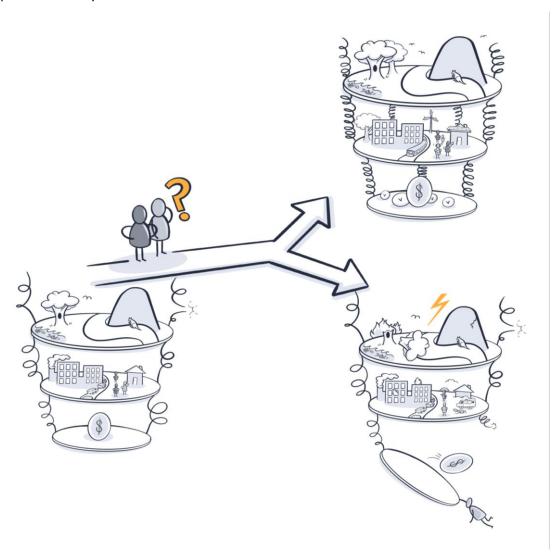CSIRO

Disaster-resilient and adaptive to change – narratives to support co-ordinated practice and collective action in Queensland

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Executive Summary

Chapter 1 Future pathways - disaster-resilient, adaptive to change

The changes in climate, and the changing nature of disruption and escalating scale of disasters in recent decades are underscored by cumulative impacts of chronic stresses and changes, as well as acute events. The only way to avoid worsening outcomes is to work across the whole system – communities, infrastructure, goods and services, economies and natural assets – to understand the causes and effects of cumulative, cascading and compound risk, and to address them by taking collective action.

This will require adapting governance so that public and private organisations, and the communities they serve, have clear roles and responsibilities to support decisions about future goals, and pathways to reach them. These pathways need to help people reach goals in a resilient and adaptable way, successfully navigating the inevitable future shocks and hazardous changes ahead. Co-ordinated collective actions are necessary to address systemic risk.

Queensland Reconstruction Authority contracted CSIRO and ThinkPlace to deliver:

- a consultation or co-design process that ensured that the products would be useful across all State agencies to harmonise approaches;

- 'compelling narratives' about the importance of resilience for Queensland – which are presented as narrative elements combining diagrams and text;

- a 'resilience framework' for Queensland – which through consultation with a range of organisations was changed to a 'Resilience Checklist'.

The target audience for this report is Queensland State agency staff, advocates and champions who are not necessarily specialists in the methodologies behind applying resilience, adaptation, disaster risk reduction tools, but need to be able to explain complex systems concepts and why they are important to a range of their stakeholders. This report does not contain technical details – they are in an accompanying report.

There are common aspirations across many policy areas of Queensland, summarised from State agency stakeholder workshops and perusal of the policies as:

> 'functioning economies, connected communities, healthy natural assets which are disaster resilient and adaptive to change' delivered via a policy philosophy of 'state facilitated, regionally co-ordinated, and locally led planning processes'.

This report presents a set of narratives about understanding systems and risk, the nature and magnitude of change required, and pathways to futures which are disaster-resilient and adaptive to change. It also introduces a Resilience Checklist as an approach to guiding co-ordination of methods, practice and collective impact for Queensland agencies delivering services in the future. Lastly, this report reflects on the need for coordinated collective action and identifies how a consistent, coherent approach to resilience can deliver outcomes of broad benefit to Queensland.

Chapter 2 Key insights from interviews

Interviews with State agency participants confirmed an acceptance that resilience approaches need to change to keep pace because disasters themselves are changing.

The multi-faceted nature of resilience as a term and concept is acknowledged – some aspects are widely accepted, while others are more intractable and contentious, but potentially transformative.

Interview participants identified that there are barriers to and opportunities for doing resilience differently. Commonly cited constraints mask powerful forces and incentives that reinforce current mindsets and actions, hindering more collaborative resilience approaches

They expressed a strong desire to find ways for agencies and sectors to work together through negotiated processes, harnessing their existing frameworks and tools in a more coordinated and mutually supportive way.

Chapter 3 Resilience, adaptation, and disaster risk reduction – a set of related concepts

If policy and management documents and tools provide clarity about goals that are defined by stakeholder values and aspirations, then concepts of resilience, adaptation, transformation and disaster risk reduction can be used to identify what can be maintained, what needs to be modified, and what will need to be transformed in order to meet those goals.

This report presents concepts in terms of the ways of thinking and doing for the magnitude and nature of change needed to reach the desired outcomes of 'functioning economies, connected communities, and healthy natural assets which are disaster resilient and adaptive to change'. This is in order to be useful to guide co-ordinated practice for those who use different definitions or terminology.

Chapter 4 Chronic stresses and acute events cause compound, interacting risks and cascading impacts

There are chronic and periodic stresses which combine with the more acute stresses (shocks) to create systemic stress and risk. When an acute event occurs, the disaster management arrangements are activated for response and recovery.

As the specific and stresses and shocks as well as the systemic risks increase, the disaster response capacity and the collective capacity to cope will be exceeded, and this will lead to catastrophic disaster.

Currently, State agencies go through separate processes to define problems, managing individual aspects and delivering services related to portfolio responsibilities, but many agencies' day-to-day work can and does contribute to disaster risk reduction.

The resourcing, capabilities and mandates of agencies will be more stretched in the future, and they will be unable to deliver on their objectives unless there is coordination across silos and a reassessment of existing objectives.

Co-ordinated action will be necessary to address the stresses and aspects of risk related to exposure and vulnerability, adapt to the changing circumstances, while also building the collective capacity to cope.

Acute events will still occur, but the damage, loss and suffering will be reduced.

Narrative 1 Chronic, periodic and acute stresses combine and amplify to create systemic risk, leading to the potential for catastrophic disaster. Changing roles, responsibilities and approaches to managing chronic, periodic and systemic risk will lower risk, and increase capacity to cope.

Chronic, periodic and acute stresses are increasing, creating interacting compound stresses, which together create cumulative stress. When an acute stress event occurs on top of a higher level of chronic and periodic stress, the threshold in 'capacity to cope' is crossed (represented by a peak in the event crossing the floor in the central section of the diagram). As the intensity and frequency of acute stress (shock) events increases on top of increasing chronic and periodic stress, and these interact to create additional compound stresses, the capacity to cope is exceeded, and catastrophic disaster can occur (as shown on right hand side of the diagram)(adapted from Resilient Queensland in Action p 55 (State of Queensland (Queensland Reconstruction Authority), 2020b)).

- Queensland government agencies work directly with regions and local governments to support 'functioning economies, connected communities, and healthy natural assets which are disaster resilient and adaptive to change', as expressed in a range of policy goals across several portfolios.

- All communities, economies and ecosystems are experiencing different types of underlying stresses – slow-acting chronic stresses and periodic stresses – as well as more visible acute stresses.

- The compound stresses (shown in pink) represent the cascading and interacting consequences, recognising that these can be more than the sum of the contributing stresses.

- The 'on-ground' consequences are depicted above the 'capacity to cope' floor on the diagram.

- Acute stresses due to natural hazards have always been part of Queensland's experience. When an acute event occurs that causes the local capacity to cope to be exceeded, then disaster is declared and disaster response arrangements are activated.

- Disaster response and recovery in Queensland has been increasing in capability and effectiveness, but the chronic, periodic, acute and compound stresses are also increasing in frequency or magnitude.

- The implications of the increasing compound stress combined with increasing frequency, magnitude, extent (and in some cases intensity) of acute events are profound. It means that not only the capacity for disaster response will be exceeded due to catastrophic events, but also that of governments, societies and economies more broadly.

Step changes to the way that chronic, periodic, acute and compound stresses and shocks are managed. Adapting, and building resilience will increase the collective 'capacity to cope' and will help regions, communities and economies to deal with the inevitable natural hazard events and other disruptions that will occur in the future (adapted from p 55 Resilient Queensland in Action (State of Queensland (Queensland Reconstruction Authority), 2020b)

- The implications of the increasing frequencies, magnitudes, and nature of different types of stresses are well recognised in contemporary approaches internationally, nationally and in Queensland.

- In the past, most effort was on characterising the risks posed by each hazard, and finding mitigations that could be enacted by individual organisations. Contemporary approaches recognise systemic risk – that which emerges from compound stresses, and which no one organisation or level can individually manage. This requires a very different approach.

- Some aspects of risk (exposure and vulnerability) are currently managed by individual State agencies, and this will help reduce specific risk (or build specified resilience).

- Compound stresses and systemic risks – and the responses required to manage them – are   beyond the remit and control of any one organisation, level of government or sector of private enterprise, or community. They can only be addressed by taking co-ordinated collective action across all of these actors.

Chapter 5 A systems approach to create pathways to 'Do better' or 'Do differently'

Changing the 'mental models' of decision-makers is key to supporting systemic change, but it is challenging to communicate useful complex systems narratives.

To assist this, we provide a flexible 'storyboard' for the overarching systems narrative, where the diagrams can be used one by one to tell the story in a generic way, providing elements of the story that can be mixed and matched by the user to tell their own stories consistently within a bigger picture.

The narrative outlines how the system works. The recent period of relative prosperity and stability has been based on prioritising outcomes that are valued very differently when they are abundant compared to when they are threatened or lost (for example, clean water and air, or provision of essential goods and services). The cumulative choices and decisions that are made in times of relative stability contain the seeds of vulnerability to disaster.

Given the current trajectories for climate change and other chronic stresses, many systems will be unable to continue delivering the outcomes that people value. In this context, there are three different pathways (ways of thinking, deciding, acting) to choose – 'Doing things the same', 'Doing things better', and 'Doing things differently' – and each has quite different outcomes, points of intervention, decisions and actions.

Although there are some parts of the system that may be able to continue to deliver on goals by 'doing the same', the inevitable changes and disruptions of the future mean that effort must be substantially shifted to the 'doing things better' and 'doing things differently' pathways.

Narrative 2 A systems approach is needed – understanding cause and effect, points of leverage, and three pathways ('Doing the same', 'Doing better' and 'Doing differently') to create futures that are disaster-resilient and adaptive to change.

- People, as individuals or groups, hold many diverse values and prioritise things of value differently, depending on the context.

- There are often tensions in these values, so that trade-offs need to be made according to priorities at individual, group or societal levels.

- Decisions and actions at individual and societal levels reflect complex processes in which tensions in different values and knowledge types are managed and trade-offs are made. Decisions are only likely to be adaptive and effective where values, rules and knowledge align.

- Cumulative choices about values, rules and knowledge shape our systems (e.g. systems for supplying food, water and energy, and for providing services in health, finance, etc).

- The system works well in times of stability and prosperity (especially for those in a position to benefit from current system configurations), but harbours the seeds of vulnerability to disruption.

- The world now faces rapid, unprecedented change.

- When disruptions happen – particularly compound ones from interacting shocks such as the bushfires followed by the coronavirus – the system experiences cascading impacts, and can suffer catastrophic damage to lives, livelihoods, infrastructure and ecosystems.

- During a disaster, communities, businesses and government agencies tend to work well together with clear priorities (for example for primacy of life). After disaster however, there is a set of choices about the pathways forward, and people prioritise what is valued differently.

- In a 'Doing the same' pathway, recovery aims to re-establish the status quo as quickly as possible to replace what was lost or damaged. This reinforces existing vulnerabilities.

- In a 'Doing better' pathway, reconstruction focusses on 'betterment' of infrastructure, and improved preparedness of communities and businesses. Of course there are also efforts to do things better before a

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disaster and while this all helps, it does not fundamentally change the structure of the system and therefore the vulnerabilities remain.

A systems approach is needed – understanding cause and effect, points of leverage, and three pathways ('Doing the same', 'Doing better' and 'Doing differently') to create futures that are disaster-resilient and adaptive to change.

- In a 'Doing differently' pathway, post-disaster recovery periods create windows of opportunity for using the shifts in what is valued, or in what has been lost, to create large, transformational changes.

- People commonly reprioritise or gain a new understanding of what they value when life is disrupted.

- Understanding how values shift when life is disrupted is vital for reconfiguring our systems so that they better support what really matters to us in times of crisis.

- A shift in values can create the need for new, and perhaps different kinds of knowledge, and motivate the development of new formal and informal rules.

- These changes will enable systems to be restructured or reconfigured quite differently, and if done well can lead to cascading opportunities while limiting cumulative risk and cascading negative impacts.

- This will help to create more sustainable systems which that are resilient to disasters and adaptive to future shocks, and serve shared, long-term societal values whether there is a disaster or not.
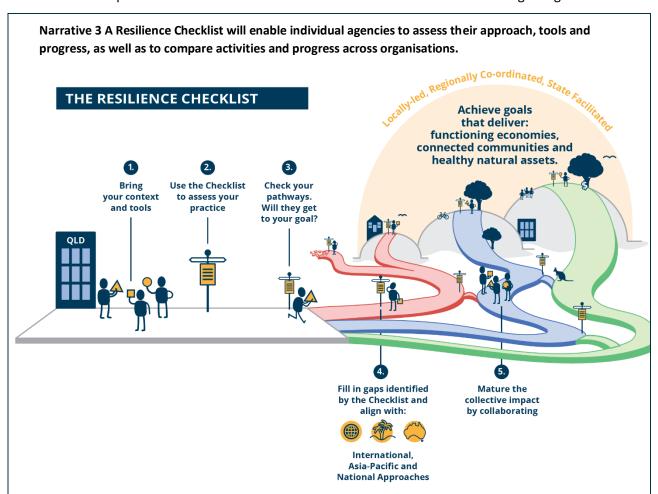
Chapter 6 A Resilience Checklist – to support co-ordinated practice and collective action

The advice from the stakeholder interviews, and the workshops were that a new tool for 'how to do…' resilience would not be helpful nor adopted, due to the plethora of existing approaches. Instead, they supported an approach which would enable and support self-assessment of current tools and practices as

well as comparison across agencies and organisations, guiding everyone to decisions and actions with the desired collective outcomes.

The Resilience Checklist was developed as a response to the needs that were elicited from project participants. It provides a set of checklist items which can be used to provide complementary guidance to organisations without them having to replace existing approaches.

Level 1 of the Checklist is a simple entry point for people and organisations, and provides six high-level items based on 'activities' or 'processes' which are likely to support achieving the seventh item which is based on 'outcomes' of conferring resilience attributes upon a system in support of achieving goals. Level 2 of the Checklist expands on each of these items in more detail to allow a more thorough diagnosis.

Narrative 3 A Resilience Checklist will enable individual agencies to assess their approach, tools and progress, as well as to compare activities and progress across organisations.

THE RESILIENCE CHECKLIST

Locally-led, Regionally Co-ordinated, State Facilitated

Achieve goals that deliver: functioning economies, connected communities and healthy natural assets.

1. **Bring your context and tools**

2. **Use the Checklist to assess your practice**

3. **Check your pathways. Will they get to your goal?**

QLD

4. **Fill in gaps identified by the Checklist and align with:**

International, Asia-Pacific and National Approaches

5. **Mature the collective impact by collaborating**

The use of the Resilience Checklist by individual organisations to check their own approaches, and form the basis for collaboration and collective action.

- Why is the Resilience Checklist needed? Across many policy areas of Queensland there are common aspirations for achieving similar outcomes.

- There is, however, a need to improve the technical coherence and co-ordination around the practices of resilience, adaptation, disaster risk reduction, economic development and transitions, and integrated planning, while still allowing for the varied interpretations of definitions and tools/method that different organisations already have.

- Queensland State agency stakeholders do not need another tool for 'how to do' resilience and adaptation, as there are already multiple approaches in play. The Resilience Checklist provides the guidance to co-ordinate practice.

- The Resilience Checklist supports organisations in a range of ways to reach common goals.

Chapter 7 Using the Resilience Checklist in a staged approach to complement new governance for co-ordinated service delivery by State agencies

Collaboration and redefined responsibilities will be needed across all of Queensland's State agencies – including central agencies and those that have not previously included climate and disaster within their remit – to action the management of systemic disaster risk and building resilience under the National Disaster Risk Reduction Framework. It opens the door for Queensland State agencies to work together in new and different ways at state level, as well as with the Federal government, local and regional organisations, NGO's and the private sector.

People and organisations at all levels in the public and private sectors are at different stages on a journey towards effective systemic risk reduction. The Resilience Checklist has been designed to be useful at any stage on that journey.

The Checklist can be used independently by individuals and groups to check whether their current tools, practices and pathways reflect good resilience planning practice and adequately support pathways for 'doing differently'. This enables some coordination simply by fostering shared understanding of resilience practice requirements.

The Checklist can also be used more systematically and effectively as part of a new collaborative governance approach. For example it could be used to compare practices and needs across agencies, identify opportunities for pooling resources to better support common needs, identify and fill gaps and inadequacies, make proposed actions more directly comparable to enable sequencing and prioritisation of investment and actions, streamline or unify language, and reduce the cognitive and resource burden across a range of organisations beyond the State agencies. If it is to be useful in supporting collective action, it will require distributed governance mechanisms and appropriate organisational support (including the mandate and resources) for the cross-agency co-ordination effort.

Narrative 4: The Resilience Checklist can complement the creation of new ways of interacting and governance mechanisms for co-ordinating State government service delivery.

Experience on the ground

Treasury/Industry

Disaster Management

Health/Social Services

All Agencies

CURRENT STATE GOVERNMENT SERVICE DELIVERY
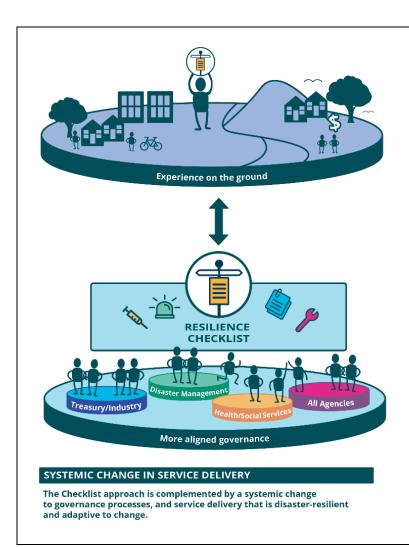
Different tools and processes used by each state agency/portfolio. Necessary to meet specific portfolio challenges and needs but can overwhelm people to communities and regions.

Currently each State agency works with regional/local levels with their own agency-specific tools and processes. The different approaches, tools, priorities used by each of the agencies have understandably evolved to deal with specific contexts and challenges within each domain or sector. The on-ground experience for those needing to engage with all of these tools simultaneously can be confusing and overwhelming.

Experience on the ground

RESILIENCE CHECKLIST

Treasury/Industry

Disaster Management

Health/Social Services

All Agencies

MORE COMMON PRACTICE, AND CO-ORDINATED SERVICE DELIVERY

There are common features of 'systemic risk' across portfolios. A common approach - a Resilience Checklist - can be individually applied by agencies to complement their existing approaches and tools.

The Resilience Checklist can be used to check current tools, practice and pathways: agencies could use the Checklist independently to assess their own goals, methodological approaches, alignment opportunities and pathways forward, resulting in some increased consistency of approach.

In the future, the Resilience Checklist could be used to support more formalised cross-agency co-ordination and collaboration, if supportive governance structures are created.

Typically, achieving collective impact requires distributed governance, and an organisation or mechanism for cross-agency responsibilities and mandates that can support the process of change.

Experience on the ground

RESILIENCE CHECKLIST

Treasury/Industry · Disaster Management · Health/Social Services · All Agencies

More aligned governance

SYSTEMIC CHANGE IN SERVICE DELIVERY
The Checklist approach is complemented by a systemic change to governance processes, and service delivery that is disaster-resilient and adaptive to change.

Chapter 8 Conclusions and next steps

The work is intended to support decision makers, advocates and champions of resilience, adaptation, disaster risk reduction, regional planning and community services with narratives that can be 'mixed and matched', and visual and text elements that can be contextualised. This is a novel element of this work.

The use of the Checklist can be used to support collaborations between Queensland State agencies and a range of other actors to:

- check whether the methodological approaches and tools they are using are consistent with the practices that will be necessary to meet the challenges of climate change and other major disruptions;

- compare practices and promote learning across organisations, and create opportunities to find gaps, duplications and synergies for example in the State-wide rollout of resilience strategies, deeper coordination of the climate adaptation, disaster risk reduction, and broader integrated planning and investment initiatives for land use and infrastructure and economic development, and planning delivery of a range of social services in health, housing.

There are emerging public- and private-sector led initiatives promoting investments that proactively mitigate disaster risks and enable adaptations to climate change (for example, the National Disaster Risk Reduction Framework, the Taskforce on Climate-related Financial Disclosures (TCFD), and Environmental,

Social and Governance (ESG)). These recognise the need for, and are incentivising, actions that can be undertaken at scale to contribute to delivering national/regional priorities. Queensland can gain both efficiencies in its' own management of responses to, as well as the potential benefits from these initiatives through improving its cross-agency and multi-level coordination around resilience.

Many of the practices and options that could be enabled could create new capabilities for navigating complex trade-offs and for prioritising options that yield system level-benefits across all sectors and scales, with fewer unintended outcomes. It could support the inclusive identification and implementation of a suite of options – spanning small or no changes through to large system change, and ensure that the initial scoping or specification of projects or investments is sufficiently open to promote the development of necessary 'Doing better' and 'Doing differently' pathways, and confer qualities/attributes of resilience in the system. It can help to build capabilities and capacities of individuals and agencies to consider future risks early in decision processes and promote low regrets decision making.

1   Future pathways - disaster-resilient, adaptive to change

1.1   Introduction

The changes in climate, and the escalating scale of disasters in recent decades are underscored by cumulative impacts of chronic stresses and changes, as well as acute events. The only way to avoid worsening outcomes is to work across the whole system – communities, infrastructure, goods and services, economies and natural assets – to understand the causes and effects of cumulative, cascading and compound risk, and to address them by taking collective action.

This will require adapting governance so that public and private organisations, and the communities they serve, have clear roles and responsibilities to support decisions about future goals, and pathways to reach them. These pathways need to help people reach goals in a resilient and adaptable way, successfully navigating the inevitable future shocks and hazardous changes ahead. Co-ordinated collective actions are necessary to address systemic risk.

Evidence-based narratives that use inclusive language and framings and connect events through stories can help to make sense of complex problems and solutions. Combined with tools which focus on actions and practice, narratives are a powerful way to cut through sector specific jargon and tropes, and inspire people to see new ways of thinking and deciding. This report provides written and visual narratives to shape new ways of making sense of complex problems and how to address them. The narratives are intended for use by Queensland State agency staff at a range of levels. The narratives are for explaining system risk and how to address it to a range of their own stakeholders at different levels of government, as well as in business and community.

This report presents a 'Resilience Checklist' – a list of system level guidances – for assessing whether planned actions support a stepping away from current 'locked in' pathways and forge new ones to reach desired goals in resilient and adaptable ways.

Lastly, this report reflects on the need for coordinated collective action and identifies how a consistent, coherent approach to resilience can deliver outcomes of broad benefit to Queensland.

1.2   Goals for Queensland

Setting clearly articulated goals is a critical step in any change process – so that it is not 'change for change sake'. Goals for the state of Queensland are expressed in different words or terms by different policies, sectors or agencies, but there is a consistency across the aspirational goals, for example:

- *Queensland Strategy for Disaster Resilience*: 'Through the Strategy we are committed to the continued delivery of programs and initiatives that help to build safe, caring and connected communities, create jobs and a diverse economy and protect our precious natural environment';

- *Queensland Climate Transition Strategy*: 'Pathways to a clean growth economy': 'an innovative and resilient Queensland that addresses the risks and harnesses the opportunities…We will make the transition to a low carbon, clean growth economy in a way that secures new jobs and opportunities for Queenslanders, supports and strengthens our communities, and protects our natural environments';

- *Queensland Fire and Emergency Services (QFES)* is: 'tasked with creating safe and resilient communities and to minimising the impact and consequences of emergencies on the people, property, environment and economy of Queensland';

- *Queensland Climate Adaptation Strategy (Q-CAS)*: 'provides a framework for ensuring an innovative and resilient Queensland that manages the risks and harnesses the opportunities of a changing climate. The Q-CAS is centred around a partnership approach that recognises that climate change is everyone's responsibility, and that a collaborative approach is needed to ensure resilience is embedded in Queensland's diverse economies, landscapes and communities.'

The most relevant focus areas of policy for different agencies is revisited in Chapter 6, but for the purpose of this report, the long term goal of Queensland State agency stakeholders has been summarised from a range of policy documents, interviews and workshops as:

'supporting functioning economies, connected communities, and healthy natural assets which are disaster resilient and adaptive to change'.

The narratives and Resilience Checklist provided in this report aim to support all these efforts to be better co-ordinated in delivering the common goal above.

1.3   Background to this project

In 2017 the Queensland Reconstruction Authority (QRA) updated the *Queensland Strategy for Disaster Resilience*, initially developed in 2014, to incorporate climate change risk and deliver a comprehensive, all-hazards approach to building disaster resilience throughout Queensland.

The Strategy aligns with the *Sendai Framework for Disaster Risk Reduction 2015-2030* and provides an overarching framework to empower Queenslanders to factor in resilience measures and activities as they anticipate, respond and adapt to changing circumstances.

In May 2018, QRA released *Resilient Queensland 2018–21 – Delivering the Queensland Strategy for Disaster Resilience* as the state-wide, whole-of-government implementation plan to strengthen Queensland's resilience to natural disasters, with the objective to make Queensland the most disaster resilient state.

Resilient Queensland was developed in consultation with State agencies, the private sector and local governments to coordinate the state-wide delivery of the *Queensland Strategy for Disaster Resilience*. It is a whole-of-government response to disaster resilience that involves better coordination of government policy, information management, project delivery and stakeholder collaboration.

The engagement phase (2018-2021) of *Resilient Queensland* has concluded. The emphasis in this phase was to:

- catalyse and sustain collective action towards better integration, increased capability, and actionable outcomes for practitioners and the people of Queensland;

- test methodologies for regional resilience strategies as part of a locally-led, regionally-coordinated and state-facilitated model. This involved running pilots for the Brisbane River Strategic Floodplain Management Plan and five regional resilience projects with relevant local governments and other key stakeholders.

As outlined in a recent progress report *Resilient Queensland in Action* (State of Queensland (Queensland Reconstruction Authority), 2020b), there is now an implementation phase, which will comprise two steps:

- a state-wide roll-out of regional resilience models to support regional and local implementation;

- deliver the program designed during the first step.

In August 2019, QRA engaged CSIRO to work with State agency stakeholders to explore how best to co-ordinate efforts for building resilience (including adaptation and transformation) and support the 'state-wide roll-out' of *Resilient Queensland*. The process and products of the CSIRO project will help provide some of the collaborative mechanisms and approaches to support the state-wide roll out.

1.4   Objectives of the project

The project as originally conceived was to deliver:

- a consultation or co-design process that ensured that the products would be useful across all State agencies to harmonise approaches;

- a 'compelling narrative' about the importance of resilience for Queensland;

- a 'resilience framework' for Queensland.

These steps were intended to provide a more consistent understanding and application of the concept of resilience across State agency stakeholders and what this means in a pragmatic way in terms of the vision, goals, objectives and decision criteria across agencies in Queensland. The consultation process led to a Resilience Checklist being delivered rather than a resilience framework, as explained further below.

1.5   Approach to meeting the objectives

1.5.1 A review and consultation process

A process of review and consultation, and participatory co-design for this project included:

- a process of review of existing policies and approaches in Queensland as well as resilience assessment approaches being applied internationally;

- a series of semi-structured interviews exploring the framings of concepts of resilience, adaptation, transition, and disaster risk reduction; current activities and exploration of what needs to happen next (Interview Insights report (Measham et al., 2020));

- a stakeholder workshop (20-21 Feb 2020) to test and further develop the narratives identified from the analysis, elicit further discussion about what was being done, and what still needed to be done to achieve outcomes. The workshop was designed using the principles represented in the Checklist itself – for example there was an appropriately wide scope to support the magnitude of change required; a range of stakeholders from inside and outside of the target audience of Queensland State agencies, across a range of levels of government and a couple from the private sector; created a safe, ethical and creative dialogue space; and used a systems framing and thinking;

- building on workshop outcomes that development of another 'how to …' tool or framework for resilience was not desired across agencies because there are already so many. Instead, there was an expressed interest in showing how best to build on what was already in place and provide clear guidance on how best to harmonise, and co-ordinate (Checklist Technical Report (O'Connell et al., 2020));

- using workshop outcomes to develop a 'Checklist' of actions that need to be done in a co-ordinated way across agencies to achieve the short- and longer-term outcomes desired by State agency stakeholders under the banner of 'functioning economies, connected communities, and healthy

natural assets which are disaster resilient and adaptive to change' (Checklist Technical Report (O'Connell et al., 2020));

- reviewing, and where appropriate, drawing from a range of international, national and State-based methodologies for resilience, adaptation, disaster risk reduction to develop a Resilience Checklist (Checklist Technical Report (O'Connell et al., 2020));

- testing the progress and ideas at a second stakeholder online workshop (3 June 2020) (Checklist Technical Report (O'Connell et al., 2020));

- working individually with some stakeholders to test the utility of narratives, supporting diagrams, and the 'Checklist' approach.

1.5.2 Developing a 'compelling narrative' for Queensland

Narratives are increasingly important as a way to help catalyse systemic change (e.g. Monbiot, 2017, Berns et al., 2013, Marshall, 2015). There is a wealth of evidence about the ways in which stories help create sense and meaning for people, and thus are an important way to support decision-making. The seminal works on systems thinking (e.g. Meadows, 2008, Senge, 1990, Sterman, 2000) emphasise the role of mental models in effecting systems change.

The ideas being conveyed are complex and nuanced, so the task of providing a 'compelling narrative' was approached in a novel way in this project. This report presents narrative elements comprising combinations of diagrams and text presented in a specific format, which can be modified and combined as required.

In developing narratives, the aim was to ensure that they were:

- based in logic supported by science and evidenced by previous studies;

- sufficiently inclusive to be relevant across State agencies;

- able to be used and customised by State agencies to reflect their own contexts, approaches and support their interactions with their own stakeholders;

- collaboratively designed with a representative group of primary audiences for the narrative;

- using inclusive language that states what is being done without relying on the different interpretations of different people or communities of practice.

Four narratives are embedded in this report. They are presented as elements of diagrams with accompanying text explanations in the format of

Bold lead sentences
  o   bullet points with further detail and examples.

This format enables easy construction of summaries using the core text narratives by using only the bold text (as is done in the Executive Summary), and the flexible addition of context specific examples as bullet points.

The visual elements can be mixed and matched with text, simplified and customised for agencies to use in their own communications if they wish.

There is no hierarchy between the diagrams and text – they are both equally necessary in conveying narratives, and the diagrams are an important tool for reflecting specific interpretations of the narrative. The authors have tested and validated these perspectives with a range of audience members. The final diagrams are thus tailored to the needs and preferences of the audience.

In elevating some narratives about the role of resilience in Queensland, it is also important to diminish the power of some existing ones that no longer serve the agencies, business or communities well. For example, the commonly expressed dichotomy between 'top-down' (referring to government driven) and 'bottom-up' (from the grassroots community) processes is widely used in language and diagrams, but this dicohotomy is no longer helpful in explaining or visually representing the compounding and interacting stresses, nor many ways in which agencies are now interacting with regions and communities. The narratives in this report offer an alternate expression that is more reflective of the current mode of operation - i.e. one of state-level functions that are designed to support locally-led decisions for regions, cities, communities, economies and ecosystems. This is expressed as place-based visual elements, with the 'machinery of government' in a supporting role. Visual storytelling amplifies and makes accessible the narratives, providing a medium by which to transfer those stories without losing the intended meaning. Through their use, the elements become visual artefacts or memes that start to shift the way people visualise, think about and narrate their systems, thus aiding the objectives of building resilience, adapting to change and reducing disaster risk.

It is widely accepted that taking a systems approach is necessary to solve most of the complex problems facing society. But representing the systems complexity of cause and effect, feedbacks, interdependencies and cascading outcomes visually and in narratives remains challenging. The visual narratives seek to build capability across government, business, community, and champions and advocates for resilience to do this better.

1.6   Target audience for report

The target audience for this report is Queensland State agency staff, champions and advocates who are not necessarily specialists in the methodologies behind applying resilience, adaptation, disaster risk reduction tools, but need to be able to explain some of the complex systems concepts and why they are important to a range of their stakeholders. This report does not contain technical details – they are in accompanying reports.

1.7   Outline of the project products and this report

1.7.1 The project products

The report presents an overview of the logic and work completed in this project, focussing on the narratives. There are several complementary products:

1. The report 'Key insights on resilience: Conversations with Queensland State agencies'. Agency stakeholders were interviewed to gain key insights into what different agencies are already doing, what they consider still needs to be done, and the barriers and enablers. These interviews helped to target the design of the methods and products of this project (called Interview Insights report throughout this report (Measham et al., 2020)).

2. 'A Resilience Checklist – a guide for doing things differently and acting collectively: a Technical Report from CSIRO to Queensland Reconstruction Authority' (called Checklist Technical Report (O'Connell et al., 2020)).

3. Resilience Checklist excel file.

1.7.2 Outline of this report

Each of the chapters in this report represents different but related and interdependent narratives.

Chapter 1 Future pathways - disaster-resilient, adaptive to change describes the background to the project commissioned by QRA. The three objectives were to consult with Queensland State agencies to harmonise approaches; provide a 'compelling narrative' about the importance of resilience for Queensland; and a 'resilience framework' for Queensland. The consultation process led to a Resilience Checklist being delivered rather than a resilience framework.

Chapter 2 Key insights from interviews synthesises a series of confidential interviews across the State agencies, which set the scene for further exploration of how key agency stakeholders would like to move forward and therefore shaped the project methods, as well as the key narratives.

Chapter 3 Resilience, adaptation, and disaster risk reduction – a set of related concepts provides a simple explanation of some of the key concepts underpinning this work, how they relate to each other and how they are used in different communities of practice. These framings are important for those coming from a particular perspective on how these terms are used, but the narratives use language and terms that are agnostic to the disciplinary framings.

Chapter 4 Chronic stresses and acute events cause compound, interacting risks and cascading impacts (narrative 1). This narrative explores the interaction between chronic and episodic stresses, and how they lead to cumulative and systemic stress. When an acute stress occurs, the threshold of 'capacity to cope' is breached. The responsibilities for managing the different stresses lie across diverse sectors and levels, and therefore multiple agencies and organisations have a vital role to play in reducing or preparing for reducing these risks.

Chapter 5 A systems approach to create pathways to 'Do better' or 'Do differently' (narrative 2). The narrative explores root causes and effects of disaster, and the points of intervention. It lays out three main pathways for action: 'doing things the same' (which reinforces systemic vulnerabilities and disaster risk); 'doing things better' (which creates improvements within existing systems), and 'doing things differently' (which creates options for transformed pathways that allow societal aspirations to be met in resilient and adaptable ways).

Chapter 6 A Resilience Checklist – to support co-ordinated practice and collective action (narrative 3). The Checklist itemises the methods and practices that are most likely to underpin a transition to the 'doing things differently' pathway. The Checklist can be used to assess methods or tools, as well as their applications in projects or planning processes. It can be used to support learning, identification of gaps and overlaps and synergies within or across organisations. The full rationale and explanation of the Checklist is provided in a separate Technical report (O'Connell et al., 2020)

Chapter 7 Using the Resilience Checklist in a staged approach to complement new governance for co-ordinated service delivery by State agencies (narrative 4). Using the Checklist to support decisions and practice that move towards 'doing better' and 'doing differently' pathways would be useful at the level of individual organisations, but could be enhanced by appropriate new structures, processes or cultures of collaboration across organisations.

Chapter 8 Conclusions and ways forward: The narratives and Checklist represent a novel approach, still in early stages of development. This approach to resilience could create new capabilities and support co-ordinated collective action for navigating complex trade-offs and prioritising options that yield system level-benefits across all sectors and scales, with fewer unintended outcomes.

1.8 Key messages from this section

- The changes in climate, and the changing nature of disruption and escalating scale of disasters in recent decades are underscored by cumulative impacts of chronic stresses and changes, as well as acute events. The only way to avoid worsening outcomes is to work across the whole system – communities, infrastructure, goods and services, economies and natural assets – to understand the causes and effects of cumulative, cascading and compound risk, and to address them by taking collective action.

- This will require adapting governance so that public and private organisations, and the communities they serve, have clear roles and responsibilities to support decisions about future goals, and pathways to reach them. These pathways need to help people reach goals in a resilient and adaptable way, successfully navigating the inevitable future shocks and hazardous changes ahead. Co-ordinated collective actions are necessary to address systemic risk.

- Queensland Reconstruction Authority contracted CSIRO to deliver:

  - a consultation or co-design process that ensured that the products would be useful across all State agencies to harmonise approaches;

  - 'compelling narratives' about the importance of resilience for Queensland – which are presented as narrative elements combining diagrams and text;

  - a 'resilience framework' for Queensland – which through consultation with a range of organisations was changed to a 'Resilience Checklist'.

- The target audience for this report is Queensland State agency staff, advocates and champions who are not necessarily specialists in the methodologies behind applying resilience, adaptation, disaster risk reduction tools, but need to be able to explain complex systems concepts and why they are important to a range of their stakeholders. This report does not contain technical details – they are in accompanying reports.

- There are common aspirations across many policy areas of Queensland, summarised from State agency stakeholder workshops and perusal of the policies as:

  'functioning economies, connected communities, healthy natural assets which are disaster resilient and adaptive to change' delivered via a policy philosophy of 'state facilitated, regionally co-ordinated, and locally led planning processes'.

2 Key insights from the interviews

This chapter summarises the findings from a series of structured conversations with Queensland State agencies, which were used to help frame the narratives, and methods for further engagement during the project. The details are presented in the Interview Insights report ((Measham et al., 2020).

2.1 Approach

From September to October 2019, CSIRO conducted 13 interviews and received one written response to interview questions. The majority represented agencies on the Queensland Resilience Coordination Committee (QRCC) and in most cases were nominated to participate by their Director General. Two additional interviews were conducted with agencies that were also considered critical to advancing State-level engagement with Resilient Queensland. Interviews were conducted in person or by phone with an interviewer and an additional CSIRO team member to take notes. Interviews followed a semi-structured format and took between 45 minutes and 1.5 hours.

Detailed notes were taken at each interview and written up as interview summaries. In addition, with the consent of interviewees, audio recordings were made of most of the interviews. Analysis of the interview summaries was based on the 'Adaptive Theory' approach (Layder 1998), checking the extent to which the interviews built on existing knowledge (rather than fully inductive coding approach). The analysis of the interviews was conducted to meet the multiple purposes of the project, namely 1) to engage with QLD agencies and listen to their perspectives, 2) to inform the next phase of the project and inform future action and 3) to uncover key insights from the interviewees about resilience and how Queensland agencies work together.

2.2 Nine inter-connected themes

In summary, the interview team identified nine inter-connected themes:

1. **The Narrowing Window for Preparedness, Recovery and Learning:** It is recognised that the increasing duration of the disaster season is putting significant pressure on an already strained disaster management system, and this can be expected to continue. As the disaster season spans a greater part of each year, the time for learning, reflection, preparation and policy development decreases because agencies are disproportionately focused on responding.

2. **Shared Responsibility:** Reducing disaster risk requires everyone to take responsibility, within their means, and there needs to be clarity in roles and responsibilities. During response time, agencies have a clear understanding of their responsibilities. Beyond these established roles during familiar circumstances, responsibility becomes more ambiguous.

3. **Resilience-as-Usual:** Resilience has multiple meanings, and the most common interpretations of resilience included building back better, maintaining business continuity, returning to business-as-usual. There is general support for this type of resilience because it appears to address visible, tangible aspects of disaster risk. This is a relative comfort zone for resilience discussions.

4. **Resilience as 'Doing Differently':** Beyond the comfort zone is a more systemic definition of resilience, which involves longer-term thinking and planning and revisiting assumptions and values: in short, doing things differently, not just the same things better. Moving towards a 'next generation' version of

resilience by doing things differently implies connections and collaboration between agencies and sectors to support each other and avoid unintended or maladaptive cross-sectoral impacts.

5. **Action Under the Radar:** Much of what is needed to achieve resilience as 'doing differently' may occur under different names and not necessarily be called 'resilience building' actions, and includes exercises, activities, capability building, relationship and network building that generate crucial trust and are very consistent with building resilience.

6. **Camouflaged Constraints:** In addition to broadly acknowledged constraints such as resources, funding or ambiguity over responsibility, the interviews brought to light a set of constraints which were camouflaged in some way. For example, citing 'resource constraints' may sometimes obscure an underlying issue of not always knowing what actions to take.

7. **High Stakes:** from political walk-throughs during emergency response through to prioritising policies to reduce future risk, disasters and resilience are high stakes political issues. Disasters present key opportunities for visibility in the public eye, and for some agencies disasters produce an 'operational imperative' – the need to be seen to be doing something, because of the lack of visibility for the work agencies typically do on the ground.

8. **Resilient Queensland: Digging Deeper:** The interviews highlighted that all agencies are aware of the Resilient Queensland Plan. Some were highly familiar with the plan and engaged with it closely. Those who saw it as useful said it helped them to focus their efforts on the most effective ways to work towards resilience in their area and design programs and access resources to deliver outcomes expressed in the plan. However, others were only loosely familiar with it, and some indicated that the plan doesn't yet have much traction in their agencies. This was because the plan was seen to be too abstract, too disconnected from their own agencies' work, too-narrowly owned (e.g. by QRA rather than all agencies), or was challenging to effectively report against.

9. **Engaging with Resilient Queensland:** Participants would like to see the plan evolve to make more use of it as a mechanism for engagement across a wider suite of stakeholders. It could play a large role in helping to discuss roles and coordination across government and beyond. In addition, the plan could become more tangible and action oriented. It could set clearer deliverables and standards with measurable objectives in a more comprehensive way than it currently does.

A more detailed summary of these themes with illustrative quotes is in the Interview insights report (Measham et al., 2020). Figure 5 illustrates how these themes cluster around four concepts, and the emerging key messages. While each of the interview themes helps to illuminate unique perspectives on resilience held by the State agency participants, together they begin to reveal a larger, connected narrative. For example, 'Narrowing Window for Preparedness, Recovery and Learning' theme argues for the need for 'Shared Responsibility' in a changed context of disaster management and resilience (Key Message 1). At the same time these two themes are collectively linked to the inertia preventing agencies working together: everyone is so busy performing their core functions that they simply cannot look around to see what others are doing and envision more collaborative ways of working. Together these themes also help to explain why agencies may continue to operate in an 'Resilience As Usual' mode (key Message 2), further entrenched by 'Camouflaged Constraints' in a context of 'High Stakes', which is perpetuating the barriers to a more harmonious resilience approach, but points to ways to dismantle these (Key Message 3)[1].

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[1]In the initial synthesis of themes, Key Message 4 was left unidentified, as it was expected to emerge from engagement with a wider group of participants and agency representatives, and was therefore defined following the stakeholder workshop in February 2020.
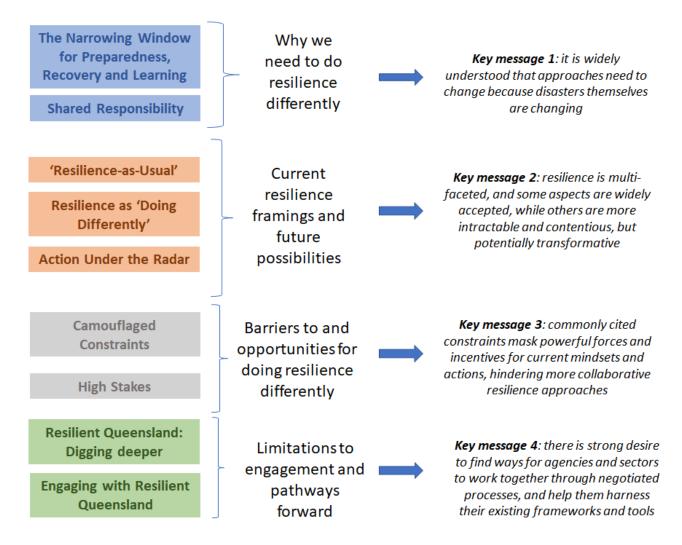
Figure 5. Clustering of interview themes around four concepts, which support four key messages.

2.3　Key messages from this section

- Interviews with State agency participants confirmed an acceptance that resilience approaches need to change to keep pace because disasters themselves are changing.

- The multi-faceted nature of resilience as a term and concept is acknowledged – some aspects are widely accepted, while others are more intractable and contentious, but potentially transformative.

- Interview participants identified that there are barriers to and opportunities for doing resilience differently. Commonly cited constraints mask powerful forces and incentives that reinforce current mindsets and actions, hindering more collaborative resilience approaches

- They expressed a strong desire to find ways for agencies and sectors to work together through negotiated processes, and harnessing their existing frameworks and tools in a more co-ordinated and mutually supportive way.

3 Resilience, adaptation and disaster risk reduction – a set of related concepts

This chapter explores the key concepts and terminology used in the report. The framing is important to help bridge the conversations between different areas of policy and communities of practice.

3.1 The key concepts

Climate adaptation and disaster risk reduction both aspire to building the resilience, adaptability and transformability of systems' components and capabilities in order to maintain a 'safe and just operating space' (Rockström, 2009, Raworth, 2018, Leach et al., 2013) in which societal goals can be pursued in spite of shocks and disruptions.

3.1.1 Resilience

Informal use of the term 'resilience' implies that resilience is always a good thing. In more formal research literature, 'resilience' is neither good nor bad, and it is simply a property of the system. For example, a vicious cycle reinforcing poverty (poverty trap) or dictatorship can be highly resilient to change but undesirable. Our work is framed to accommodate both formal and informal usage by encouraging awareness of different interpretations and requiring clarity about what is meant by the terms 'resilience', 'adaptation' and 'transformation' in specific contexts.

Some interpretations of 'resilience' imply trying to keep things the same, or to 'bounce back' to a prior state. But sometime this is just 'digging the hole deeper'. It may not be possible to mitigate or repair certain changes once tipping points and thresholds are reached, for example if sea level rise overtops affordable coastal defences. A broader concept of resilience includes the capacity to plan, prepare for, adapt and make deliberate changes to a system *before* disruptive events, and absorb, recover and adapt in their aftermath. If policy and management documents and tools provide clarity about goals that are defined by stakeholder values and aspirations, then concepts of resilience, adaptation and transformation can be used to identify what can be maintained, what needs to be modified, and what will need to be transformed in order to meet those goals.

 More formally – for example in policy contexts – it helps to distinguish between 'specified' and 'general' resilience. Both these forms of resilience are useful and there are trade-offs between them:

- Specified resilience refers to the resilience of valued system outputs (e.g. goods and services such as clean water, electricity supply, agricultural production) to specified shocks or disturbances (e.g. cyclones, floods, heat waves). Assessing specified resilience involves identifying controlling influences and understanding any thresholds leading to unwanted or irreversible impacts. The underlying philosophy is that it is possible to mitigate identified risks or their impacts. Disaster risk reduction strategies commonly focus on building specified resilience, addressing questions of 'resilience of what, to what and for whom'.
- General resilience arises from system attributes (e.g. reserves, flexibility, good social networks) that confer resilience to diverse, even unforeseen shocks or disturbances. Assessing general resilience is particularly helpful for preparing for new and unexpected risks, such as many emergent systemic risks. The underlying philosophy is that it is not possible to specify all threats. Risk-reducing factors often come from institutions and initiatives that do not appear in disaster management plans. For example, good population health supports vital capacities and enables more response options no

matter what kind of risk is being faced, and yet this is not usually an explicit motivation for public health programs. Indicators of general resilience include: adaptive system governance (e.g. decision making operates within deliberate, adaptive learning frameworks that foster innovation, nested at different scales); various sources of 'functional diversity' (e.g. multiple supply chains, alternative groups of trained volunteers, etc.) that provide multiple ways for essential needs to be fulfilled; and stocks of diverse kinds of capital (natural, built, human, social and financial) with reserves that provide buffering capacity.

Usually it makes sense both to build specified resilience to known risks, and to build general resilience for unforeseen and systemic risks; it is also important to ensure that the building of specified resilience does not undermine general resilience. Configuring systems to optimise on an objective with a narrow focus – for example economic efficiency rather than wider societal goals – is likely to undermine both forms of resilience.

3.1.2 Adaptation and disaster risk reduction

Adaptation involves deliberate planning to exercise situational awareness and preparedness to change course in response to new knowledge or events. Adaptation planning should be a participatory process involving envisaging possible futures, anticipating key decision points in the future and ensuring current decisions will enable new, desirable options for future decision makers. Effective adaptation activities are conducted in ways that foster multi-loop learning. Learning loops include: 'single loop' learning, which is about learning how to improve existing processes ('Are we doing things right?'); 'double loop' learning, which involves questioning whether existing processes are still appropriate and learning about alternatives ('Are we doing the right thing?'); and 'triple loop' learning, which involves reflecting upon how problems and solutions are framed and by whom and exploring alternatives ('How do we decide what's right?') (Australian Government (Department of Home Affairs), 2019b).

Disaster risk reduction is about reducing and preventing disaster risk, as well as managing residual risk that cannot be avoided. It involves reducing the hazards themselves, reducing our exposure and vulnerability to them, and increasing our capacities to adapt. The National Disaster Risk Reduction Framework sets out four priorities: understanding disaster risk; accountable decision-making; enhanced investment; and improved governance, ownership and responsibility. While a familiar focus is on the protection of specific assets in the face of known hazards (specified resilience), disaster risk reduction includes building general resilience and paying attention to 'systemic risk'. Systemic risk is where entire systems upon which society depends (e.g. supply chains, telecommunications, rule of law) are jeopardised by combinations of individual threats, disruptions or failures, perhaps due to cascading failures through networks of dependencies (e.g. bushfires closing roads, thus preventing tourism which drives businesses bankrupt) or nonlinear amplification through feedback loops (e.g. mild anxieties driving food hoarding meaning more people panic buy, resulting in rural communities running out of food). Systemic risk reduction is particularly challenging due to the unpredictable outcomes in our highly connected systems.

3.1.3 The complementary agendas

There are complementary agendas between several concepts (mitigation, adaptation, disaster risk reduction, sustainable development goals and resilience), and the programs, policies and other initiatives that are there to implement them (as simply illustrated in Table 1).

Table 1 Complementary agendas across major concepts and initiatives (modified from resilience concepts in the City Resilience Index toolkit (ARUP and Rockefeller Foundation, 2017))

Mitigation	Adaptation	Disaster Risk Reduction	Sustainable Development	Resilience
Acting to avoid or reduce the severity of something negative like emission of pollution	Modifying current practices or assets to limit the impacts of climate change and other future hazards	Aims to reduce the damage caused by natural hazards like earthquakes, floods, droughts and cyclones through an ethic of prevention	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs	The capacity to plan, prepare for, adapt and make deliberate changes to a system before disruptive events, and absorb, recover and adapt in their aftermath

3.2 Terminology and definitional differences between communities of practice

Different people, organisations or communities of practice use terms quite differently, which can lead to tension, confusion and fragmentation or duplication of effort. For example, some interpret resilience as keeping the system the same (maintaining or persisting); others interpret it as also accommodating a small amount of change (incremental change or adaptation); still others emphasise the potential for large transformational change to a different system (Figure 1). On this basis, some will exclude themselves from resilience initiatives because of their own perception of a narrow definition, even if that initiative frames itself according to a broader definition. This report employs the concept of resilience as working across the full spectrum of system change, and embraces the terms adaptation and transformation.

Figure 1 can be used to help groups focus their discussion on what the magnitude and nature of system changes required to reach goals, rather than arguments about the terminology *per se*.
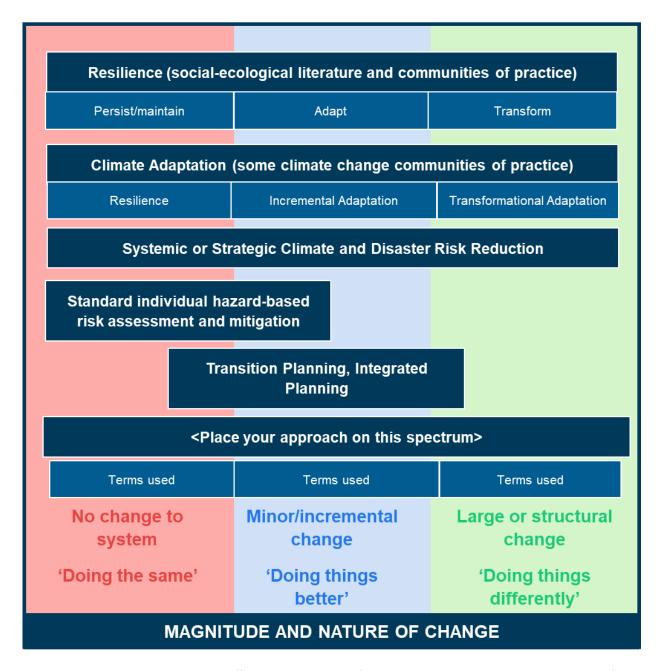
Figure 1 How terminologies used by different communities of practice map to the magnitude and nature of systems change. This diagram can be used to support discussions by asking people to place their approaches on the spectrum of change, and nominate the terms that are used to describe this level of change (rather than arguing which particular term is 'correct').

3.3 Key messages from this section

- If policy and management documents and tools provide clarity about goals that are defined by stakeholder values and aspirations, then concepts of resilience, adaptation, transformation and disaster risk reduction can be used to identify what can be maintained, what needs to be modified, and what will need to be transformed in order to meet those goals.

- This report presents concepts in terms of the ways of thinking and doing for the magnitude and nature of change needed to reach the desired outcomes of 'functioning economies, connected communities, and healthy natural assets which are disaster resilient and adaptive to change'. This is in order to be useful to guide co-ordinated practice for those who use different definitions or terminology.

4 Chronic stresses and acute events cause compound, interacting risks and cascading impacts

This chapter explores the different underlying stresses that are driving an increase in risk, and increasing the likelihood of catastrophic disaster. The existing and changing roles of State agencies in managing the stresses and risks is introduced in this chapter. A deeper look at the causes, feedbacks, points of interventions and pathways forward is presented in Chapter 5, and further exploration of responses in Chapters 6 and 7.

Large, rapid and novel change is inevitable in Queensland, now and into the future. Some causes of change are beyond the control or influence of decision makers in Queensland, with consequences that require a management response. Many of the drivers and problems are systemic and therefore affect many agencies and sectors, and can only be solved by collective, co-ordinated action – yet most agencies go through their own process of problem framing and developing solutions within the remit of their portfolio responsibilities. Until recently, dealing with climate issues was seen as the responsibility of the environment sector, and disasters the responsibility of the emergency management sector. But this is changing as the understanding about the interaction of chronic stress, acute events, and emergence of compounding risks and cascading impacts becomes better understood. Narrative 1 explores these issues.

4.1 Narrative 1 part a): Chronic, periodic and acute stresses combine and amplify to create systemic risk, leading to the potential for catastrophic disaster
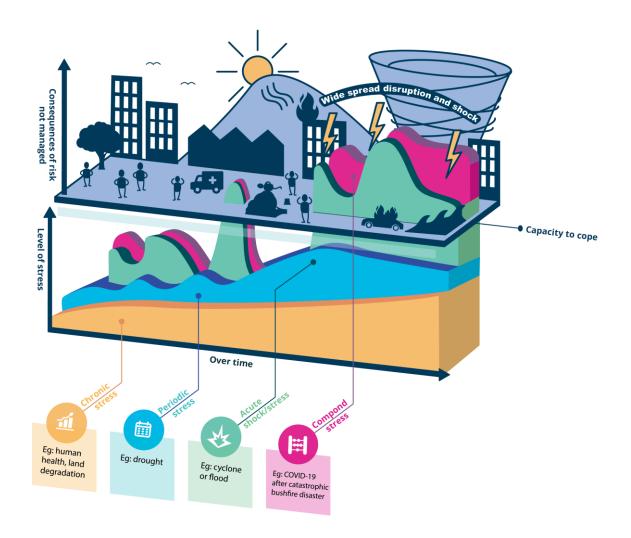
Figure 2 Chronic, periodic and acute stresses are increasing, creating interacting compound stresses, which together create cumulative stress. When an acute stress event occurs on top of a higher level of chronic and periodic stress, the threshold in 'capacity to cope' is crossed (represented by a peak in the event crossing the floor in the central section of the diagram). As the intensity and frequency of acute stress (shock) events increases on top of increasing chronic and periodic stress, and these interact to create additional compound stresses, the capacity to cope is exceeded, and catastrophic disaster can occur (as shown on right hand side of the diagram)(adapted from Resilient Queensland in Action p 55 (State of Queensland (Queensland Reconstruction Authority), 2020b)).

Queensland government agencies work directly with regions and local governments to support 'functioning economies, connected communities, and healthy natural assets which are disaster resilient and adaptive to change', as expressed in a range of policy goals across several portfolios.

- This sense of the Queensland Government supporting place-based goals in a way which is locally-led, regionally-coordinated and state-facilitated is illustrated as the top layer of the graphic in Figure 2 (and subsequent figures).

All communities, economies and ecosystems are experiencing different types of underlying stresses – slow-acting chronic stresses, and periodic stresses – as well more visible acute stresses.

- Chronic stresses (shown in orange) are increasing slowly, caused by trends in socio-economic, demographic and health drivers (for example population growth and ageing, and increasing socio-economic inequalities, chronic disease such as obesity and diabetes, or land degradation and biodiversity loss). These issues are managed by a range of government portfolios related to health, housing, planning, education and other community services, environment, planning and regional development.

- Periodic stresses (shown in blue) include increasingly frequent and/or extended events such as droughts (causing stress on for example food production, farming communities and regional towns and large cities), extended heatwaves impacting on health and mortality as well as on performance of some types of infrastructure. These stresses fall within the remit of some portfolios more than others, for example those responsible for agriculture and food, or water supply.

- Acute stresses (shown in green) often manifest in events like bushfire, flooding and cyclones.

The compound stresses (shown in pink) represent the cascading and interacting consequences, recognising that these can be more than the sum of the contributing stresses.

- If chronic stress is combined with, for example a drought and a bushfire, the compound stress is more than the linear sum of these individual stresses due to non-linear interactions, cascading consequences and thresholds which, if exceeded, can lead to catastrophic disaster and permanent, irreversible change.

- A slow chronic stress can manifest as an acute event if it reaches a threshold – for example housing prices and mortgage sub-primes were a chronic stress which became an acute event with the Global Financial Crisis in 2009.

- The diagram (Figure 1) shows how the stresses are ramping up, and in particular that the compound stress is disproportionately increasing and looming much larger. On the right of the diagram, the 2019-2020 situation of a lengthy severe and extensive drought, compounded by bushfire disasters and then the pandemic means that the compound stress which flows from the economic consequences is much higher and longer than the acute stresses themselves.

The 'on-ground' consequences are depicted above the 'capacity to cope' threshold on the diagram.

Acute stresses due to natural hazards have always been part of Queensland's experience. When an acute event occurs that causes the local capacity to cope to be exceeded, then disaster is declared and disaster response arrangements are activated.

- In Queensland, a disaster is defined as "serious disruption in a community, caused by the impact of an event, that requires a significant coordinated response by the State and other entities to help the community recover from the disruption" (State of Queensland, 2020). Disaster response is managed as set out within the Queensland Disaster Management Arrangements (State of Queensland, 2020).

- Acute events (such as those caused by a cyclone or flood), may be within the capacity of Local Disaster Management Groups, emergency services and other relevant agencies to respond and manage.

- Depending on the scale or extent of the event, their capacity can be exceeded and when this happens they can call on District Disaster Management Group and if also exceeded, response flows in turn to the State Disaster Co-ordination Group. The disaster management capacity is depicted as the space between the dotted line trigger threshold, and the collective 'capacity to cope'.

- Recovery is managed by a wider set of State agencies and other entities.

Disaster response and recovery in Queensland has been increasing in capability and effectiveness, but the chronic, periodic, acute and compound stresses are also increasing in frequency or magnitude.

- This threatens the sustainability and wellbeing of Queensland's environments, people and socio-economic activities and lifestyles. A major disruption will have cascading impacts through Queensland and can even create Australia-wide impacts.

The implications of the increasing compound stress combined with increasing frequency, magnitude, extent (and in some cases intensity) of acute events are profound. It means that not only the capacity for disaster response will be exceeded due to catastrophic events, but also that of governments, societies and economies more broadly.

The higher probability of more frequent and larger magnitudes of disaster means that:

- The resourcing, capabilities and mandates of agencies will be more stretched and unable to deliver on their objectives. For example, the capacity of the disaster management sector to prepare and respond to hazards and disasters will be exceeded more frequently as the effectiveness of their existing risk treatments decline (Crosweller, 2015).

- The resilience and capacities of individuals or communities to cope, respond to and recover from disruption and disaster will be increasingly exceeded as stressors intensify, coincide, accumulate and compound. For example, massive numbers of simultaneous fires can spread firefighters too thinly to be able to respond, while repeated flooding eventually means insurance premiums become unaffordable.

4.2 Narrative part b): Changing roles, responsibilities and approaches to managing chronic, periodic and systemic risk will reduce risk, and increase capacity to cope
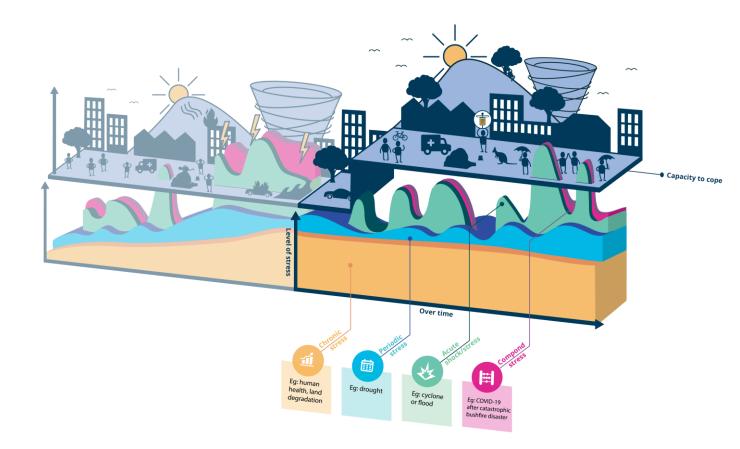
Figure 3 Step changes to the way that chronic, periodic, acute and compound stresses and shocks are managed. Adapting, and building resilience will increase the collective 'capacity to cope' and will help regions, communities and economies to deal with the inevitable natural hazard events and other disruptions that will occur in the future (adapted from p 55 Resilient Queensland in Action (State of Queensland (Queensland Reconstruction Authority), 2020b)

The implications of the increasing frequencies, magnitudes, and nature of different types of stresses are well recognised in contemporary approaches internationally, nationally and in Queensland.

- Terms 'stress' and 'risk' are composite measures, and do not make explicit which elements are contributing the most to, for example, the total risk rating in a risk assessment. The underlying chronic stresses have a 'boiling frog' effect, and contribute to compound thresholds and systemic risk.

- Risk is viewed as the intersection between the following elements:

    o Hazard – a source of potential harm or a situation with a potential to cause loss;

    o Exposure – the elements within a given area that have been, or could be, subject to the impact of a particular hazard. Exposure is also sometimes referred to as the 'elements at risk';

    o Vulnerability – the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

- The focus of contemporary disaster management is moving beyond the current ones such as preparedness, responses to disaster events, or improving annual 'risk-based pricing' of insurance premiums.

In the past, most effort was on characterising the risks posed by each hazard, and finding mitigations that could be enacted by individual organisations. Contemporary approaches recognise systemic risk – that which emerges from compound stresses, and which no one organisation or level can individually manage. This requires a very different approach.

- In 2019, the Australian Government released the National Disaster Risk Reduction (NDRR) Framework as a strategic and policy foundation to address systemic climate and disaster risk. The Council of Australian Governments endorsed the NDRR Framework in March 2020.

- The NDRR Framework recommends that people whose organisations or communities may be affected by major disruptions take a significantly more systemic approach to those risks and vulnerabilities, rather than focussing on individual and proximate risks and mitigations.

- In Queensland, this is reflected in many of the policy areas related to disaster management, for example *Resilient Queensland*, and the *Queensland Emergency Risk Management Framework*. However, the full implications of what this means in practice – for example the new roles and responsibilities that need to be carried across all of the State agencies – have not yet been fully recognised and embraced.

Some aspects of risk (exposure and vulnerability) are currently managed by individual State agencies, and this will help reduce specific risk (or build specified resilience).

- It is not possible for State agencies to influence the hazards *per se* – for example chronic ones such as population growth and ageing, periodic ones such as drought, or acute ones such as heatwaves or cyclones.

- It is possible, however, to address stresses and risks related to exposure and vulnerability aspects – for example, chronic ones such as increase in diabetes and obesity can be addressed through preventative health measures (shown by the orange colour block levelling out); drought stresses and impacts can be reduced through management of primary production, food and water supply chains (shown by the flattening of the blue curves); and acute ones through improvements in disaster response management.

- Each agency goes through separate processes to define problems, managing individual aspects and delivering services related to portfolio responsibilities, and (as shown by the interviews) many agencies' day-to-day work can and does contribute to disaster risk reduction.

Compound stresses and systemic risks – and the responses required to manage them – are beyond the remit and control of any one organisation, level of government or sector of private enterprise, or community. They can only be addressed by taking co-ordinated collective action across all of these actors.

This will require:

- reducing systemic risk across all sectors (illustrated by the pink line staying closer to the upper limit of the acute stress as the new ways of doing things take effect);

- making step changes to the collective capacity to cope given the inevitable chronic and periodic stresses and changes, as well as acute events such as cyclones, bushfires, pandemics which lead to disaster (Illustrated by the step up in the threshold – of course a simplified representation of time, indicating rapid change rather than a single change);

- ramping up complementary efforts across different levels of government, the private sector, and communities to better diagnose and treat the systemic risk;

- coordinating across agencies with siloed responsibilities and revisiting existing objectives and governance mechanisms.

4.3 Key messages from this section

- There are chronic and periodic stresses which combine with the more acute stresses (shocks) to create systemic stress and risk. When an acute event occurs, the disaster management arrangements are activated for response and recovery.

- As the specific and stresses and shocks as well as the systemic risks increase, the disaster response capacity and the collective capacity to cope will be exceeded, and this will lead to catastrophic disaster.

- Currently, State agencies go through separate processes to define problems, managing individual aspects and delivering services related to portfolio responsibilities, but many agencies' day-to-day work can and does contribute to disaster risk reduction.

- The resourcing, capabilities and mandates of agencies will be more stretched in the future, and they will be unable to deliver on their objectives unless there is coordination across silos and a reassessment of existing objectives.

- Co-ordinated action will be necessary to address the stresses and aspects of risk related to exposure and vulnerability, adapt to the changing circumstances, while also building the collective capacity to cope.

- Acute events will still occur, but the damage, loss and suffering will be reduced. The remainder of the report explores ways to do this.

5 A systems approach to create pathways to 'Do better' or 'Do differently'

In the previous chapter the importance of underlying chronic, periodic and acute stresses and systemic risk was introduced, and the relationship with portfolio based roles and responsibilities of Queensland State agencies was explored. In this chapter, system view of cause and effect, points of intervention and the nature of interventions is illustrated, and three alternative pathways to planning the future are presented as a narrative.

There is a rich history of efforts to bring systems thinking into day-to-day decision making in government, business and community settings, using narratives including:

- 'system archetypes' to help people recognise universal patterns in systems (e.g. 'fixes that fail' or 'tragedy of the commons' and see Kim (1994));

- metaphors such as 'bathtubs' (Sweeney and Sterman, 2000) to understand systems concepts like feedbacks, stocks and flows for people with limited mathematical background;

- games such as Jay Forrester's 'Beer Distribution Game' developed in the 1950s as a playful way to understand the counter-intuitive impacts of supply chain dynamics (Sterman, 2005).

In the evidence-based narrative presented in this chapter, the generic diagrams and text provide a template which can be used for organisations to contextualise to reflect their own portfolios, constituencies, framings and tools. See Australian Government (Department of Home Affairs) (2019b) and the references therein for more on the approach embedded in this narrative.

5.1 A systems approach is needed – understanding cause and effect, points of leverage, and three pathways ('Doing the same', 'Doing better' and 'Doing differently') to create futures that are disaster-resilient and adaptive to change

The triple bottom line approach has been a well-established way of thinking – a well-used narrative – about balancing the 'pillars' of the environment, society and economy. The pillars can be traded off against eachother, with the implication that if any of the pillars fails, the whole will suffer. An alternative is shown in Figure 4. It is based on a hanging sculpture by Bjordam (2017), and shows an important and powerful reframing of this narrative where the economy is a plane suspended from and dependent on society, which is in turn suspended from the environment. If the environment fails then the life support system is removed. Of course this is oversimplified because there are important feedbacks between these three, and there are other more sophisticated framings – for example see the nested image of 'strong' sustainability in Griggs et al. (2013), or the 'doughnut economics' of Raworth (2018) which shows the 'safe and just operating space' bounded by environmental limits and a social foundation. In the current report, the authors have used the Bjordam (2017) framing, because this most profound system dependency is so frequently underplayed and overlooked.
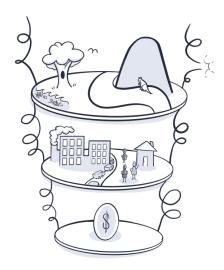
Figure 4 Critical system dependencies - environment, society, economy (Inspired by Tone Bjordam sculpture (Bjordam, 2017))

Not only are the broad systems of environment, society and economy interdependent, but there are myriad sub-systems for food, water, energy, communications, finance, health and more (Australian Government (Department of Home Affairs), 2018, O'Connell et al., 2018a). The extent to which these systems meet the needs of society is very sector- and context dependent. Systems with 'just-in-time' supply chains or service provision, and other tightly linked interdependencies may work in 'normal' times, but are vulnerable to disruptions that can create Australia-wide vulnerabilities to catastrophic disaster – as was manifest in 2020 with bushfires and COVID-19. So how should these complex linkages be communicated?

One of the most important ways to support systemic change is by changing the 'mental models' that decision-makers have about how the system works (Meadows, 2008). Participants of resilience planning workshops often highlight the insights they gain from systems thinking (Maru et al., 2017, O'Connell et al., 2018b), but it is quite challenging for decision-makers, leaders and communicators to tell complex systems narratives that are coherent, relevant to their context and simple enough to communicate effectively to a range of audiences. It's an attempt to provide flexible elements of the story that can be mixed and matched by the user to tell their own stories in a way which builds the bigger picture in a coherent way.

5.2 Narrative 2 A systems approach is needed – understanding cause and effect, points of leverage, and three pathways ('Doing the same', 'Doing better' and 'Doing differently') to create futures that are disaster-resilient and adaptive to change

Reinforcing vulnerabilities
Doing Things the Same

Beginning the journey
Doing Things Better

People have held values, and value things differently

Values are in tension

V.R.K
Dominant values are codified as 'rules' supported by knowledge

Which drive cumulative choices forming typical system patterns

Current system works in times of stability and prosperity but seeds vulnerability

Disaster!

TRANSPORT and COMMUNICATION
ENERGY
FOOD
WATER
JOBS
HEALTH and SOCIAL SERVICES

Doing things the same

Doing things better

Figure 5 Doing things the same, and doing the same things better after disruption reinforces existing vulnerabilities

People, as individuals or groups, hold many diverse values and prioritise things of value differently, depending on the context.

- People have different foundational or held values, and these are usually stable. However, they also assign value to things, and relationships.
- Examples include physical things such as buildings and technological infrastructure (e.g. the internet), and relationships between people, or between humans and nature. People also value non-physical things such as a sense of security, harmonious relationships, income and helpful customer service.

There are often tensions in these values, so that trade-offs need to be made according to priorities at individual, group or societal levels.

- The trade-offs in values and choices are made partly by individuals, families, communities and other informal groups; and partly through the actions of formal groups such as all three levels of government, businesses and other organisations.
- For example, there is tension between prioritising a prosperous now, over a prosperous future; or individual interests over collective benefits; tangible assets over intangible things such as a feeling of safety; stability over change; liberties over regulation; or people/development over nature.
- Priorities change between periods of stability and periods of disruption (for example before, during and after catastrophic disaster).
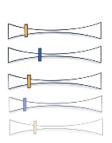
Decisions and actions at individual and societal levels reflect complex processes in which tensions in different values and knowledge types are managed and trade-offs are made. Decisions are only likely to be adaptive and effective where values, rules and knowledge align.

- The values of individuals are reflected in 'rules' at a societal level that codify, simplify, or provide common 'guidelines' for society at large.

- For decisions to be credible, legitimate and legal, decision makers need: knowledge of the nature of change, response options and the implications of both; values to assess the options in terms of their legitimacy and feasibility; and rules that enable implementation.

- All sorts of institutions, or 'rules' exist to codify, simplify, or provide common 'guidelines' for society at large. These 'rules' can take many forms – from informal cultural 'norms' (e.g. washing hands before eating) through to formal laws and policies and regulations from government, incentives, consultation processes, business plans, codes of conduct, building and planning codes and processes. They are informed by knowledge, which then intersects with the values and the rules.
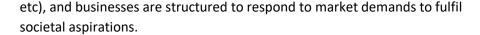
Cumulative choices about values, rules and knowledge shape our systems (e.g. systems for supplying food, water and energy, and for providing services in health, finance, etc).

- Various facets of these systems are managed by government departments according to sector or portfolio areas (e.g. health, transport, agriculture

etc), and businesses are structured to respond to market demands to fulfil societal aspirations.

- The systems of governance and market forces that usually flourish under a stable and prosperous system tend to hold a 'Business as Usual' pattern of reinforcing the prevailing systems.

The system works well in times of stability and prosperity (especially for those in a position to benefit from current system configurations), but harbours the seeds of vulnerability to disruption.

- The characteristics of our economy, society and environment at any moment in time represent a 'snapshot' of the outcomes of ongoing societal processes. This diagram is a representation of the current state of the system.
- There has been a period of relative stability and prosperity in Australia and globally, but 'slow burn' issues such as climate change, driven by prioritising a certain set of values, mean that many parts of the earth system (for example the climate, biodiversity) or social systems (for example inequitable societies) have breached or are close to thresholds of irreversible change (as represented by the springs' holding the discs becoming more stretched and tenuous.

The world now faces rapid, unprecedented change.

- The system is experiencing increasing instability due to a range of chronic stresses and changes which reach interacting thresholds. This is explored in more detail in Chapter 4).
- Extreme natural hazard events are inevitable, and there is an increasing chance of multiple events at once or in close succession, amplifying impacts.

When disruptions happen – particularly compound ones from interacting shocks such as the bushfires followed by the coronavirus – the system experiences cascading impacts, and can suffer catastrophic damage to lives, livelihoods, infrastructure and ecosystems.

- Acute events such as the severe Cyclone Debbie in 2017, or the bushfires in 2019, closely followed by the COVID-19 pandemic in 2020 reveal the vulnerabilities that have been seeded during 'normal' times.

- The critical dependencies show in the diagram are evident – the economy crashes if society is faced with a pandemic. The ultimate dependence of society and economy on the environment means that if the environment reaches thresholds where it is unable to maintain or recover ecosystem function at global scale, society and economy will be unable to function. These system failures will occur not just because of one dimension of stress or risk, or one acute event, but because of the underlying systemic risk which amplifies through the system.

During a disaster, communities, businesses and government agencies tend to work well together with clear priorities (for example for primacy of life). After disaster however, there is a set of choices about the pathways forward, and people prioritise what is valued differently.

In a 'Doing the same' pathway, recovery aims to re-establish the status quo as quickly as possible to replace what was lost or damaged. This reinforces existing vulnerabilities.

- Actions such as rebuilding the same infrastructure; relying on specifications or planning processes that are not adapting to changing hazard risk profiles or previous experience; recovery plans which continue or exacerbate societal inequalities; or resuming supply chains which may have failed in disruption all risk reinforcing vulnerability to the next extreme event.

In a 'Doing better' pathway, reconstruction focusses on 'betterment' of infrastructure, and improved preparedness of communities and businesses. Of course there are also efforts to do things better before a disaster and while this all helps, it does not fundamentally change the structure of the system and therefore the vulnerabilities remain.

- An example of 'Doing things better' before a disaster at a regional scale in Queensland is shown in the Mary Regional Resilience Strategy. An inclusive process was used to explore the values that the region wished to maintain and promote as a vision. A systems approach was taken to co-ordinating actions and decisions, and integrating the planning processes and implementation programs (State of Queensland (Queensland Reconstruction Authority), 2020a).
- 'Doing things better' after a disaster usually includes an increase in the knowledge component (often by virtue of inquiries, Royal Commissions and other investigations), and this may translate to useful changes in 'rules' – which may range from policy revisions, building standards, or changes in cultural norms around preparedness or jurisdictional responsibilities around disaster management (for example see Lukasiewicz et al. (2017).
- This may lead to some changes in the way that systems are configured, but do not usually translate to major structural changes; more typically it amounts to adjusting existing systems to work better, but core vulnerabilities to catastrophic disaster remain.
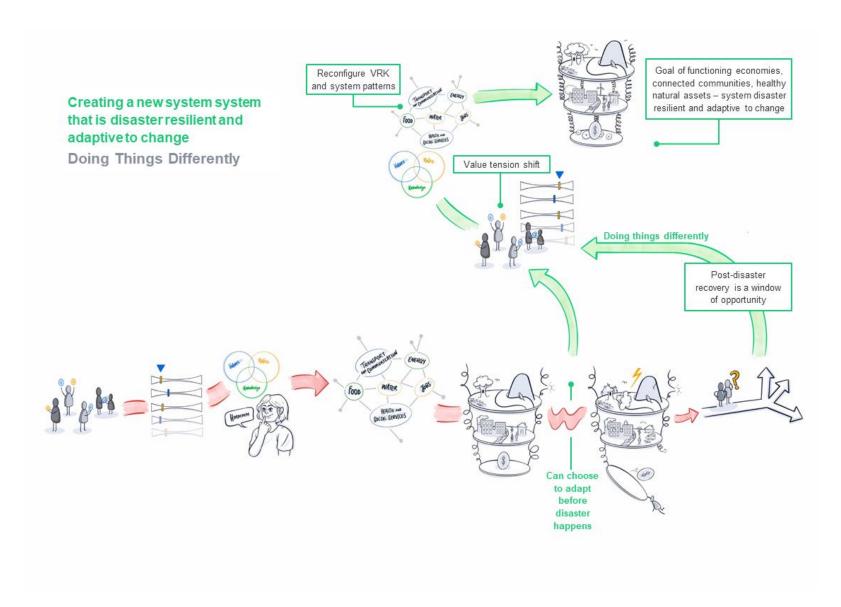
Figure 6 Doing things differently to restructure and adapt systems to the change and instability will reach towards the goal of 'functioning economies, connected communities, healthy natural assets – disaster resilient and adaptive to change'

	In a 'Doing differently' pathway, post-disaster recovery periods create windows of opportunity for using the shifts in what is valued, or in what has been lost, to create large, transformational changes. • There are also opportunities to make interventions and alter activities prior to catastrophic events, altering the system to reduce vulnerability and increase capacity to live successfully with extreme hazard events. But there is often an inertia and lack of recognition from people of what is valued in a crisis, and it is harder to make changes prior to shocks.
	People commonly reprioritise or gain a new understanding of what they value when life is disrupted. • Disasters such as the bushfires, or disruptions such as COVID-19 show clearly that during disruption the things that people value are reprioritised. Examples include: during 2019 and 2020, people have valued clean air and water, or food, energy and medical supply chains, or reliable telecommunications that are usually taken for granted; and essential workers who are usually not visible or valued.
	Understanding how values shift when life is disrupted is vital for reconfiguring our systems so that they better support what really matters to us in times of crisis. • For example, valuing a safe place to live over the amenity of living close to forest or beach, or valuing having some buffer and reliable supply chains over cost minimisation are usually recognised as important during and after disruption.
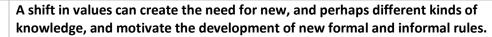
	A shift in values can create the need for new, and perhaps different kinds of knowledge, and motivate the development of new formal and informal rules.
	
	• Often the options for what is feasible in future, given the current trajectory, lie outside of the current 'option space' for current decision makers. In this case, large change in decision-making structures or processes may necessary. For example it is known what areas will be impacted by sea level rise, and more knowledge will not solve the problem. Rather, barriers to acting on that knowledge are because no one organisation is 'in charge'; the planning rules and ways that coastal homes and infrastructure is valued do not incentivise retreat as a viable option.
	• However, there are examples of where large changes have been, or are being made:
	    o A local scale example from Queensland is the relocation of the whole town of Grantham after a flood devastated the town in 2011 not only required a shift in the formal responses (Okada et al., 2014) but also in the values, mindsets and cultural aspects of town and regional residents and businesses (Fidler and Kanowski, 2020).
	    o Examples of national scale changes include New Zealand's recent move to a Wellbeing budget (Government of New Zealand, 2019) – a

	structural shift in the objectives, approach and measures of progress at a national scale will drive many flow-on system changes. o A global database for COVID-19 recovery plans that multisolve for economic recovery, equity and climate is collating emerging plans from around the world to seed ideas and capture progress on pathways to transformational change (Climate Interactive, 2020).
	These changes will enable systems to be restructured or reconfigured quite differently, and if done well can lead to cascading opportunities while limiting cumulative risk and cascading negative impacts. • For example, the sorts of changes that are happening in the finance, legal and insurance sectors have the potential to start influencing many of the systems that provide for food, water, energy, transport and communications; services such as health, education and other social services; or behaviours and social processes such as governance and planning. • Currently, the changes are around disclosure of climate and disaster risk, and changes in rules around this (for example see (Australian Government, 2019, Task Force on Climate-related Financial Disclosures, 2020). • The flow on consequences of this will include changing the access to finance and credit; credit ratings for a range of organisations, states or even countries; cost and access to insurance for homes, infrastructure and other assets; and liability for those who do meet fiduciary responsibilities in taking adequate account of financial risk. • In combination with economic disruptions and the recovery effort that will be needed during and after the pandemic, manufacturing and supply chains may be reconfigured so that cost minimisation is rebalanced with national or local supply security, agility and buffers to deal with demand surges (e.g. as with medical and other essential supply chains). This potentially opens up many new opportunities for Australian industries, which can cascade through to the wider economy.
	This will help to create more sustainable systems which that are resilient to disasters and adaptive to future shocks, and serve shared, long-term societal values whether there is a disaster or not.

5.2.1 Example of a contextualised narrative using the 'systems narrative' storyboard.

This is an example of using the storyboard to tell the story of why and how QRA has changed, and will continue to change, the way that it is implementing *Resilient Queensland*.

Story 'beat'	Narrative
	• QRA was set up in 2011 following a string of acute events, which resulted in the entire state being impacted in some form during that 'summer of disasters'. • Since the establishment of the QRA, Queensland has been impacted by more than 80 significant natural disaster events with a reconstruction program for public assets of more than $15 billion.
	• In the early days of QRA, post disaster recovery focussed on 'building back the same' to repair the loss and damage. • There were rules around access to recovery funding that meant that this option was the only viable one. This did not, however, take account of the increasing risk profiles for climate-related hazards – for example the increasing frequency and intensity of flood events meant that building infrastructure back to the same engineering specifications maintained the vulnerability.
	• Recognising the changing risk profiles, there have been some important changes at national level with the National Disaster Risk Reduction Framework, and the associated funding reforms that support the ideas of 'doing better' and 'doing differently'.
	• The work conducted now by the Queensland Resilience Coordinating Committee (QRCC) is working effectively towards the objective of 'building back better' the infrastructure, with new standards less vulnerable to projected future hazard risk profiles, as well as a range of resilience-building activities in communities.
	• The next steps will be towards enhancing the 'doing better' pathways while starting to build the cross-agency capability for 'doing differently'. • This means understanding systemic climate and disaster risk; what is valued, by whom and how it may be lost in climate change or disaster; and how to work in an inclusive way with a range of stakeholders at national, regional and local levels to reconfigure systems through the state-wide roll-out of Resilient Queensland. QRA will collaborate across agencies to support 'functioning economies, connected communities, and healthy natural assets which are disaster resilient and adaptive to change'.

5.3   Key messages from this section

- Changing the 'mental models' of decision-makers is key to supporting systemic change, but it is challenging to communicate useful complex systems narratives.

- To assist this, a flexible 'storyboard' is provided for the overarching systems narrative, where the diagrams can be used one by one to tell the story in a generic way, providing elements of the story that can be mixed and matched by the user to tell their own stories consistently within a bigger picture.

- The narrative outlines how the system works. The recent period of relative prosperity and stability has been based on prioritising outcomes that are valued very differently when they are abundant compared to when they are threatened or lost (for example, clean water and air, or provision of essential goods and services). The cumulative choices and decisions that are made in times of relative stability contain the seeds of vulnerability to disaster.

- Given the current trajectories for climate change and other chronic stresses, many of systems will be unable to continue delivering the outcomes that people value. In this context, there are three different pathways (ways of thinking, deciding, acting) to choose – 'Doing things the same', 'Doing things better', and 'Doing things differently' – and each has quite different outcomes, points of intervention, decisions and actions.

- Although there are some parts of the system that may be able to continue to deliver on goals by 'doing the same', the inevitable changes and disruptions of the future mean that effort must be substantially shifted to the 'doing things better' and 'doing things differently' pathways.

6 A Resilience Checklist to support co-ordinated practice and collective action

In Chapter 2, key insights from State agency stakeholders were presented, and in Chapter 3, their various framings around the use of the concepts of resilience, adaptation, transition, transformation and risk were explored. Chapter 4 presented the different types of underlying stresses in the system and how these relate to portfolio roles and responsibilities. In Chapter 5 the system dynamics were explored, and three pathways for planning ahead were presented. This Chapter presents a 'Resilience Checklist' to help agencies take stock of their own approaches and pathways, and provide a basis for collaboration. The full rationale, Checklist and detail are presented in the Checklist Report (O'Connell et al., 2020).

The advice from the stakeholder interviews, and the workshops were that a new tool for 'how to do…' resilience would not be helpful nor adopted, due to the plethora of existing approaches. Instead, stakeholders supported an approach which would enable and support self-assessment of current tools and practices as well as comparison across agencies and organisations, guiding everyone to decisions and actions with the desired collective outcomes. The Resilience Checklist was developed as a response to the needs that were elicited from project participants. It provides a set of checklist items which can be used to provide complementary guidance to organisations without them having to replace existing approaches.

6.1 Some of the existing policy and planning approaches to resilience, adaptation and transition in Queensland that could benefit from greater co-ordination

Many State agencies have existing initiatives (a sample of the most relevant appears in Table 2) which share some common goals and aspirations and are pulling in the same direction. However, there are some issues to be considered, including:

- They are individually applied at regional and local they can lead to inconsistency, duplication, gaps and discrepancies because they are based on approaches using disparate framings, language, methods.

- The approaches have largely not been robustly tested to check whether they will deliver on the sorts of changes that will be necessary to achieve long term goals given the disruptions and challenges faced. Many approaches focus on protecting what is already there, or maintaining *status quo* or improvement in delivery of services.

- Existing governance arrangements have not been designed to enable decision-makers to diagnose and respond effectively to systemic challenges such as climate and disaster risks. As portrayed in Chapter 5 Narrative 2, societal vulnerabilities can be traced back to the values, rules and knowledge underpinning past decision-making.

- Cross-agency co-ordination will not be realised where it has not been valued as a priority (and therefore structured, resourced and incentivised), or if it is prevented by existing rules of engagement prevent (even if it is a stated priority). In these circumstances, societal outcomes requiring such coordination will not be realised, which creates a systemic vulnerability.

Systemic risks arise across portfolios (for example land use planning and zoning, disaster management, where and how infrastructure is built, education and training, health programs, agricultural and natural resource management, telecommunications, delivery systems (Australian Government (Department of Home Affairs), 2018), and thus there is benefit from taking a consistent approach for diagnosing and managing the risks.

Table 2 Overlapping approaches to resilience, adaptation, disaster risk reduction, emergency response planning, recovery in Queensland.

Approach	Product and level	Lead Agency	Framing and focus
Regional resilience strategies	Regional strategies (pilot projects)	QRA	Integrated planning approach Support the coordination and prioritisation of future resilience building and mitigation projects across Queensland Identify and prioritise actions to strengthen disaster resilience
Queensland Emergency Risk Management Framework (QERMF)	State-level framework and methodology	Queensland Fire and Emergency Services (QFES)	Provides a risk assessment methodology for the prioritisation, mitigation and management of risk Informs risk-based disaster management planning across the emergency management sector
Queensland Climate Adaptation Strategy 2017-2030 (QCAS)	State-level strategy	Queensland Department of Environment and Science (DES)	Coordinated approach to climate adaptation that recognises the state's exposure to a range of climate hazards and the great diversity of Queensland's communities, regions, natural environments and industries Sets out a sectoral planning process
Sector adaptation plans	Human health and wellbeing; Biodiversity and ecosystems; Tourism; Small and medium business; Industry and resources; Agriculture; Built environment and infrastructure; Emergency services	DES	Addresses the specific adaptation needs of Queensland's major economic sectors, and the biodiversity and ecosystems that support them. Developed in partnership with key stakeholders to facilitate inter- and intra-sectoral collaboration and identify and address common issues.
Pathways to a Clean Growth Economy: Queensland Climate Transition Strategy	State-level strategy; adaptation pathways for reaching future goals at regional level	DES	Outlines how Queensland proposes to prepare for a transition to reach zero emissions by 2050 and set itself on the pathway to meet this target, and to unlock opportunities for investment and innovation in a low-carbon global economy
Climate Risk Management Framework and Guideline for Queensland Local Governments	Framework - local level (draft)	Local Government Association of Queensland (LGAQ)	Provides a standardised overarching approach and detailed activities for progressing holistic understanding, management and responses to all current and future climate risk within a Local Government Area Integrates state-wide and regional strategies and plans, in collaboration with industry and broader community

6.2   A Checklist as a way forward

Other programs around the world have established Checklists to provide guidance for navigating complex systems, including Donella Meadows' list of 'leverage points' for systems change (Meadows, 1999). Atul Gawande's best-selling book, 'The Checklist Manifesto' is an example of both: compelling story-telling that highlights the tremendous value of Checklists in guiding professionals in all fields through complex, often life-threatening, situations (Gawande, 2010).

A Resilience Checklist was developed to enable individual agencies to assess their approach, tools and progress, as well as to compare activities and progress across organisations (dealt with further in Chapter 7). Narrative 3 provides a stand-alone explanation why a Resilience Checklist is needed, and what it does.

6.3   Narrative 3: A Resilience Checklist will enable individual agencies to assess their approach, tools and progress, as well as to compare activities and progress across organisations

Across many policy areas of Queensland there are common aspirations for achieving similar outcomes.

- Despite slightly different framing in sector-, portfolio- or policy- specific goals – it is clear that Queensland State agencies are pulling together in the same direction.

There is, however, a need to improve the technical coherence and co-ordination around the practices of resilience, adaptation, disaster risk reduction, economic development and transitions, and integrated planning, while still allowing for the varied interpretations of definitions and tools/method that different organisations already have.

Queensland State agency stakeholders do not need another tool for 'how to do' resilience and adaptation, as there are already multiple approaches in play. The Resilience Checklist provides the guidance to co-ordinate practice.

- Rather, guidance is required on
  - o   whether various approaches are able to deliver on the task of planning effective pathways to the desired future/goals, and
  - o   assessing the initiatives already at work, so as to know where and how to co-ordinate, and mature the approach to collective impact.

THE RESILIENCE CHECKLIST

1. **Bring your context and tools**

2. **Use the Checklist to assess your practice**

3. **Check your pathways. Will they get to your goal?**

Locally-led, Regionally Co-ordinated, State Facilitated

Achieve goals that deliver: functioning economies, connected communities and healthy natural assets.

QLD

4. **Fill in gaps identified by the Checklist and align with:**

International, Asia-Pacific and National Approaches

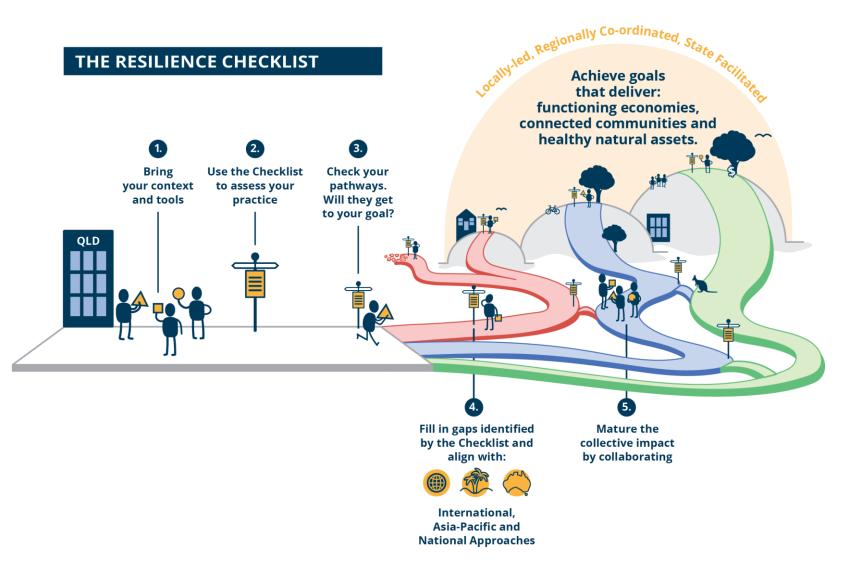5. **Mature the collective impact by collaborating**

Figure 7 The use of the Resilience Checklist by individual organisations to check their own approaches, and form the basis for collaboration and collective action.

The Resilience Checklist supports organisations in a range of ways in support of reaching common goals.

- The 'Checklist' is intended to enable each State agency (and many other actors such as local governments, regional groups, and the private sector) to bring their own sector specific initiatives, organisational approaches, methods or tools, and check whether they are on a pathway towards the desired future state of 'functioning economies, connected communities, healthy natural assets which are disaster resilient and adaptive to change'.

- This sets a broad alignment of goals across various agencies and portfolio areas. There are a range of government programs, working to deliver to different policy objectives and legislative structures, which incorporate the ideas of resilience (or related concepts such climate adaptation, disaster risk reduction and disaster plans, transition to clean growth choices).

Step 1: Bring your context and tools.

- Queensland policies across State agencies are nested within a broader set of related disaster risk reduction, adaptation, resilience, integrated planning and economic development approaches at national and international levels

- They are contextualised to Queensland through a policy philosophy of 'state facilitated, regionally co-ordinated, and locally led planning processes.

Step 2: Use the Checklist to assess practice.

- The Checklist draws on stakeholder engagement conducted during its' development, as well as a range of contemporary methodological approaches, knowledge of the state and national policy landscapes, and the needs and rapid changes in the financial, legal and insurance industries.

- Each organisation will bring their own context and tools, tailored to specific needs. Regardless of the approach or tool, there are some generic capacities needed:

  o A systems approach recognising three broad pathways ('Doing the same', 'Doing better' and 'Doing differently') is broadly accepted from the stakeholder consultation as a useful way to visualise and narrate the magnitude and nature of change that needs to occur in order to reach the desired goals.

  o Tools/methods for planning and assessing resilience must be able to support 'Doing the same', 'Doing better' and 'Doing differently' pathways, rather than being constrained in scope. Currently, there is a strong focus on 'doing things better'. This may be sufficient for those parts of the system where there is confidence that values and services can continue to be delivered in the face of future changes in climate, population and uncertainty. However, there is a clear need to do things differently in some parts of the system, as the external drivers of change amplify.

  o The tools/methods must be to be applied with a certain set of management characteristics, iterating to mature the understanding and application of the approach and progress towards collective outcomes.

  o The approaches must confer or enhance a certain set of attributes or characteristics upon the system, which in turn enable the system to deliver on its defined goals despite change and disruption.

Step 3: Check the organisation's pathways. Will they get to defined goals, in a way which is disaster-resilient and adaptive to change?

- Current climate and disaster risk, and broader resilience challenges require systemic change, thus doing things differently. Depending on the risks, uncertainties and opportunities faced by a system

of interest, it is possible to have a combination of the three pathways working simultaneously in different parts of the system.

- o 'Doing things the same' – shown in red, the pathway is wide initially representing the easy path of current practice, but it narrows over time representing decreasing ability to achieve desirable outcomes as climate change and other chronic stresses and disruptions continue. A branch forks off this path, leading to a crumbling end – this depicts that the goals won't be reached, and that there is a risk of cascading system failures with this approach.

- o 'Doing better' – recent initiatives have increased the prominence of this approach, especially during recovery after disaster (e.g. 'Build Back Better'). This pathway reduces existing vulnerabilities, creates options, and will address moderate levels of change. This pathway has limited scope to address many systemic risks and vulnerabilities.

- o 'Doing things differently' – this pathway is narrow now representing it is a small component of activity currently and challenging in the current context. It widens over time to indicate that it has the greatest potential for enduring development opportunities and continuing delivery of value and services as change continues across the state and world.

Step 4: Fill in gaps identified by the Checklist and align with international, Asia-Pacific and national approaches.

- Check alignment in policy context, which tends to be siloed and contains many areas of overlapping practice.

- If your approach, tools or context do not support, enable and activate decisions, actions and practices which take you towards the goals in a credible, evidence based way, then there will be gaps (or indeed it could mean that the approach is simply not suitable).

- There are many tools and approaches which outline specific comprehensive methods that could be used or adapted – for example:

  - o the Strategic Guidance for Climate and Disaster Risk, developed to support the NDRR Framework (Australian Government (Department of Home Affairs), 2019c);

  - o Wayfinder (Enfors-Kautsky et al., 2018);

  - o Resilience, Adaptation Pathways and Transformation Approach ver 2 (O'Connell et al., 2019);

  - o the City Resilience Index from the 100 Resilient Cities program (ARUP and Rockefeller Foundation, Date not provided).

- In addition, there are many approaches in use in Queensland which cover some, or all of the important methodological capacities. Some of these are documented and formalised, while others are more practice-based and reside within particular individuals or groups. These are further discussed in the Checklist report.

Step 5: Mature the collective impact by collaborating across a range of organisations.

- As well as supporting the approach of individual organisations, the Checklist is intended to facilitate cross-organisational comparison to ensure that there is adequate coverage of all the necessary actions and tasks across the state by the range of actors.

- The Checklist could be complemented by a change in governance arrangements to provide improved co-ordination between State agencies, and with other organisations. These are discussed in Chapter 7.

6.4   What is the Checklist?

The Checklist consists of a set of features of methods, tools or practices that can be applied in any context. It can be applied to any specific method, regardless of whether the framing is one of resilience, adaptation, disaster risk reduction, regional or sector strategies, transitioning communities and economies or other types of planning.

The Checklist is presented in more detail in (O'Connell et al., 2020) as a set of tables, and is also available as a simple excel document, which can be used interactively. It is designed to be used in conjunction with the systems change narrative (section 5.2).

The Checklist comprises:

- Level 1 – a simple set of 'entry level' Checklist items to enable decision-making individuals and groups start identifying whether these practices are embedded into their approaches, tools and applications thereof. The Level 1 Checklist items are shown in

- Table 3.

- Level 2 – each of the simpler Level 1 items can be unpacked to a more detailed set of Checklist items, which provide a more detailed description of Level 1 criteria, and can guide a more detailed diagnosis by people within organisations who are responsible for the development and application of methods, approaches and tools for resilience, adaptation, disaster risk reduction etc.

- For each of these Levels, the Excel spreadsheet version permits a simple qualitative assessment of:
  - the extent to which a Checklist item is achieved (0 = not at all, 1 = partial, 2 = fully) in:
    - the design or capability of methodological approaches/tools (e.g. as specified in relevant documentation or guidance material);
    - the application of the approach/tool in any given process, place, project etc (e.g. as evidenced by on-ground outcomes from its application);
  - the most likely pathway that the approach enables (1 = Doing the same, 2 = Doing better, 3 = Doing differently).

The Level 1 Checklist is presented in the next section. Level 2 contains too much detail for this overview report, and can be found in the Checklist report (O'Connell et al., 2020).

6.5   A summary of Level 1 of the Checklist

Checklist Level 1 items 1 - 6 focus on *processes* or *activities* that are known to improve the likelihood of moving towards desired system states and goals. Broadly, these include scoping, collaborative governance, inclusive engagement, systems thinking, adaptive planning and strategic learning processes.

Checklist Level 1 item 7 is about the *outcomes* of those processes and activities. Checking that outcomes of items 1 to 6 have conferred the qualities listed in Item 7 provides good guidance, but is not a replacement for a comprehensive Monitoring, Evaluation and Learning program to evaluate on-ground outcomes.

Table 3 Resilience Checklist Level 1.

Item	Description
1. Approach and scope is adequate to support coherent practice and level of required change to reach sustainability goals.	Provides clarity about what key words/terms mean in terms of decisions, and practice. This is supported with clear cause-effect logic behind the method or approach being used. Considers the full spectrum of potential system changes (from no change, to large structural change), both identified and unknowable risks, chronic stresses and changes or acute disruptions.
2. Collaborative governance practice in the planning process.	Approach is supported by governance and resourcing arrangements that match the nature and magnitude of the required changes and accountable decision-making practices. It fosters collaboration and shared responsibility across scales, levels and sectors to address challenges of institutional inertia and constraints which are not visible, and obscured by surface issues[2].
3. Inclusive and ethical engagement process supports range of perspectives and plausible futures, and builds agency and capability for co-ordinated collective action towards goals.	Problems and opportunities are adequately defined, includes diverse perspectives, values and a broader systems view. There is exploration of a range of plausible futures, consideration of the values, characteristics and functions that people want the future system to hold, as well as what the current trajectory may deliver. There is a fair, safe and ethical dialogue or planning process, with adequate facilitation and leadership to support the process and level of change required. Supports building capability, agency, and capacity for co-ordinated collective action.
4. Systems thinking and analysis is embedded in the approach to identify key points of intervention and the nature and magnitude of change required.	Multiple stakeholder or disciplinary perspectives and values, rules and knowledge are represented in the system description. Incorporates physical (e.g. infrastructure), natural, human (e.g. socio-economic and/or behavioural patterns), governance and technological components of the system. The analysis includes chronic or slow stresses as well as episodic and acute shocks, multiple levels, spatial- and time-scales, key thresholds at which system behaviour changes, and dynamics of cause and effect. Key points of intervention are identified. Nature and magnitude of change required to reach the 'desired future' clear – which parts of the system can stay the same; or need incremental, or transformational change. Appropriate evidence base is used.
5. Planning for options and pathways to the goals and outcomes flows from inclusive, ethical engagement process and systems approach, and incentivises changes in behaviours, decisions and actions to support the necessary change.	Options are identified based on a systems view, and decisions and actions prioritised and sequenced into adaptive pathways. Approach supports strategic and operational practices with clear roles, actions, responsibilities and decision points within adaptive management cycles. It supports co-ordination across scales and sectors to address systemic challenges by collective action. Likely distribution on private and public benefits and costs is characterised. Cost/benefit tradeoffs are defined, and preferred behaviours, choices and pathways are incentivised. Reliable, credible evidence is used to underpin investment decisions - which are robust to short term political or boom-bust cycles. Appropriate evidence base is used.
6. Active and strategic learning is embedded in every stage of the process, and is acted upon.	Approach operates within strategic adaptive management frameworks that enable multi-loop learning (Loop 1: are we doing things right? Loop 2: are we doing the right things? Loop 3: How do we decide what is right?). Prioritises learning-by-doing by individuals and groups in areas of novel change and high uncertainty. Supported by knowledge management practices for documenting decisions, underpinning evidence base and lessons learned.

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[2] These are called 'camouflaged constraints' in Chapter 3.

Item	Description
7. The approach confers or supports a set of system qualities or properties which move towards goals in a way which is disaster-resilient and adaptive to change.	The on-ground outcomes of any approach may take a long time to manifest and may be expensive or difficult to measure. The outcomes of applying Steps 1 - 6 will increase likelihood of system qualities such as reflective and active learning; robustness; functional redundancy (diversity and buffer capacity); flexibility, resourcefulness, and integration. A Monitoring, Evaluation and Learning program is set up to evaluate on-ground outcomes of items 1 – 6 in progress towards goals, and the attributes of resilience[3].

6.6   Key messages from this section

- The advice from the stakeholder interviews, and the workshops were that a new tool for 'how to do…' resilience would not be helpful nor adopted, due to the plethora of existing approaches. Instead, they supported an approach which would enable and support self-assessment of current tools and practices as well as comparison across agencies and organisations, guiding everyone to decisions and actions with the desired collective outcomes.

- The Resilience Checklist was developed as a response to the needs that were elicited from project participants. It provides a set of checklist items which can be used to provide complementary guidance to organisations without them having to replace existing approaches.

- Level 1 of the Checklist is a simple entry point for people and organisations, and provides six high-level items based on 'activities' or 'processes' which are likely to support achieving the seventh item which is based on 'outcomes' of conferring resilience attributes upon a system in support of achieving goals. Level 2 of the Checklist expands on each of these items in more detail to allow a more thorough diagnosis.

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[3] There are many examples, such as the City Resilience Index which has 7 qualities, each with indicators, method for measuring, analysing and interpreting to assess progress.

7   Using the Resilience Checklist in a staged approach to complement new governance for co-ordinated service delivery by State agencies

The Resilience Checklist was introduced in Chapter 6, and its' use as a tool by individual organisations explored. The utility and benefits could potentially be greatly enhanced by complementary changes in governance across State agencies, and partnerships between all levels of government, regional bodies, NGO's, the private sector and communities.

7.1   Co-ordinated collective action is required

The National Disaster Risk Reduction (NDRR) Framework emphasises mitigating systemic risk, while disaster recovery funding reforms provide an important opportunity to emphasise strategic anticipatory activities and investments for a system level response. QRA and all other disaster response, management and recovery agencies will therefore expand their focus beyond their responsibilities under the disaster management arrangements. Collaboration and redefined responsibilities will be needed across ALL of Queensland's State agencies – including central agencies and those that have not previously included climate and disaster within their remit – to action the management of systemic disaster risk and building resilience under the National Disaster Risk Reduction Framework.

It opens the door for Queensland State agencies to work together in new and different ways at state level, as well as with the Federal government, local and regional organisations, NGO's and the private sector. The existing collaborative arrangements of the functional groups of agencies are well placed to also widen their focus to include pathways for mitigating systemic risk at a system level. Alternatively, agencies may wish to propose completely different mechanisms for this during the next stage of engagement.

7.2   Organisations are scattered along a pathway of 'readiness' to embrace resilience as 'Doing differently'

Views expressed in interviews (Measham et al., 2020) and workshops (O'Connell et al., 2020), as well as of a range of other documents and policies shows a that many Queensland State agencies embrace the need for more collaborative approaches. There was, however, also a lack of engagement from some agencies.

People and organisations at all levels, and in the private and public sector, are spread along a spectrum of 'readiness' to embrace the scale of the problems and the magnitude and nature of change required to address them, as well as the changing roles and responsibilities that will be needed (as shown by footsteps on Figure 8). They may be:

- seeking to maintain current systems by 'Doing the same'. This is sometimes framed as 'business as usual' or 'business continuity' (a term which sometimes meant keeping the system the same, or sometimes recognised that the system must be modified to maintain services in a crisis) or modifying current systems 'transitions' or 'climate adaptation' plans to date (aligned to the 'Resilience as Usual' themes from interviews);

- knowing that in order to achieve policy goals and avoid crossing thresholds as shown in Figure 2, many systems require substantial reconfiguring (labelled 'Resilience as Doing Differently' in interviews). They may be on the track to doing things better, without quite knowing how.

In the longer term, systems need to be configured in a considerably differently way to cope with major disruptions, and ideally in time all agencies and other parties will be feeling 'We've got this!'.
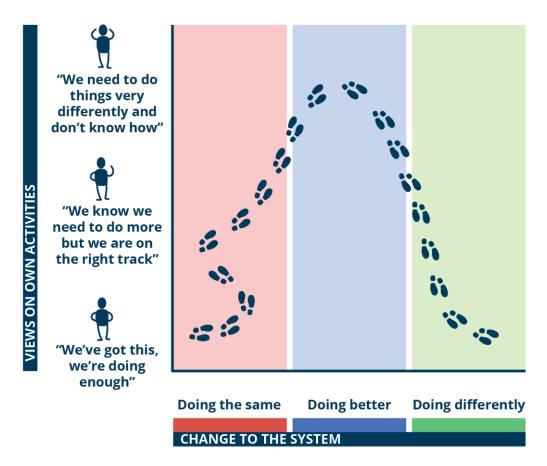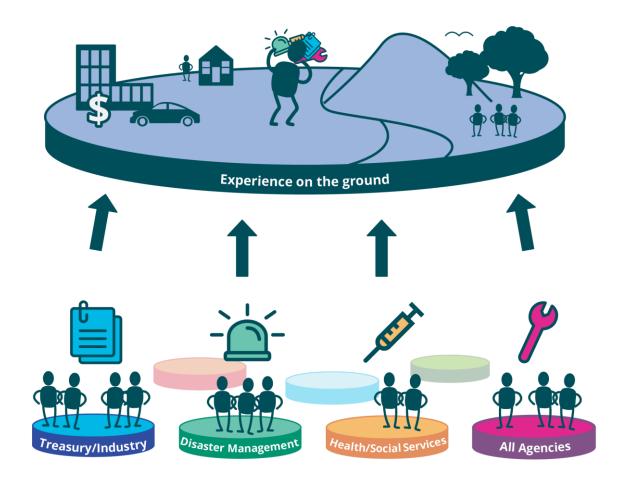

Figure 8 the amount of change required in a system, and the views of respondents on their activities. Activities in Queensland are scattered across this continuum, but are clustered in the bottom left zone of the graphic.

Achieving long-term goals and collective impact requires co-ordinating the methodological approaches and 'tools', as well as creating some new ways of interacting (reflected in new governance 'rules'). These may take the form of structures such as formalised committees, as well as less formalised cultural norms around collaboration being adopted across agencies.

The interviews (Measham et al., 2020) and workshops (O'Connell et al., 2020) revealed a consistent message that there are high levels of effective coordination between agencies during disasters, and during recovery a subset of agencies also work effectively together. They also revealed that there is much less co-ordination during more 'everyday times' when response and immediate recovery is not required – even though many of the goals and actions across agencies are consistent.

The interviews and workshops provided the space for many perspectives to be expressed and heard. The participants at the stakeholder workshops expressed a wish to continue collaborating as a group in some way beyond the life of this project. This opens the door to exploring different ways and forums for collaborating into the future. These are not finalised in this report, but offered as pathways to consider going forward, and are explored the Narrative 4 (Figure 9, Figure 10, and Figure 11) below.

7.3 Narrative 4: The Resilience Checklist can complement the creation of new ways of interacting and governance mechanisms for co-ordinating State government service delivery.
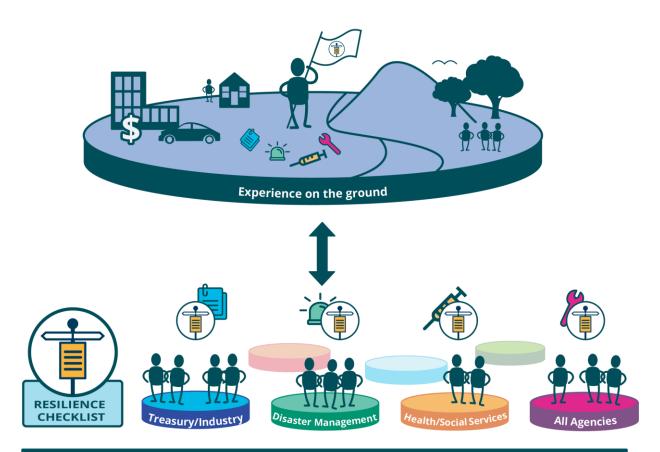

Figure 9 Current situation: each agency has their own tools and processes which they use to support regions, and it can lead to overwhelm those on the ground

Currently each State agency works with regional/local levels with their own agency-specific tools and processes (Figure 9). The different approaches, tools, priorities used by each of the agencies have understandably evolved to deal with specific contexts and challenges within each domain or sector. The on-ground experience for those needing to engage with all of these tools simultaneously can be confusing and overwhelming.

- The common set of challenges around climate change and disaster lead to widespread calls and specific policies and programs for 'building resilience', 'adapting to climate change', or 'transition planning for communities'. There is scope for more coordination between approaches to reduce confusion, foster mutually supportive actions and avoid unwanted cross-sectoral impacts.
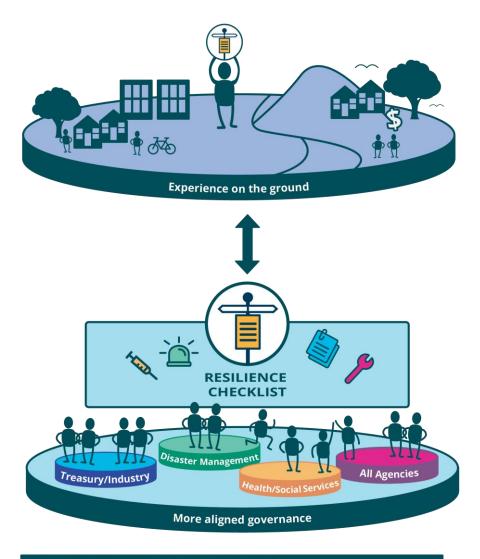
Figure 10 A step forward – the Resilience Checklist can be used independently by each organisation (State agency or otherwise) to support the regions, and guide practice towards more co-ordinated practice and collective action

The Resilience Checklist can be used to check current tools, practice and pathways: agencies could use the Checklist independently to assess their own goals, methodological approaches, alignment opportunities and pathways forward, resulting in some increased consistency of approach (Figure 10).

- The Checklist is sufficiently generic to enable agencies or actors to assess their own approaches for themselves. It can be used independently by agencies in addition to their existing tools, to check whether there are gaps in their approach which may constrain them from reaching the common goal.

- The Checklist may also be used by State agencies or local and regional groups to propose projects at state and/or national level to fill any gaps, and to provide a more consistent basis for projects across agencies to be developed and prioritised for funding, especially by new streams of funding that might be made available through new disaster risk reduction funding reforms (federal and state) or private sector investments.

Figure 11 The Resilience Checklist can be used in future to compare the process and practice across organisations, enabling gaps and duplications to be identified, and prioritising areas for further action. This can be better supported by using different governance structures to help with formal co-ordination as well as less formalised collaborations across organisations.

In the future, the Resilience Checklist could be used to support more formalised cross-agency co-ordination and collaboration, if supportive governance structures are created (Figure 11).

- Use of the Checklist by agencies independently sets the scene for agencies to share and compare their Checklists, to gain a state-wide picture of progress, commonalities, inconsistencies and gaps in practice, and hence to support improved coordination (Figure 11).
- Many of the practices and options that could be enabled will need mechanisms/forums for collaborative design and implementation across multiple sectors and levels of government. Such coordination would create new capabilities for navigating complex trade-offs and prioritising options that yield system level-benefits across all sectors and scales, with fewer unintended outcomes.

Typically, achieving collective impact requires distributed governance, and an organisation or mechanism for cross-agency responsibilities and mandates that can support the process of change[4].

- All of these have a strong focus on governance because new kinds of decisions will be required, and current decision-making processes may not work well. Rapid novel change may require fundamental shifts in how and where certain decisions are made. Finding ways to create pathways for stakeholders to act collectively towards agreed goals under uncertainty, with the capacity to take alternative options and paths as more is learned and conditions change is critical. Unless any methodological approach is embedded in effective governance, it will be insufficient. Typically, achieving collective impact requires a 'backbone organisation' to act across the organisations and support the change – if the Checklist is to be used in this way, it will require this type of support.

7.4 Key messages from this section

- Collaboration and redefined responsibilities will be needed across all of Queensland's State agencies – including central agencies and those that have not previously included climate and disaster within their remit – to action the management of systemic disaster risk and building resilience under the National Disaster Risk Reduction Framework. It opens the door for Queensland State agencies to work together in new and different ways at state level, as well as with the Federal government, local and regional organisations, NGO's and the private sector.

- People and organisations at all levels in the public and private sectors are at different stages on a journey towards effective systemic risk reduction. The Resilience Checklist has been designed to be useful at any stage on that journey.

- The Checklist can be used independently by individuals and groups to check whether their current tools, practices and pathways reflect good resilience planning practice and adequately support pathways for 'doing differently'. This enables some coordination simply by fostering shared understanding of resilience practice requirements.

- The Checklist can also be used more systematically and effectively as part of a new collaborative governance approach. For example it could be used to compare practices and needs across agencies, identify opportunities for pooling resources to better support common needs, identify and fill gaps and inadequacies, make proposed actions more directly comparable to enable sequencing and prioritisation of investment and actions, streamline or unify language, and reduce the cognitive and resource burden across a range of organisations beyond the State agencies. If it is to be useful in supporting collective action, it will require distributed governance mechanisms and appropriate organisational support (including the mandate and resources) for the cross-agency co-ordination effort.

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[4] Typically called 'backbone organisations' in the collective impact literature

8 Conclusions and next steps

8.1 Novel approaches delivered

The use of narratives and checklists to bring systems thinking into day-to-day decision making in government, business and community settings is well-established. However, success in each context has involved considerable testing and refining to resonate with intended audiences or users. The authors have worked closely with QRA and State agencies to develop narratives and a first version of a Resilience Checklist tailored to the needs of Queenslanders. These are still in early stages of development and will require further testing and honing with use.

The narratives were constructed from previous work State of Queensland (Queensland Reconstruction Authority) (2020b) and the pilots for regional resilience strategies (for example State of Queensland (Queensland Reconstruction Authority) (2020a), the work conducted during the Australian Vulnerability Profile and the Guidance for Strategic Disaster Risk Assessment (O'Connell et al., 2018b, Australian Government (Department of Home Affairs), 2019a), and the interviews (Measham et al., 2020) and workshops (O'Connell et al., 2020) conducted in this project.

The intention behind this work is to support decision makers, advocates and champions of resilience, adaptation, disaster risk reduction, regional planning and community services with narratives that can be 'mixed and matched', and visual and text elements that can be contextualised. This is a novel element of this work.

The intended use of the Checklist is as a catalyst to support collaborations between Queensland State agencies and a range of other actors to:

- check whether the methodological approaches and tools they are using are consistent with the practices that will be necessary to meet the challenges of climate change and other major disruptions
- compare practices and promote learning across organisations, and create opportunities to find gaps, duplications and synergies which could help to build collective impact.

It can be used in many situations supporting government and non-government processes and initiatives across the state. For example, it could support the State-wide rollout of resilience strategies, and plan for deeper coordination of the climate adaptation, disaster risk reduction, and broader integrated planning and investment initiatives for land use and infrastructure, and planning delivery of a range of social services in health, housing, etc.

Queensland State agencies can take up further testing and development of the Resilience Checklist, and develop suitable governance structures to support further collaboration in order to build upon the strong engagement and momentum developed during this project.

8.2 Beneficial outcomes from a consistent, coherent approach to Resilience

There are emerging public- and private-sector led initiatives promoting investments that proactively mitigate disaster risks and enable adaptations to climate change. The National Disaster Risk Reduction Framework, the Taskforce on Climate-related Financial Disclosures (TCFD), and Environmental, Social and

Governance (ESG) investing (often used synonymously with sustainable or socially responsible investing) are three examples. These recognise the need for, and are incentivising, actions that can be undertaken at scale to contribute to delivering national/regional priorities.

Queensland can gain both efficiencies in it's own management of responses to, as well as the potential benefits from these initiatives through improving its cross-agency and multi-level coordination around resilience. This is because a more coordinated and consistent approach to resilience will help:

- **build shared understanding of the meaning and application of concepts** such as resilience, adaptation, transformation, transition, disaster risk reduction (see Section 3) that aligns with these initiatives.

- **develop a shared vision of resilience** that underpins **the collective diagnosis of the causes and effects of problems and mutually beneficial collective treatments or actions** spanning aspects of land-use planning, building standards, infrastructure design, urban and regional development, and asset management and investments.

- the **inclusive identification and implementation of a suite of options** – spanning small or no changes through to large system change (or, using other terms – resistance/persistence, resilience, adaptation and transformation), in recognition that some responses may work in one circumstance but may not be appropriate in others or over the longer term.

- **ensure that the initial scoping or specification of projects or investments is sufficiently open** to promote the development of necessary 'Doing better' and 'Doing differently' pathways, and confer qualities/attributes of resilience in the system. Too many tendering or policy development processes provide a constrained pre-defined scope, and apply narrow economic assessment, thus procedurally ruling out the desired outcomes.

- **build capabilities and capacities** of individuals and agencies to consider future risks early in decision processes and **promote low regrets decision making** to explicitly account for uncertainty and ambiguity about the magnitude of change, thus increasing their likelihood of being successful.

- **make visible those places where agency day-to-day business can help other agencies with their DRR activities**. For example, the Department of Treasury can play a vital service in its day-to-day work in advising agencies on how to appropriately cost up-front prevention measures that defray larger long-term costs, or how to characterise non-monetary costs and benefits in routine cost/benefit analyses. Currently Treasury is not necessarily seen as a 'service provider', and such a framework could help foster an understanding of all the ways in which the agencies, working together, can serve the public in delivering better disaster risk reduction.

Many of the practices and options that could be enabled could create new capabilities for navigating complex trade-offs and for prioritising options that yield system level-benefits across all sectors and scales, with fewer unintended outcomes.

There will be some follow-up by CSIRO as part of a Monitoring, Evaluation and Learning process in the next year to check whether how much these products have been useful, and why.

8.3   Key messages from this section

- The work is intended to support decision makers, advocates and champions of resilience, adaptation, disaster risk reduction, regional planning and community services with narratives that can be 'mixed and matched', and visual and text elements that can be contextualised. This is a novel element of this work.

- The use of the Checklist can be used to support collaborations between Queensland State agencies and a range of other actors to:

  - check whether the methodological approaches and tools they are using are consistent with the practices that will be necessary to meet the challenges of climate change and other major disruptions;

  - compare practices and promote learning across organisations, and create opportunities to find gaps, duplications and synergies for example in the State-wide rollout of resilience strategies, deeper coordination of the climate adaptation, disaster risk reduction, and broader integrated planning and investment initiatives for land use and infrastructure and economic development, and planning delivery of a range of social services in health, housing.

- Many of the practices and options that could be enabled could create new capabilities for navigating complex trade-offs and for prioritising options that yield system level-benefits across all sectors and scales, with fewer unintended outcomes. It could support the inclusive identification and implementation of a suite of options – spanning small or no changes through to large system change, and ensure that the initial scoping or specification of projects or investments is sufficiently open to promote the development of necessary 'Doing better' and 'Doing differently' pathways, and confer qualities/attributes of resilience in the system. It can help to build capabilities and capacities of individuals and agencies to consider future risks early in decision processes and promote low regrets decision making.

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Acronyms

LGAQ	Local Government Association of Queensland
NDRR Framework	National Disaster Risk Reduction Framework
DES	Queensland Department of Environment and Science
QFES	Queensland Fire and Emergency Services
QRA	Queensland Reconstruction Authority
QRCC	Queensland Resilience Coordinating Committee