climate change adaptation progresses, governments and the communities they represent will need to be vigilant to avoid maladaptive responses.

For example, defending some coastal assets in the face of sea level rise will be environmentally and socially challenging and economically prohibitive. Engineering works that solve one problem but exacerbate another are undesirable and would represent a maladaptive response.

Another example is found in emergency management planning. The adaptive response would not emphasise 'response and recovery' processes over 'strategic planning for resilience'. Committing disproportionate resources to the former at the expense of the latter may prove to be ultimately maladaptive by leading to institutional path dependencies which will ultimately make resilience more difficult to build.

E.2.4 Measuring resilience

The Australian Academy of Sciences (AAS) has reviewed the desirable characteristics for assessments such as resilience profiling.

The AAS recommends the following resilience assessment attributes:

1. **Timescale.** The assessment should have a time horizon of 2050 at least.
2. **Context.** The assessment is informed by a range of alternative global scenarios and a set of projections for feasible Australian futures (e.g. population trajectories).
3. **Specified Resilience.** The assessment characterises 'specified resilience' – the resilience of particular aspects of Australian society to defined shocks (such as climate change hazards).
4. **General Resilience.** The assessment characterises 'general resilience' – our ability to cope with all kinds of shocks, known and unknown so as to continue functioning in a desired way.
5. **Transformation.** The assessment explicitly explores options for transformational changes in the system, both at fine scales and, if needed, at the scale of the whole system.
6. **Dynamics.** The assessment draws on complex systems insights and methods to characterise the dynamics of connected social–technical–biophysical systems.
7. **Participatory, Adaptive Processes.** The assessment is conducted in a participatory manner and as part of an adaptive learning process so that it contributes usefully to effective and ongoing engagement with individuals, communities, businesses and governments.

Resilience assessments that employ meaningful participatory processes can be used to identify and overcome barriers to adaptation (see Case Study: Design-Led Engagement by VEIL). The adoption of these processes reflects a number of the factors outlined in the community outreach work undertaken by the Office of the Commissioner for Environmental Sustainability and reflected in the report *Many Publics: Participation, Inventiveness and Change*.[41]

In that report we cited the scholarship, which tells us that participation encourages social learning, resourcefulness and resilience. People who start with a participatory ethic will respond more effectively to the challenges of 'rapid onset emergency interventions' and resist dependency. This group of people also has the capacity to produce more creative and compelling outcomes.

Case Study: Design-Led Engagement by Victorian Eco-Innovation Lab (VEIL)

The Victorian Eco-Innovation Lab is currently leading a project to explore barriers to local resilience building in response to future climate extremes. A key aspect of the project is participatory design workshops with community members from two case study towns: Anglesea and Creswick.

The process has proved valuable in inviting community members to safely explore the more extreme mid-term implications of climate change (to 2037) and identify locally appropriate adaptation options – many of which propose a radical departure from the status quo.

‘Glimpses’ of the future are based on proposals developed by people in Anglesea and Creswick, and were used to communicate the ideas beyond the design workshops. The public exhibition of future visions is a useful tool for promoting new conversations and generating new ideas about what is possible when planning for the future.

The project’s rationale is that cultures of decision making that prioritise response and recovery more than long-term preparation and adaptation will leave communities exposed to rare, high-impact weather events. However, moving from prediction-oriented planning to an emphasis on systemic resilience will meet challenges in changing ingrained institutional practices.

Key stages in the workshop process include:

1. **Stakeholder interviews.** These were conducted over a number of months to develop an understanding of the case study communities – focusing on influential individuals and groups, shared assets and values, and perceived vulnerabilities.
2. **Developing local narrative climate scenarios.** Regional climate change projections were analysed to determine plausible ‘worst case’ climate conditions for 2037. These were translated into a series of narratives that depicted multiple (and overlapping) impacts from climate change as seen by three fictional future residents.
3. **Participatory visioning workshops.** Two-day facilitated workshops were run in Anglesea and Creswick with approximately 20–30 people attending. Participants were led through a process of identifying key local assets and functions and using the future scenarios to identify and rank vulnerabilities. People then explored options for adaptation guided by design principles that emphasised building resilience of critical functions.
4. **Showcasing visions for feedback.** Workshop outcomes were worked into a series of visual images by professional designers and then into different formats to encourage wider stakeholders to comment. Different media were used including a facebook page, website and public posters and these reflected the different communities in both towns and helped explore how alternative modes of communication would affect feedback.
5. **Agency workshops.** Workshops were held in Melbourne, Hepburn Shire and Surf Coast Shire to explore institutional barriers to the proposed strategies. In each workshop, participants represented different state and regional agencies and formal stakeholders.

As the project is still underway at the time of writing this report, its impact on planning and community decision making is still emerging. However, a number of lessons are already clear about the strengths of the process and the barriers to adaptation for climate extremes.

Communities are more than capable of exploring the negative realities of extreme climate change over the medium term (approximately 25 years) and equally capable of proposing sophisticated ways to build resilience in response. Key success factors include:

- perceived independence of the process (from a political agenda)
- minimal direct emphasis on ‘climate change’
- a structured process that balances positivity and creativity with confronting plausible future impacts
- using tailored narratives to convey implications of climate change.

Getting a broad cross-section of the community to participate is very difficult, as is developing buy-in from the wider community. Online engagement, as used in this project, was successful in terms of the breadth of audience reached but not in terms of garnering strong feedback.

Cognitive barriers can pose a strong barrier to agencies supporting community-led adaptation. Agency professionals may readily accept the likelihood of extreme climate events but still only accept adaptation pathways based on incremental, rather than radical, change.

E.2.5 Role of government

The role of the government is currently outlined in the Victorian Climate Change Adaptation Plan, released in April 2013.[42] The plan sets out six key strategies to build Victoria's climate resilience, providing a new framework for adaptation planning across the Victorian Government:

- managing risks to public assets and services
- managing risks to natural assets and natural resource-based industries
- building disaster resilience and integrated emergency management
- improving access to research and information for decision making
- supporting private sector adaptation
- strengthening partnerships with local government and communities.

There is still a substantial public debate to be had regarding the extent of the role of government in engagement with communities that display low levels of resilience. Is the government merely the insurer of last resort? In which case, there also needs to be a clear demarcation of personal responsibilities. For example, should people who choose to live in areas prone to flood or bushfire be expected to assume associated risks?[43]

It is critical that resilient systems, as a function of the circumstances and means by which they are developed, avoid maladaptive development. It is therefore important to ensure that we profile and develop resilience systematically and systemically to inform private and public decision making.

Government has a major role to play in facilitating these changes and in supporting the formal adoption and application of resilience mechanisms. But, government should not assume the role of sole decision maker and practitioner when communities themselves need to acquire the skills and ability to respond effectively. Initiatives should include policy, regulation and strategic planning.

Where government uses resilience monitoring as the basis for increased investment in programs that seek to improve long- and short-term responses to climate change, it is crucial that these measures:

- consider, formulate and address a suite of measures of vulnerability
- audit as many community assets as is practical to assess adaptive capacity
- avoid maladaptation.

Pocket Park with olive trees and rosemary, West Melbourne