Australian Government

ANNEX TO:

AUSTRALIA'S NATIONAL MIDTERM REVIEW OF THE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015-2030 REPORT

ARE WE SUCCEEDING AT MAKING AUSTRALIAN COMMUNITIES SAFER IN THE FACE OF GROWING DISASTER RISK?

Strategic and International Policy Team
121 Marcus Clarke Street
Canberra, ACT, 2601
E: disasterriskreduction@recovery.gov.au

Table of Contents

Annex A: Methodology

Australia's national midterm review was developed by NEMA in consultation with stakeholders from across all sectors. The midterm review was conducted concurrently to the development of the Second National Action Plan for the National Disaster Risk Reduction Framework (NDRRF), and where possible, the consultations were aligned to inform both processes.

The process for the midterm review comprised a retrospective element, exploring disaster risk reduction progress since 2015, an element to identify contexts shifts over this time and anticipated shifts to 2030, and a prospective element to describe future disaster risk reduction efforts to respond to identified challenges. The Second National Action Plan will identify the actions that need to take place to enable that shift.

This report takes a national perspective, having been developed by the Australian Government. It has been informed by input from a range of valuable sources, such as local and state and territory governments, community groups, and private industry. The authors acknowledge that this is a selection of activities and is by no means comprehensive. Additionally, the authors have focused on initiatives and activities which drive systemic change, as opposed to scientific and technological advancements. The views of other cohorts have been captured throughout the report, where relevant, and a selection of verbatim written submissions can be found in the referenced annexes. A desktop and literature review was also conducted to inform the findings of this report.

Stakeholders were invited to engage with and contribute to this report. The views are representative of those who were able to respond during the engagement noted in **Annex B.**

1. Lines of inquiry

Three key lines of inquiry, and supporting questions, were developed to complement consultation processes and ensure the necessary components for the national midterm review were met. These questions sought to capture an understanding of the broader state of the national disaster risk reduction system and what should be done to improve it.

These lines of inquiry were developed from UNDRR guidance on the cross-cutting themes and proposed questions for the midterm review, as well as the overarching outcome, goal, and guiding principles of the Sendai Framework. The four priorities of both the Sendai Framework and NDRRF also informed the lines of inquiry.

1.1. People and networks

All sectors of society – all tiers of government, academia, industry and non-government - must work together to reduce systemic disaster risk. This line of inquiry sought to understand how all-of-society governance and partnerships have contributed to disaster risk reduction, through questions such as:

- What priority actions can be taken to create, enable and empower partnerships to strengthen strategic risk reduction action at the local, subnational and national levels?
- What new or emerging initiatives need to be developed to support partnerships in reducing systemic disaster risk?
- Do key stakeholders understand their shared responsibility for disaster risk reduction and collaborate to act accordingly?

1.2. Information and decision-making

Effective systemic disaster risk reduction requires multi-hazard, risk informed decision-making based on improved availability of data and information. Questions included:

a) How and to what extent can systemic risk knowledge and insight, including the interconnected nature of risk, be improved?

b) What are the key measures to be taken to ensure systemic disaster risk reduction is systemically applied across all sectors of society and integrated into decision making?

1.3. Investment

Coordinated and complementary public and private investment is critical to address to mitigate existing, and prevent the creation of, new disaster risk. A reliance on post-disaster recovery to build back better is, on its own insufficient, though does play a key role in risk reduction. Questions include:

a) What measures can be taken at the local, state and territory and national levels to encourage greater investment in resilience?

b) What actions are required to strengthen the resilience of business and industry sectors to systemic disaster risk?

2. Focus areas

2.1. Retrospective

The retrospective review focused on the actions, policies, frameworks and institutional changes that have been implemented in the disaster risk reduction landscape from 2015 to 2022 .This included engagement with key stakeholders, such as the state and territory governments, to take stock of national efforts to reduce disaster risks over this period. Review of key documents and research such as the Royal Commission also informed this section. Stakeholders were invited to provide written submissions to the retrospective review, with the option of having one-on-one discussions. The questions used to solicit stakeholder input can be found at **Annex C**.

2.2. Context shift

The contextual shifts which have occurred from 2015 to 2022 were identified through desktop document review and stakeholder engagement, including through the development of the Second National Action Plan for the NDRRF. Anticipated contextual shifts to be factored into future national disaster risk reduction efforts between now and 2030 were primarily identified through stakeholder engagement, including the reducing disaster risk in Australia survey (see **Annex D**).

2.3. Prospective

The prospective review focused on the potential policy, governance or institutional adjustments and new modalities for accelerated national implementation of the Sendai Framework to 2030. This builds on efforts described in the retrospective review and responds to the emerging issues identified in the context shift. Information for the prospective review was largely collected through the consultations to develop the Second National Action Plan for the NDRRF.

3. Process details

3.1. Clearance

A draft report was socialised with all stakeholders who provided input as an opportunity for further comment and review. The final report was cleared through NEMA Executive, and received endorsement from the Minister for Emergency Management (16 September 2022). The relevant state and territory ministers were provided a copy of the final report through a National Emergency Management Ministers' Meeting (NEMMM) whilst attending the Asia-Pacific Ministerial Conference on Disaster Risk Reduction from 19-22 September 2022.

3.2. Engagement

A range of modalities were used to engage with stakeholders to compile this report. These included dedicated interviews, workshops, and discussions and extensive national consultation as part of the development of the Second National Action Plan for the NDRRF. Details of stakeholder engagement as part of this review can be found in **Annex B**.

Annex B: Stakeholder Engagement

Australia's midterm review consisted of the following stakeholder engagement:

- Three, two-hour online discovery discussions brought together cross-sectoral representatives to discuss potential themes and actions to be captured in the Second National Action Plan. 33 people attended the online discovery discussions.
- During the one-hour From Risk to Resilience: Developing Australia's Second National Action Plan Webinar, Executive from the then National Recovery and Resilience Agency spoke about the next steps towards reducing risk and improving disaster risk in Australia, and how to get involved. 412 people listened in to the webinar.
- The full day Catalysing Change Workshop brought cross-sectoral representatives from across Australia together, in-person, to reflect, discuss and further built upon the themes and actions identified in the discovery sessions. 46 people attended the workshop.
- The Developing the Second National Action Plan Discussion Paper encouraged stakeholders to share experiences and insights related to the role they play in the domestic risk reduction system, as well as the key enabling elements that would help them, or their organisation, contribute more effectively to reducing disaster risk and building resilience. The discussion paper received 61 responses.
- The Reducing Disaster Risk in Australia survey (see **Annex D**), sought feedback on a range of systemic disaster risk issues to establish a baseline of Australia's understanding of disaster risk reduction and the broader national disaster risk reduction system. The results of this survey will be used as a starting point for the monitoring evaluation and learning framework for the NDRRF. The survey received 354 responses.
- Dedicated workshop and deep dive with the Australian Local Government Association were held which explored local government's role in what successful disaster risk reduction looks like, how it can be achieved, and the enablers and barriers for success (see **Annexes F and G**). The deep dive was attended by 21 local government representatives, with approximately 70 attending the workshop.
- Six, two-hour deep dives were conducted with a range of stakeholders, with sessions dedicated to the inclusion of particular voices, such as First Nations and youth, which sought to develop a roadmap of transformational actions to reduce disaster risk, and how we might align and unify efforts (see **Annex H**). A total of 183 participated in the deep dives.
- The From Risk to Resilience Summit brought together cross-sectoral leaders and practitioners in disaster risk reduction to re-think disaster risk in Australia and discuss priority actions for the Second National Action Plan. A total of 184 people attended the summit.
- Targeted engagement was undertaken with state and territory governments, including through written responses (see **Annexes I to N**). A total of 12 targeted engagements – through both interview and written correspondence – were conducted with state and territory governments.
- Stakeholders were invited to develop case studies to illustrate examples of systemic and innovative approaches to addressing disaster risk within Australia (see **Annexes O to AG**). 18 case studies were submitted.

Annex C: Retrospective Review Questions

Retrospective Review Written Submission

The Sendai Framework for Disaster Risk Reduction 2015-2030

The overarching goal of the Sendai Framework is to *prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience*.

Acknowledging that risk is complex, the Sendai Framework takes an interconnected approach and calls for a paradigm shift to adopt systems-based approaches and innovative ways to collaborate and reduce the creation of new risk. Further, both the Sendai Framework and the National Disaster Risk Reduction Framework (NDRRF) emphasise that reducing disaster risk is a **shared responsibility**. However, this responsibility is often not shared equally. Underpinning the Sendai Framework – and the broader 2030 Agenda through the Paris Agreement and Sustainable Development Goals – is the creation of opportunities which actively work to avoid decisions that create risks while concurrently building resilience, which requires:

1. An understanding of the dynamic systemic nature of disaster risks in order to root causes, rather than symptoms;
2. Novel approaches to collaboration and robust governance across all sectors of society; and
3. Investment in resilience.

On behalf of the Australian Government, the National Recovery and Resilience Agency (NRRA) is preparing Australia's contribution to the midterm review of the Sendai Framework to take stock of the work that has been done to date and highlighting best practice where it takes place.

We are seeking for you to coordinate on behalf of your State or Territory government more broadly, a written response to this request.

Retrospective Review

The objective of this retrospective review is to take stock of how Australia, collectively, has reduced disaster risks from 2015-2022. As part of this retrospective review, we are hoping to capture the progress made to-date, and the challenges experienced, in preventing and reducing disaster risk in line with the Sendai Framework.

The input will also identify solutions and best practices, as well areas where advice and support is required to accelerate and amplify action in pursuing the outcome and goals of the Sendai Framework, the 2030 Agenda and other related international frameworks.

The guiding questions below will assist with your written response. These questions are not meant to be proscriptive - you are invited to answer the questions which best fit your domain or jurisdiction, and to provide as little or as much information as you like.

As you will see, the final question is forward looking. Through this question, we are seeking to gain a better understanding of the topic(s) you want to see featured in the next steps of the national midterm review – where we hope to collaboratively work together to identify emerging issues and future contexts on both what will likely occur and needs to occur in order to seek to achieve the outcome, goal and overarching targets of the Sendai Framework by 2030 and beyond.

Acknowledging the range of consultations currently taking place across Government to develop the second National Action Plan, we are seeking written submissions as part of this retrospective review.

We request that you regard this written submission as your organisation or jurisdiction's submission to the retrospective review.

If you would prefer to have a conversation to discuss these questions, the alignment with the National Action Plan, or have any other questions, please get in touch with Tricia Addie (Tricia.Addie@recovery.gov.au or at 02 6113 9738) to arrange a time.

Grateful if you could provide your response by **COB 20 May 2022**. Written responses can be submitted to DisasterRiskReduction@recovery.gov.au, cc'ing Tricia.Addie@recovery.gov.au and Alexandra.Nichols@recovery.gov.au.

Retrospective Review Questions

Your response/s to the below should provide a narrative overview your progress towards the expected Outcome, Goals and Global Targets of the Sendai Framework.

The level of detail provided should be proportionate to the overall progress of the Sendai Framework in your jurisdiction. If possible, consider the impact of your progress disaster risk reduction across sectors, and for key vulnerable groups identified in the Framework, such as women, children, Indigenous peoples, people living with disability and the elderly, throughout your response.

Please submit your written response by **COB 20 May 2022** to DisasterRiskReduction@recovery.gov.au, cc'ing Tricia.Addie@recovery.gov.au and Alexandra.Nichols@recovery.gov.au.

The level of clearance is up to your organisation or jurisdiction, noting that your response will be consolidated within a broader national midterm review and recirculated for review.

1. **Please describe the key initiatives within your jurisdiction or domain which have sought to address and reduce systemic risk since 2015.**
   Describe key policies, programs, investments, partnerships, or other relevant initiatives that address and reduce systemic risk since 2015. Please indicate details such as when these initiatives started and ended, are due to end, or if they are ongoing, and provide any links if available.

2. **What are your major achievements, challenges and barriers to implementing the Sendai Framework since 2015?**
   If possible, please link these achievements, challenges and barriers directly to the Outcome, Goal, Global Targets, Priorities for Action and Guiding Principles of the Sendai Framework, or more broadly, please identify actions to reduce disaster risk in your jurisdiction.

3. **What partnerships and initiatives have been most successful in assisting in the reduction of disaster risk?**
   Consider partnerships and initiatives across levels of government, industry and all other sectors of society and their outcomes. Please provide links if available.

4. **How have national, sub-national and local public policy, legislation, and governance structures changed to align with the Sendai Framework?**
   Please describe how these have changed since 2015, and have changed the way you operate within and relate to other parts of the system to reduce disaster risk. Please provide links if available.

5. **How and to what extent has the establishment of national and/or local disaster risk reduction strategies and plans resulted in expanded efforts in systemic risk reduction?**
   Please include names of plans and strategies, and consider why these have been successful. Please also provide links if available.

6. **How and to what extent have investments in disaster risk reduction increased since the implementation of the Sendai Framework (2015), and what measures are in place to ensure these investments are risk-informed?**

Please refer to both structural and non-structural measures (see Paragraph 30 of the Sendai Framework for more information) when referring to investments. If possible, provide a 2015 baseline for these as well. Please provide links if available.

7. **What major changes / emerging issues / topics of concern are anticipated in the period to 2030 and beyond which will need to be considered in prioritising, accelerating and amplifying action to reduce disaster risk? *Please provide links if available.***

Annex D: Reducing Disaster Risk in Australia Survey

Welcome!

Thank you for your interest in the Reducing Disaster Risk in Australia Survey.

The National Recovery and Resilience Agency has released this survey to inform Australia's midterm review of the Sendai Framework for Disaster Risk Reduction 2015-2030, contribute to the development of the second National Action Plan of the National Disaster Risk Reduction Framework (Framework) and establish a baseline of Australia's understanding of disaster risk reduction (DRR) and the broader national DRR system.

Once established, this baseline can be used to monitor the nations progress against the priorities set out in the Framework, as well as inform the review of the Framework and its next iterations.

This survey will take up to 15 minutes to complete and we request you respond as an individual.

While the first question is mandatory, all remaining questions are optional. You are able to skip any question you prefer not to answer. All responses will remain anonymous and be aggregated prior to use. Any and all information taken from this survey will be aggregated in such a way as to ensure it will not be possible to identify any individual.

Click the arrow to begin.

What best describes you...

- ○ Federal Government
- ○ State/Territory Government
- ○ Local Government
- ○ Community Sector
- ○ Academia
- ○ Not for Profit
- ○ Private Sector
- ○ General Public

Do you work in disaster management or in the disaster management sector?

[Asked of all respondents **except** general public]

- ○ Yes (1)
- ○ No (2)

What sector do you work in?

[Asked of all respondents **except** general public]

- ○ Research / Academia
- ○ Finance / Investment / Insurance
- ○ Planning
- ○ Program Management
- ○ Education / Training
- ○ Emergency Management / Services
- ○ Infrastructure
- ○ Risk Management
- ○ Policy
- ○ Other

Optional: Would you care to elaborate?

[Asked of all respondents **except** general public when other is selected above]

Which State/Territory do you live in?

- ○ Australian Capital Territory
- ○ New South Wales
- ○ Northern Territory
- ○ South Australia
- ○ Tasmania
- ○ Queensland
- ○ Victoria
- ○ Western Australia

What best describes where you live?

[**Only** asked of general public respondents]

- ○ I live in a city
- ○ I live regionally
- ○ I live rurally

What age group do you fall into?

- ○ Under 25
- ○ Between 25 and 64
- ○ Over 65

When it comes to 'systemic disaster risk'...

- ○ Honestly, I don't really know yet
- ○ I'm beginning to develop an understanding
- ○ I'm well across the key concepts
- ○ I have an advanced understanding

In your opinion, has there been a reduction in disaster risk since 2015?

- ○ Yes
- ○ No

In your opinion, what factors create risk to disasters? (select all that apply)

- ☐ Climate change
- ☐ The weather
- ☐ Where people live
- ☐ Social vulnerability
- ☐ Infrastructure and investment
- ☐ Growing populations
- ☐ Building codes
- ☐ Socioeconomic status
- ☐ Social marginalisation (i.e. disability, cultural and linguistic diversity)
- ☐ Other

Optional: Would you care to elaborate?

[Asked of all respondents **except** general public when other is selected above]

In your opinion, who is responsible for reducing disaster risk? (select all that apply)

- [ ] Me
- [ ] The private sector
- [ ] My Local Council
- [ ] My State / Territory Government
- [ ] The Federal Government
- [ ] Insurance companies
- [ ] All of the above

In your opinion, since 2015, to what degree have we as a nation...

	Not well at all	Slightly well	Moderately well	Very well	Extremely well	I don't know
Prevented the creation of new risk	○	○	○	○	○	○
Reduced our existing risk	○	○	○	○	○	○
Strengthened the resilience of communities	○	○	○	○	○	○
Strengthened the resilience of the built environment (i.e. buildings)	○	○	○	○	○	○
Strengthened the resilience of critical infrastructure (i.e. telecommunications networks)	○	○	○	○	○	○

How well do you think decision makers understand systemic disaster risk and use this information to inform decision-making?

- ○ Not well at all
- ○ Slightly well
- ○ Moderately well
- ○ Very well
- ○ Extremely well
- ○ I don't know

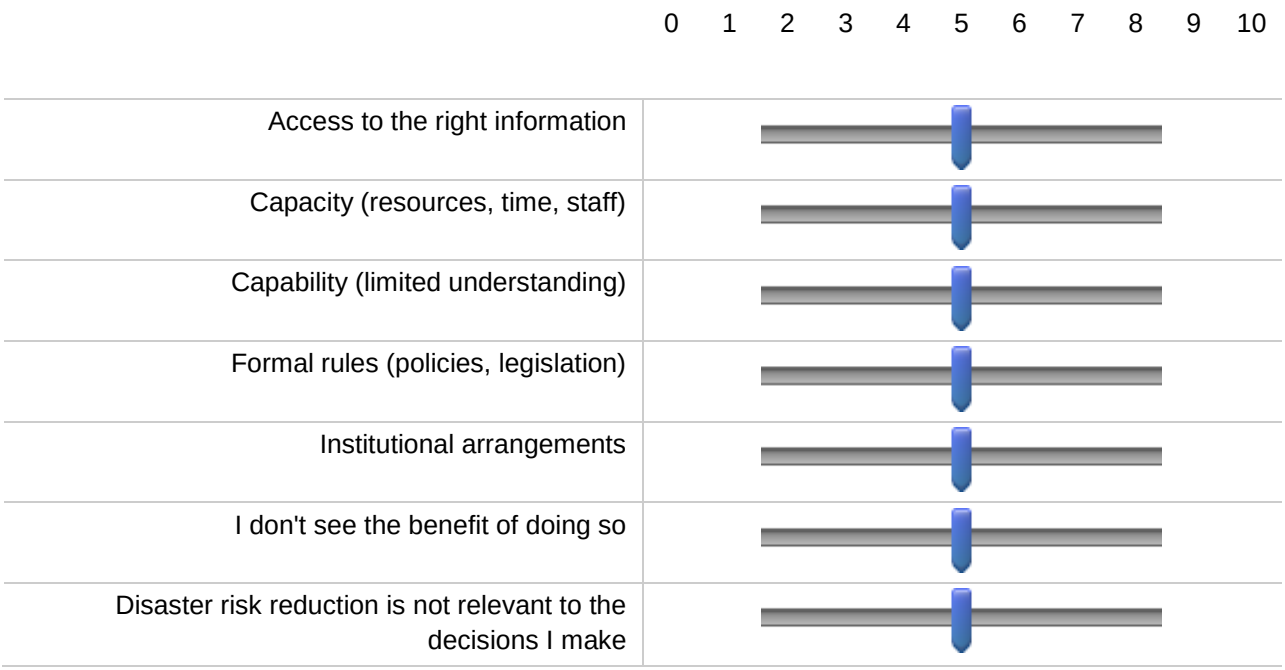
Relative to your work, do you take disaster risk reduction into account when making decisions?

[Asked of all respondents **except** general public]

- ○ Yes
- ○ No

To what degree do the following elements hold you back from incorporating disaster risk reduction into your decisions? (0 = does not hold me back at all, 10 = holds me back completely)

[Asked of all respondents **except** general public when **no** answered above]



In your opinion, to what degree are the following elements important for delivering disaster risk reduction outcomes?

	Not important	Slightly important	Moderately important	Very important	Extremely important	I don't know
Governments working better together	○	○	○	○	○	○
Increased public-private investment	○	○	○	○	○	○
Better understanding of climate and disaster risks	○	○	○	○	○	○
Increased capacity of decision-makers to make risk-informed decisions	○	○	○	○	○	○

Since the National Disaster Risk Reduction Framework was developed in 2019, to what degree has your understanding of the root causes of disaster risk improved?

[Asked of all respondents **except** general public]

- ○ What is the National Disaster Risk Reduction Framework?
- ○ None at all
- ○ A little
- ○ A moderate amount
- ○ A lot
- ○ A great deal

My jurisdiction has coherent policy (i.e. strategies, frameworks) on what to do to reduce disaster risk.

[**Only** asked of Government respondents]

- ○ Yes
- ○ No

To what degree has this policy (i.e. strategies, frameworks) been implemented?

[**Only** asked of Government respondents when **yes** is selected above]

- ○ Not well at all
- ○ Slightly well
- ○ Moderately well
- ○ Very well
- ○ Extremely well
- ○ I don't know

Optional: What are the key reasons as to why not?

[**Only** asked of Government respondents when **no** is selected above]

To what degree has your jurisdiction undertaken disaster risk reduction action to address...

[Asked of all respondents **except** general public]

	None at all	A little	A moderate amount	A lot	A great deal	I don't know
Climate change adaptation	○	○	○	○	○	○
Sustainable and regional development	○	○	○	○	○	○
Supply chain vulnerability	○	○	○	○	○	○
Public health systems	○	○	○	○	○	○
Agricultural and food systems	○	○	○	○	○	○
Environment and biodiversity systems	○	○	○	○	○	○
Infrastructure planning and investment	○	○	○	○	○	○
Land-use and urban planning	○	○	○	○	○	○

Relative to your work, to what degree is disaster risk reduction considered when making financial or investment decisions?

[Asked of all respondents **except** general public]

- ○ None at all
- ○ A little
- ○ A moderate amount
- ○ A lot
- ○ A great deal
- ○ I don't do make financial or investment decisions

Since 2015, have you observed an increase in Government investment in disaster risk reduction?

[Asked of all respondents **except** general public]

- ○ Yes
- ○ No

To what degree have you observed this increase in Government investment in disaster risk reduction...

[Asked of all respondents **except** general public when **yes** is selected above]

	None at all	A little	A moderate amount	A lot	A great deal	I don't know
Relative to spend on response and recovery	○	○	○	○	○	○
From the private sector to supplement (or in conjunction with) public funding	○	○	○	○	○	○
Relative to the magnitude of disaster	○	○	○	○	○	○

Relative to your work, where do you want to see increased future Government investment or focus? (select all that apply)

[Asked of all respondents **except** general public]

- [ ] Social and community cohesion
- [ ] Critical infrastructure
- [ ] Land use planning
- [ ] Climate adaptation and mitigation
- [ ] Governance / institutional arrangements
- [ ] Interoperable data and information to support decision making
- [ ] Capability building
- [ ] Nature-based solutions and emissions reduction
- [ ] First Nations knowledge systems and leadership
- [ ] Measuring and qualifying success
- [ ] Other

Optional: Would you care to elaborate?

[Asked of all respondents **except** general public when **other** selected above]

To what degree has the National Disaster Risk Reduction Framework and/or the Sendai Framework for Disaster Risk Reduction 2015-2030 influenced your policies, legislation, planning and institutional arrangements?

[Asked of all respondents **except** general public]

- ○ None at all
- ○ A little
- ○ A moderate amount
- ○ A lot
- ○ A great deal
- ○ I don't know

Optional: Would you care to elaborate?

[Asked of all respondents **except** general public]

Optional: What measures can public institutions take at national levels to ensure risk is priced more accurately within all financial transactions?

[**Only** asked of Federal Government and Private Sector respondents]

Optional: What further actions are required to strengthen business and industry resilience to disaster risk by 2030?

[**Only** asked of Federal Government and Private Sector respondents]

Optional: What are the emerging disaster risk issues that will impact you, your organisation or your community from now until 2030?

Asked of all respondents **except** general public]

Optional: What are the most important actions needed to reduce disaster risk and increase the resilience of people, assets and ecosystems from now until 2030?

Asked of all respondents **except** general public]

Annex E: AIDR Contracted Services

- The Australian Disaster Resilience Handbook Collection, which provides an authoritative, trusted and freely available source of knowledge about disaster resilience principles in Australia.
- Networking and National Capability Development Program, which is a professional development events and learning opportunities, including an annual conference.
- The Education for Young People Program, which provides resources for use in educational settings.
- The Volunteer Leadership Program, which provides courses for volunteers to build knowledge and share experiences.
- Knowledge management, including the Knowledge Hub and Australian Journal of Emergency Management (AJEM). The Knowledge Hub is a national, open-source platform which supports and informs policy, planning, decision-making and contemporary good practice in disaster resilience. AJEM is a quarterly journal of analysis, considered views, lessons learned and insights into current and future issues from researchers and practitioners at all levels of emergency management.
- The National Emergency Management Risk Assessment Guidelines Online, which is a free training course to build understanding and confidence in the emergency risk management process.
- The Australian Emergency Management Library, which is physical and online presence housing resources of national interest and significance including books, reports and multimedia items.
- The Resilient Australia Awards, which celebrate and promote national initiatives which build whole-of-community resilience to disasters and emergencies around Australia, as well as images capturing resilience in action. The awards recognise collaboration and innovative thinking across all sectors.
- The National Disaster Recovery Monitoring and Evaluation Framework and Database, which assists end-users to understand the role of outcomes in disaster recovery planning and evaluation.
- The Major Incidents Report, which is an annual overview of events regarded as nationally significant by the emergency management sector.
- The Australian Disaster Resilience Glossary, which provides a consensus on terms and definitions or information on the range of terms and definitions encountered in disaster and emergency management to account for jurisdiction and contextual variation.
- A national community education and engagement program for the Australian Warning System.

Annex F: Australian Local Government Association Deep Dive Summary

A virtual deep dive with local government representatives was run on the 31st of May 2022. The key objectives were to explore what successful disaster risk reduction looks like, what it can achieve, and the enablers and barriers for success. We saw consistent themes aligned to the key priorities of the National Disaster Risk Reduction Framework.

Priority 1: Understanding disaster risk

We need to holistically understand the risk, by

- having a national view of the risks and vulnerabilities to understand our highest priorities for recovery and mitigation, as well as a larger focus on all hazards, and their concurrent and compounding effects;
- undertaking greater consultation with local government to incorporate greater empowerment, avoid program retrofitting, and assess vulnerabilities and capabilities; and
- increasing local government capability and capacity, as well as increasing community education to ensure communities have a robust understanding of the risks they face, and localised solutions which empower personal responsibility, resilience and understanding.

Priority 2: Accountable Decisions

We need to be brave and collaborate better, earlier, by

- closely involving local governments and communities in decision-making and program design which is aligned to localised priorities and risk reduction efforts;
- moving beyond assessments and consultation to ensure that action is taken where gaps are found; and
- creating coherence across all levels of government to facilitate better feedback loops.

Priority 3: Enhanced investment

Investment needs to be increased and streamlined, by

- promoting greater funding into mitigation and adaptation, through both funding and capacity building;
- reviewing and enhancing existing funding programs, to better embed Build Back Better principles; and
- streamlining funding and grant programs to facilitate ease of access to State and Federal support.

Priority 4: Governance, ownership and responsibility

Stronger coordinated and consistent national leadership, by

- consolidating our approach and collective objectives to disaster management across all levels of government;
- improving how we report back on lessons learned – lessons only become learned once implemented;
- facilitating an environment for greater Council-to-Council collaboration, in an effort to develop greater synergy to work as one.

We also thank all participants who attended the deep dive.

The information above is intended to provide a general understanding of the views of Local Government representatives expressed on 31 May 2022. It is acknowledged this information may not be representative of all Local Governments, and is instead provided to guide further discussions with Local Government representatives.

Annex G: Australian Local Government Association Workshop Summary

A face-to-face concurrent session with local government representatives was run on the 21st of June 2022, which approximately 70 participants attended. This session sought to build on the key findings from the Local Government Deep Dive held on the 31st of May. The key objectives were to discuss local governments' experience with reducing disaster risk, to agree on a forward commitment and next steps, as well as the enablers and barriers to success. The below is a summary of five Sli.do questions which were posed to session participants.

What do you see as your role in reducing disaster risk?

Local government representatives articulated their role as one or more of the following:

- To provide leadership and advocate for the resourcing needs of their community.
- To engage with the members of the community in helping them plan and prepare.
- To act as the on-the-ground coordination and support mechanism.
- To pursue mitigation actions and initiatives.

What should we ensure we capture in the Second National Action Plan?

The suggestions we received from local government representatives included:

- Increasing and improving our investment, by:
    - Ensuring that we build back better.
    - Matching grant criteria to community needs.
    - Changing the ratio of investment into response versus mitigation.
    - Making funding more accessible through streamlining and redirecting funding.
- Coordinating better, by:
    - Gathering bipartisan and national support from all levels of government.
    - Engaging local government early.
    - Information sharing mechanisms.
    - Leadership from bottom up.
- Innovate in how we understand and approach disaster risk reduction, by:
    - Evidence-based fire fuel reduction strategies.
    - Cataloguing disaster types and available resources.
    - Vulnerability profiles of every single Local Government Association.
    - National Set of Disaster Overlays.
    - Solutions and strategies that are within and beyond our budgetary constraints.
- Community Engagement and Capacity Building, by:
    - Having authentic conversations.
    - Building individual and organisational skills.
    - Improving community connectedness.
    - Strengthening social capital.

What have been some of the barriers to success?

Local governments representatives identified some common challenges faced, including:

- The national leadership and vision of key decision makers is too vague at times.
- Dissemination of local and relevant information and advice.
- Politics and bureaucracy can make it difficult to get approvals and longevity in policies and initiatives.
- Adaptive infrastructure – built, technological and social etc.
- Land use planning that is inappropriate and overrides local environmental plans.

What would overcome these…realistically?

Some of the solutions proposed included:

- Developing incentives for communities to upgrade to resilient homes.
- Creating a clear strategy and chain of responsibility for mitigation and resilience activities.
- Local consultation and adaptation of local knowledge or expertise.
- Uniformity in data collection.
- Incorporating and facilitating more training, professional development and community education.
- Greater and better forms of investment.

What needs to happen?

Moving forward, we need to:

- Improve how we invest in disaster mitigation – particularly around the areas of relevance and accessibility.
- Build community capability and resilience – such as through incentives to upgrade to resilient homes.
- Strengthen local government capability with resourcing, and better collaboration with state and federal government.
- Gather and share information and specialist support more widely and efficiently.

Annex H: Deep Dives

The Catalysing Change Workshop raised a new question: ***How we might begin to align and unify efforts in order to reduce disaster risk for the long term?***

Data collected during the consultation phase was considered against this question, with the emphasis on what kind of transformation system changes would need to be true, across themes, in order to significantly reduce disaster risk for the long term.

Data was sorted to search for higher order strategic patterns and trends arising across the different time horizons and themes discussed. Other sources of data related to the National Disaster Risk Reduction Framework were also considered[1] including the types of actions raised previously, that currently remain unfunded or where limited progress has been made.

Several patterns in the calls to action were identified. Several interconnected system changes or critical connectors for system change were recognised and formulated, with the launch of the UNDRR 2022 Global Assessment Report validating these. Data was then progressively mapped against this higher-order framework (excel table), with good correlations.

Three of these critical connectors for system change are being tested in the deep dives through the three questions posed.

It is believed these questions may provide a useful framework for structuring content of the NAP in a way that meets the challenge for the next stage of NAP development. It is believed these questions will help to further elicit and describe proposed initiatives which put the “action back into action plan”.

Session Overviews

The three deep dive questions and sessions were interrelated and cumulative – session 1 (A+B+C) informed session 2 (A+B+C).

In session 1, we discussed the selected question together and heard different perspectives and insights. In breakout rooms, deep dive participants explored goals, barriers and opportunities between now and 2030.

In session 2, we explored the potential pathways to achieve collective goals, and tested the following lenses as a prompts for actions required:

- Leadership, people and networks
- Information, decisions and learning
- Market, regulatory and policy incentives
- Environmental outcomes and nature-based solutions

For each action, we explored: Who is needed to make it happen? What is their role? E.g. Individuals, households, communities, the third sector, business and government.

Topic 1

How might we expand and measure the range of values considered in decision making and learning?

Despite good intentions to build resilience, the current societal, political and economic choices seem to be doing the reverse. The choices people make are driving vulnerability and increasing losses. Valuing more of the same will increase harm and suffering.

We know people value different things, and that the things people value changes with context, time, experience, motivation and wisdom. The things people value change when their lives are disrupted. Values influence decisions. A range of values are already considered in decision making. These decisions are leading to the creation of vulnerability

[1] These include the Guidance for Strategic Decisions on Climate and Disaster Risk, the program logic for the NDRRF Monitoring, Evaluation and Learning Framework, the Royal Commission into National Natural Disaster Arrangements Report, the 2022 UNDRR Global Assessment Report, areas of future work outlined in the First National Action Plan, CSIRO’s Climate and Disaster Resilience Report to the Prime Minister, and a desktop review of progress made against the NDRRF 5 year outcomes.

rather than the reduction of vulnerability. Over time, this has been strongly influenced by whose values are included, and by assumptions of 'stability' and continued national prosperity. The range of people included in defining the values, and the ways that these are measured and included in decision making needs to be expanded, and re-balanced.

There are societal benefits to risk reduction efforts, and universal values that contribute to wellbeing and happiness, such as caring for country, being able to fulfill dreams and not experiencing harm. There are questions about whose values are prioritised, and whose are traded off. Current risk assessment methods and processes do not yet consider how to manage risks, to protect what is valued be people the most.

There is a saying that "what gets measured gets managed". Factors not measured are excluded from decision making and learning opportunities are missed. How might we account for factors such as sustainability, the value of ecosystems and future climate change impacts to reveal imbalances in existing systems? What is known about the rights of nature? How are the rights of nature considered in decision making?

Topic 2

How might we connect the complexity of disaster risk reduction with how people perceive risk and make decisions?

There is more data than ever before. Yet disaster risk is growing. Conventional approaches to multi-scale risk management are no longer fit for purpose. People make decisions on information and knowledge that is relevant to their context. How risk information is communicated influences decisions. Human biases influence decision-making and risk reduction outcomes. How much that is communicated to the public about risk influences decisions.

Risk information products can undervalue how risk perceptions influence decision making, such as the framing used to policies and products (e.g. consider 1 in 100yrs, compared to one in five chance over the next 25yrs). The way people interpret and make sense of information is usually through narrative, and the stories they tell themselves and the language they use is critical to perception of concept. The use of the term 'natural disaster' can also mislead people to think the devastating results are inevitable, out of our control and are simply part of a natural process. There is also the 'she'll be right' mentality across many Australians, and a sense of stoicism in disaster that undermines the needs of many (e.g. disasters lead to PTSD, unemployment, housing crisis etc). Reframing narratives in an evidence-based way that reflects many perspectives is critical.

Data needs will never be completely met. There are limitations in risk analytics in situations with high levels of ambiguity and uncertainty. Technocratic solutions are appealing. However, people make decisions. People, and the institutions they work for can resist making good decisions about risk, even with good scientific data – especially if there are mismatches in values and rules which prevent making fit-for-purpose decisions despite availability of data.

Silo-approaches are abundant. Cross-scale aspects of disaster risk confound existing silos (organisations, sectors, jurisdictions). Other forms of knowledge and ways of knowing to communicate risk are undervalued. Including indigenous knowledge, working across disciplines, or methods such as knowledge brokering, foresight, megatrends, scenarios analysis. Imagining all the different ways the future could unfold is also a challenge for the mind. This is a challenge in personal lives, the tension between the present self, and future self - knowing how much to spend and how much to save – to minimize future regret.

Decisions are currently influenced by short term thinking and historical experience. There is contestation about the problem and solutions. Existing risk management approaches are inadequate. Decision making processes are also slow and struggle to keep pace with the changing environment. How might participation, transparency and dialogue be stepped up in risk decision making to speed up learning and system changes (including engaging culturally and linguistically diverse (CALD), first nations, disability, women, youth).

Topic 3

How might we account for the real costs of risk in financial systems and incentivise opportunities for risk reduction?

Currently, the financial industry (and governments) are not able to account for the extent of financial assets at risk under various future climate scenarios.

They do not account for real costs of risk (over the long term, across life spans, and across different values). Currently there are limited incentives for fully understanding and assessing the systemic (cross-scale and uncertain) nature of risks and risk reduction which means the magnitude and possibility of disasters are always underestimated and mitigation is underinvested in.

Financial (and governance) systems are not yet embracing transdisciplinary approaches and tend to take siloed and top-down approaches principally focused on a single (monetized) value.

Absence of clarity about the roles and responsibilities for assessing, raising awareness, and managing risks between public and private sector actors leading to situations where investors can create and transfer risks to others and substantial missed opportunities for coordinated and collaborative investments across government, business and community to invest in activities that create or realise values that all benefit from.

Existing often entrenched organizational policies and cultures and disciplinary practices incentivize short-term priorities focused on narrow sets of beneficiaries (shareholders not stakeholders) and values (largely on monetized values and assets, with non-monetized values very much secondary) which misdirects efforts into ‘pricing risk’ and value extraction (i.e., annual revenue streams to shareholders) instead of creating longer-term diverse values for wider beneficiaries in place.

Annex I: Western Australia Jurisdictional Input

Submitted by: Western Australian Department of Fire and Emergency Services

Retrospective Review

Please describe the key initiatives within your jurisdiction or domain which have sought to address and reduce systemic risk since 2015.

The Emergency Management Act 2005 (the Act) is the overarching legislation in WA for emergencies and includes a focus on addressing and reducing systematic risk. Under the Act, the function of the State Emergency Management Committee includes provision of advice to the Minister of Emergency Services "on emergency management and the preparedness of the State to combat emergencies" as well as "to develop and coordinate risk management strategies to assess community vulnerability to emergencies". The Act also stipulates the establishment and function of District Emergency Management Committees and Local Emergency Management Committees, prescribes the hazard management agencies, combat agencies and support organisations, and the involvement of local governments in emergency management; all of which provide oversight of emergency and disaster risks at all levels of government in WA.

Additionally, hazard management agencies, combat agencies and support organisations have partnering agreements with multiple organisations to support the mitigation and/or treatment of the systematic risks as relevant their functions under the Act.

Key policies, strategies, initiatives and plans which underpin the reduction of risks in WA include:

- State Emergency Management Policy: A Strategic Framework for Emergency Management in Western Australia
- State Emergency Management Plan: A Strategic Framework for Emergency Management in Western Australia
- 16 State Hazard Plans (which include responsibilities for prevention, preparedness, response and recovery arrangements for each specified hazard)
- State Support Plans
- State Emergency Management Procedures:
    - Prevention and Mitigation
    - Recovery
    - State Emergency Management Guidelines
- Emergency Management Tools including:
    - WA Emergency Risk Management Local Government Handbook
    - WA Emergency Risk Management Treatment Manual
    - Risk Toolbox
- District Emergency Management Framework
- Local Emergency Management Framework
- WA Implementation Plan for the National Disaster Risk Reduction Framework
- State Emergency Management Committee Strategic Plan
- Annual Emergency Preparedness Report
- State Risk Project Report and Data.

The above are ongoing and information can be accessed via the SEMC Website.

What are your major achievements, challenges and barriers to implementing the Sendai Framework since 2015?

When highlighting major achievements, challenges and barriers to the implementation to the Sendai Framework, it is important to reflect on the environment, priorities and context for WA. Disaster risk reduction is a complex, multi-faceted continuous process and often occurs within communities in parallel with responses to and recovery from emergencies. The implementation of disaster risk reduction initiatives such as the Sendai Framework can be challenged by the prioritisation of the risks and emergencies which occurred within WA, particularly over the past 2 years and potentially for the next 12-18 months. WA will continue to respond to the ongoing pandemic emergency and deal with the associated flow on impacts and recovery as well as recovery arrangements from previous emergencies.

There has been a number of lessons learnt and findings from reviews which WA has addressed after consideration. The Royal Commission into National Natural Disaster Arrangements (RCNNDA) includes reference to the Sendai Framework and its implementation through NDRRF (for the Australian context) identifying "*the value of a national level understanding of disaster risk*"[1]. WA has accepted or accepted in principle the majority of recommendations and is working together with the Commonwealth and other States and Territories to implement these. Recommendations from the RCNNDA will contribute to the reduction of disaster risk in WA.

WA also has several initiatives which are aimed at the reduction of disaster risk reduction locally including:

- All West Australians Reducing Emergencies (AWARE): a WA government initiative to enhance WA's Emergency Management (EM) arrangements by building EM capacity and knowledge at both the local and district levels.
- State Risk Project: designed to build a comprehensive and consistent understanding of the risks faced at state, district, and local levels.
- Mitigation Activity Fund Grants Program (MAFGP): The Western Australian Government established the MAFGP to reduce bushfire hazards that present an extreme, very high or high risk to assets, in combination with the progressive rollout of the BRM Planning Program. The combination of these two programs has greatly assisted in ensuring that community bushfire risks are systematically assessed, prioritised and mitigated.

Governments nationally have been focused on risk response to a greater degree than risk reduction during the 2020-2022 period through necessity to ensure the safety of the wider community. While COVID-19 has presented significant hurdles in implementing the Sendai Framework, DFES has actively collaborated with commonwealth and state agencies to achieve all four priorities. Key achievements include:

- Commencement of a review of the State Emergency Management Committee subcommittee structure to better align with priorities under the National Disaster Risk Reduction Framework and the Sendai Framework.
- Finalisation of a comprehensive state risk assessment of all hazards prescribed in State legislation and commencement of the development of a treatment guide and state risk register.
- This work has helped to highlight risk treatment strategies, which have in turn helped to drive a range of collaborative activities to reduce disaster risk. An overview of indicative activities, including how they relate to the Sendai priorities is as follows:
    - Creation of multiple Memoranda of Understanding (MoU) with agencies and institutions including, Geoscience Australia, the WA Department of Mines, Industry Regulation and Safety, and James Cook University. Leveraging the subject matter experts within these organisations, DFES has successfully enhanced its understanding of disaster risk (**Priority 1**) for the following hazards and associated impacts: earthquake, cyclone, storm, riverine flood.
    - The lessons learned through the collaborative research underpinned by the DFES' current MoUs, including a successful flood intelligence program, are currently being applied to an expanded drive to further enhance our understanding of disaster risk through the development of a coastal hazard intelligence program and a seismic hazard intelligence program. One current key initiative is the

[1] https://naturaldisaster.royalcommission.gov.au/publications/html-report/chapter-04

collaboration with a multitude of Commonwealth, State and local government organisations to develop a coastal capture program to fill significant gaps in the spatial and topographic data of the WA coastline. This project will be critical to establishing a baseline for assessing coastal risk, and hazard management and land use planning activities for decades to come.

- The above initiatives will also play a critical role in achieving **Priority 3**, "Investing in disaster risk reduction for resilience" as the enhanced understanding of disaster risk provide support for enhanced policy, program, planning and investment decision-making. Already, outputs of projects conducted since 2015 have resulted in, guidance on enhancing resilience of heritage buildings, publicly available information on maintaining homes in cyclone-prone regions, and an enhanced understanding of risk associated with critical infrastructure.
- The multi-agency collaboration across all tiers of government have helped to reinforce **Priority 2**, "Strengthening disaster risk governance to manage disaster risk". By working towards nationally consistent approaches for hazard modelling, data sharing, alerts and warnings, stakeholders are endeavouring to ensure consistency and minimise duplication across all sectors in their identification, prioritisation, communication and reduction of disaster risks and losses.
- Through the activities outlined above, DFES is working towards achieving its primary mission of enhancing disaster preparedness for effective response, which is consistent with **Priority 4** of the Sendai Framework. Collaborating with the array of stakeholders described above, DFES is working towards integrating disaster risk reduction into State land-use planning measures, building codes and regulations, and enhanced community awareness.

What partnerships and initiatives have been most successful in assisting in the reduction of disaster risk?

The collaborative and partnering arrangements, as well as the involvement of agencies, associations and organisations at all levels of government, in a wide range of initiatives has supported the achievement of the reduction of disaster risk in WA.

Examples include:

- linking grant funding such as National Risk and Resilience Program, Preparing Australian Communities Program to risk reduction,
- the Bushfire Centre of Excellence and support materials, training and guidelines, Cultural Fire Program, Planned Burning Assurance Program and associated support materials,
- climate change initiatives such the Western Australian Climate Change Policy, Climate Change in Western Australia Issues paper – September 2019, WA Climate Science Initiative, Health impacts of climate Change: Adaptation strategies for Western Australia,
- placement of Bureau of Metrology representatives within the State Operations Centre,
- high percentage of local governments with disaster risk reduction strategies,
- Annual Emergency Preparedness Report for WA,
- numerous research projects which consider the reduction of systematic risks for multiple natural hazards that are undertaken in partnership with organisations such as GeoScience Australia, CSIRO and multiple higher education and research institutions.

Representatives from WA actively participate in a wide range of national initiatives such National Heatwave Framework working group, development of the National Disaster Risk Reduction Framework and subsequent first and second National Action Plans, Mitigation and Risk Sub-committee for Australia New Zealand Emergency Management Committee, Australian Warning System, Australian Fire Danger Warning System, senior and ministerial representation in national forums including Australia New Zealand Emergency Management Committee, National Emergency Management Ministers Meetings, Data and Digital Ministers Meetings and many more. Participation by WA representative in the national forums and committees enables the WA context, social, environmental and vulnerability factors to be presented and considered within initiatives.

Main Roads have arrangements in place for the management of roadside vegetation and has commissioned work with the objective to incorporate best practice bushfire management into infrastructure planning, design, construction and maintenance practices to ensure:

- bushfire risk is considered in transport network planning,
- design considerations and standards address bushfire risk to the asset (including roadside stopping areas), travelling public and operation of the network and ensure impact to the transport network level of service is minimised in a bushfire event; and
- the ability for rapid recovery of the transport network level of service post bushfire event.

Western Australia has an extensive range of community engagement initiatives and tools, which are evaluated and improved as necessary. Examples include the Bushfire Ready Program, which is focused on increasing community resilience and encourages residents to form a Bushfire Ready Group, supported by trained Volunteer Bushfire Ready facilitator and local fire services personnel. Other examples include the Fire Chat program - an Australian first, My Bushfire Plan App, which encourages community resilience and the Burn Smart program, which is designed to assist property owners in planning and implementing planned burns.

State agencies conduct ongoing research with federal, state and local government stakeholders for a range of hazards, including earthquake, tropical cyclones, and storm surge. This research informs a range of public facing informational tools, such as preparedness guides, fact sheets and evacuation maps, all aimed at promoting disaster resilience for individuals and communities.

The Planning and Development Act 2005 (WA) allows for the notifications on title for new lots created which allows for identification of hazards and are targeted at prospective purchases. Mandatory consideration of risks occurs in practice in WA through the requirements of Planning and Development (Local Planning Schemes) Regulations 2015. Bushfire risk is considered through the requirements in State Planning Policy 3.7 - Planning in Bushfire Prone Areas and Guidelines for Planning in Bushfire Prone Areas.

In addition, DFES has established the Bushfire Technical Services and Emergency Management Intelligence Branch to support the identification and reduction of risks associated with the eight (8) hazards for which DFES is the prescribed hazard management agency.

How have national, sub-national and local public policy, legislation, and governance structures changed to align with the Sendai Framework?

The national alignment of policy and governance with the Sendai Framework such as the Natural Disaster Risk Framework (NDRRF) is foundational to alignment within WA. WA considers alignment with national public policy and as such is considerate of the Sendai Framework; if not explicitly, by inference. As described in greater detail in the response to question 5, Commonwealth and State disaster risk reduction funding for projects such as those outlined in question 2 require alignment with the NDRRF, which has been designed to align closely with the Sendai Framework. Consequently, the vast majority of such projects and governance structures that result from such activities reflect the principles underpinned by the Sendai Framework.

How and to what extent has the establishment of national and/or local disaster risk reduction strategies and plans resulted in expanded efforts in systemic risk reduction?

The establishment of local disaster risk reduction strategies and plans to expand efforts for systematic risk reduction in WA have been supported through the alignment of grant funding to the NDRRF. The NDRR Grant Program is funded under the National Partnership Agreement (NPA) on Natural Disaster Risk Reduction and is between the Western Australian and Commonwealth governments. The NPA aims to proactively reduce the risk of natural disasters on Australian communities and economies. In 2015, Australia and other countries at the third United Nations World Conference on Disaster Risk Reduction adopted the Sendai Framework for Disaster Risk Reduction 2015 – 2030. The Sendai Framework outlines four priorities which, at the time, helped shape Australia's disaster risk reduction approach.

The Australian Government aligned its disaster risk reduction policy with the Sendai Framework by inviting all states, territories, local government, and key private sector representatives to create the Natural Disaster Risk Reduction Framework (NDRRF).

To be eligible for NDRR funding in WA, projects must:

- Address at least one of the four (4) priorities of the Commonwealth NDRRF
- Demonstrate one or more of the thirteen (13) State Priority Action Areas, including those outlined in the WA Implementation Plan for the NDRRF; and
- Address at least one of the seven (7) managed natural hazards.

How and to what extent have investments in disaster risk reduction increased since the implementation of the Sendai Framework (2015), and what measures are in place to ensure these investments are risk-informed?

As per the response in Question 5, the NDRR Grant Program is funded under the National Partnership Agreement (NPA) on Natural Disaster Risk Reduction and is between the Western Australian and Commonwealth governments. The grants program focuses investment on disaster risk reduction as outlined in Commonwealth NDRRF and State Priority Action Areas, including those outlined in the WA Implementation Plan for the NDRRF.

Other grant funding programs provided by the Commonwealth are informed by the state risk priorities, in consultation with emergency risk specialists within DFES and other WA government agencies.

Detailed analysis on the extent to which have investments in disaster risk reduction have increased in WA since the implementation of the Sendai Framework (2015) has not been undertaken.

What major changes / emerging issues / topics of concern are anticipated in the period to 2030 and beyond which will need to be considered in prioritising, accelerating and amplifying action to reduce disaster risk?

Emerging issues that are expected to escalate for prioritised action to reduce disaster risk include:

- Climate change and the expected impacts for emergencies and disasters within WA
- Governance arrangements and the evaluation framework of risk reduction effectiveness
- Partnering between governments, non-government organisations, not for profit organisations, philanthropic and private organisations to mitigate and reduce emergency and disaster risks
- Galvanisation of energy and focus for the activation of the WA Community Disaster Resilience Strategy
- Increasing vulnerability of remote and/or regional communities due to compounding emergency events and/or disasters
- Exposure to emergency risks due to infrastructure or supply chain risks such as telecommunications, power supplies in remote and regional areas, major transportation corridors and routes.

Prospective Review

During review of the working draft national report, it was identified that there are initiatives – current and future, which are identified as additional information to the Western Australian response. The additional information is included as a Prospective Review due to the evolving and/or future nature of the initiatives.

The following information is proposed as additional to the WA response and look at the forward -looking elements of Sendai Framework's Mid Term Review:

Question 1: The Sendai Framework states that responsibilities for disaster risk reduction are shared by central Governments and relevant national authorities, sectors and stakeholders. Within your jurisdiction, what must be prioritised to ensure that responsibilities are shared in risk identification and reduction and what measures can be taken to ensure that 'no one is left behind'?

State Emergency Management Committee (SEMC) – Future Initiatives

At the 5 May 2022 SEMC Strategy Workshop, members approved initiatives which were seen as establishing the effectiveness of WA Emergency Management (EM) arrangements into the future. The SEMC future initiatives include:

- **Framework for Engagement with Philanthropic and Private Organisations** – There are clear benefits associated with partnering with private and/or philanthropic organisations to assist with providing safety for communities where capability, capacity and services are clearly defined beforehand. It is important to note

that philanthropic aims can be leveraged to address all aspects of preparedness, prevention, response and recovery (PPRR), all hazards approach to emergency management. Ensuring a risk based, evidence informed approach is taken to establishing a position for the state in regard to philanthropy and private organisations and how they can be incorporated into the current WA Emergency Management Framework.

- **Review of the state emergency management structures and responsibilities** - 'the SEMC is undertaking reviews of the State's emergency management governance structures and responsibilities at state and local government levels to ensure alignment of effort with Western Australian and national emergency management strategic objectives

Question 2: Within your jurisdiction, what is needed to enable an accelerated reduction of disaster risk and increase in the resilience of people, assets and ecosystems in the remaining period of the Sendai Framework (to 2030) and beyond?

Western Australia (WA) Climate Policy

The Western Australia (WA) Climate Policy sets out the State Government's plan for a climate resilient community and a prosperous low-carbon future. The WA Climate Policy emphasises the need to enhance climate resilience through adaptation planning to enable a process of adjustment to the impacts of climate change in a specific area of concern. The WA Climate Policy draws together climate change actions and sets new commitments. These include initiatives to support the net zero transition across the public sector, initiatives for low-carbon energy, mining and agriculture and commitments to guide decarbonisation across the rest of the WA economy.

The Western Australian Climate Policy outlines the priority themes (below) and practical actions the State Government is taking to enhance climate resilience and support the low carbon transition.

- Clean manufacturing and future industries
- Transforming energy generation and storing carbon and caring for our landscapes
- Lower-carbon transport
- Resilient cities and regions
- Government leadership

This policy looks beyond business-as-usual measures to highlight the significant actions that we are taking in collaboration with industry and the community to boost our economy, prepare for climate change and achieve our aspiration of net zero emissions by 2050.

Climate Science Initiative

The Climate Science Initiative is designed to equip WA with the latest climate science and knowledge to respond to our changing climate. The WA government is investing $3.1 million in climate science to support decision-making, ensure informed risk assessment and robust adaptation planning. Collaboration and partnerships including with other jurisdictions and Australia's world-class research and science institutions will underpin the success of the Climate Science Initiative.

The Climate Science Initiative will:

- Make updated, high-resolution climate data and information for WA available, and accessible to decision-makers and the community.
- Engage and empower Western Australians to use climate data in planning and decision-making.
- Identify and plan for future sector and regionally specific climate data and knowledge needs.

Climate Risk Assessment Tool

The Climate Risk Assessment Tool has been developed as a template to support WA state agencies and government trading enterprises (GTEs) in completing a climate risk assessment, ongoing identification of risk treatments and implementation of adaptation actions. The tool will assist users in structuring their climate risks and enables the rating of risks across multiple future time horizons to consider the long-term impacts climate change is likely to have on the organisation.

WA Emergency Management Sector Climate Initiatives

The WA emergency management sector is looking to initiatives which will enable the development of support by the sector for the WA Climate Policy. The following initiatives are outlined below:

- Update the SEMC Strategic Plan to include:
    - *Climate Change – The sector is prepared, willing and responsive to the impacts of climate change on Emergency Management.*
- Climate Change Subcommittee is established to undertake the work necessary for SEMC to achieve its climate change related strategic objective including:
- Identifying and evaluating the current situation within the sector, including:
    - Existing climate change adaptation initiatives occurring across the sector.
    - Issues and needs for the sector, including capability gaps, barriers to climate change adaptation, future challenges and opportunities.
    - Leading the development of a Western Australian Emergency Management Sector Climate Change Adaptation Plan (WA-CCAP).
    - Supporting the integration of climate change adaptation into the Emergency Management Framework.
- Effective communication and influence across government WA-CCAP.
- Develop and implement the WA-CCAP.

Western Australian Emergency Management Sector Climate Change Adaptation Plan

The State Government's *Western Australian Climate Policy* sets out the Government's plan for a climate-resilient community and a prosperous low-carbon future. The Federal government's National Climate Resilience and Adaptation Strategy also explains the implications of climate change for Australians and its plans to develop climate resilience within the community, as well as the public and private sectors. Additionally, the WA government has published its investigation into the impacts of climate change on human health and a strategy for the path forward.

It is internationally acknowledged that the effects of climate change include increased intensity, frequency and duration of extreme weather events including heatwaves, droughts, floods, storms and fires. These impacts vary in character and scale across regions and types of events.

At the SEMC Strategic Workshop in May 2022, members discussed the implications of climate change for the EM sector. Consequently, agreement was reached that reform was required to emphasise building resilience through prevention and preparedness in the WA EM landscape.

Significant research, consultation and engagement with stakeholders including government, industry and the community is proposed to develop a WA focused EM Sector Climate Change Adaptation Plan (WA-CCAP). The development of the WA-CCAP will support the newly endorsed climate change strategic objective to be included in the updated SEMC Strategic Plan.

Question 3: Within your jurisdiction, what needs to occur to empower local action in strengthening disaster risk reduction action?

Community Disaster Resilience Strategy

The Wooroloo bushfires, STC Seroja and the COVID-19 pandemic are reminders that we can all be affected by disasters - no matter who we are, where we live or what we do. While the Western Australian and Commonwealth governments are investing significantly in projects to reduce the risks posed by natural hazards, it is not possible to eliminate all risks.

The intent of the Community Disaster Resilience Strategy is to increase the capacity of communities to cope with and recover from the possible impacts of those risks.

The draft Community Disaster Resilience Strategy is due to the SEMC at the end of December 2022.

Department of Communities Emergency Welfare Capability Program

Under the WA EM arrangements, the Department of Communities (Communities) is responsible for providing and coordinating welfare services during emergencies. The *Emergency Management Act 2005* (EM Act) and the Emergency Management Regulations 2006 (EM Regulations) form the legislative basis for emergency management within WA, identifying Communities as the "*support organisation responsible for the support function of providing welfare services*" in an emergency event (EM Regulations Part 5 r.32).

The State Support Plan identifies six functional areas of welfare provision:

- Emergency Accommodation
- Emergency Food Provision
- Emergency Clothing and Personal Requisites
- Personal Support
- Registration and Reunification
- Financial Assistance

An Emergency Welfare Management Partners Forum was held in July 2021. The forum was co-convened by Communities and the Western Australian Council of Social Service (WACOSS). Participants discussed the processes, systems and frameworks required to improve the State's emergency welfare response capability across the six welfare domains.

14 key themes (figure on following page) emerged across four categories captured in the draft Partners Strategy which is currently out for consultation.

Once finalised, the Partners Strategy Outcomes Framework will:

- Connect the Partners Strategy to the outcomes sought for the members of communities impacted by events.
- Provide the necessary Theory of Change – the reasoning and assumptions that underpin the strategy and provide confidence that the actions will progress towards the intended outcomes.
- In a graphical and digestible manner, define the outputs and indicators for the strategy, which will allow both Communities and the sector to track the shared progress.

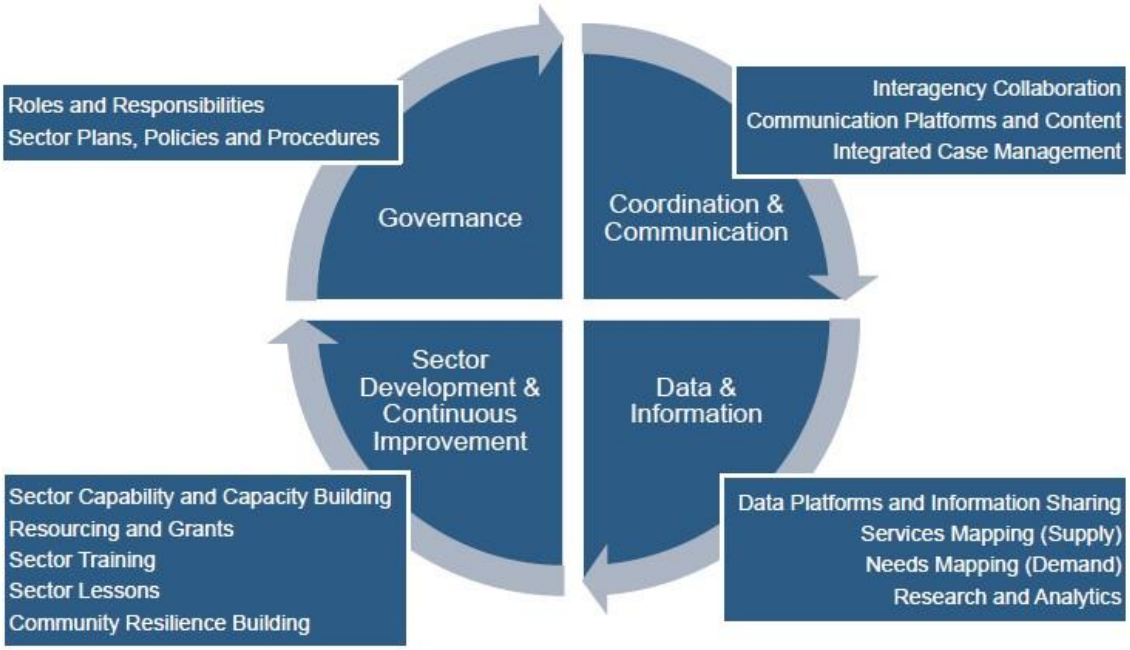


Figure 2: Partners Strategy – 14 Key Themes by Category

Question 4: In reference to the three questions above, where is this already occurring and what (if any) institutional arrangements need to change to enable this to occur?

Any changes to institutional arrangements are likely to evolve as the outcomes of reviews outlined in the previous questions are completed.

Question 5: What are the major changes / emerging issues / topics of concern anticipated in the period to 2030 and beyond which will need to be considered in prioritising, accelerating and amplifying action to reduce disaster risk?

Please refer to the responses to previous questions.

Conclusion

WA is committed to the Sendai Framework 2030 through the implementation of the National Disaster Risk Reduction Framework and its associated National Action Plan. Working in partnership with the Commonwealth and other states and territories, as well as significant leadership by government will be required to advance and embed the framework in its current and future formats.

Case Study - Department of Communities - Severe Tropical Cyclone (STC) Seroja

During the relief/response phase, Communities deployed a total of 87 staff (265 deployed since the response) which lasted six weeks (DFES, 2021). Australian Red Cross was activated by Communities to extend the psychosocial supports provided soon after STC Seroja hit, deploying 135 staff and volunteers before the official transition to recovery services. Other partners activated by Communities for assistance for the initial early relief period included Adventist Development and Relief Agency (ADRA), Food Bank, Salvation Army and Bundiyarra Aboriginal Community Corporation.

Insights from the field: Food donations

Due to remoteness, power outages and communication issues, sourcing food provision for evacuation was a significant challenge experienced by Communities. To address this issue, Communities' staff implemented solutions which included receiving food donations from several providers in the region as well as coordinating the provision of meals through external providers including Rapid Relief Team, Rainbow Jungle Cafe and other local providers.

Stakeholder support

Activities	**Numbers**
Australian Red Cross Outreach Visits	2,219
Australian Red Cross Capacity Building Sessions	6 sessions with 88 attendees
Australian Red Cross Pillowcase SchoolRoadshows	4 schools visited with 63 students
Australian Red Cross Community Resilience and Rediplan Events	1 tour with 28 farmers
Desert Blue Meetings	4
GIVIT Requests	15
Centacare Coffee Catch Ups	26

Annex J: Retrospective Review – Queensland Jurisdictional Input

Submitted by: Queensland Reconstruction Authority

Introduction

The Queensland Government welcomes the opportunity to provide input into the Sendai Framework Mid Term Review. The Queensland Reconstruction Authority (QRA) has collated feedback from key stakeholders to inform the responses to the questions provided.

Questions 1-3

Question 1: Please describe the key initiatives within your jurisdiction or domain which have sought to address and reduce systemic risk since 2015

Describe key policies, programs, investments, partnerships, or other relevant initiatives that address and reduce systemic risk since 2015. Please indicate details such as when these initiatives started and ended, are due to end, or if they are ongoing, and provide any links if available.

Question 2: What are your major achievements, challenges and barriers to implementing the Sendai Framework since 2015?

If possible, please link these achievements, challenges and barriers directly to the Outcome, Goal, Global Targets, Priorities for Action and Guiding Principles of the Sendai Framework, or more broadly, please identify actions to reduce disaster risk in your jurisdiction.

Question 3: What partnerships and initiatives have been most successful in assisting in the reduction of disaster risk?

Consider partnerships and initiatives across levels of government, industry and all other sectors of society and their outcomes. Please provide links if available.

The tables below address questions 1-3 and outline the key initiatives within Queensland that have addressed and reduced systemic risk since 2015. Major achievements, challenges and barriers to implementing the Sendai Framework since 2015 are listed against each initiative, and where possible, these have been linked to specific Outcomes, Goals, Global Targets, Priorities for Action and Guiding Principles. The partnerships and stakeholders for each initiative that have enabled its success are also described.

The tables have been themed according to the initiatives, and include:

- Strategies, Frameworks, Plans, Initiatives and Guides
- Funding programs
- Climate

Table 1: Strategies, Frameworks, Plans, Initiatives and Guides

The below table provides detail on key strategies, frameworks, plans, initiatives, and guides in Queensland that have addressed and reduced systemic risk since 2015.

Initiative / Program	Description and key actions	Partnerships / Stakeholders	Investment ($)	Outcomes (achievements, challenges & barriers)	Link to Goal / Priority / Target in Sendai Framework	Currency of initiative (start and end date)
Queensland Strategy for Disaster Resilience (QSDR) Implemented through Resilient Queensland (RQI)	The QSDR and its implementation plan, Resilient Queensland, are the frameworks used to strengthen disaster resilience in Queensland, ensuring the locally identified priorities are at the forefront of decision making. Every region across Queensland will be part of a locally led, regionally-coordinated and state-facilitated Regional Resilience Strategy by the end of 2022. *Resilient Queensland in Action (2020)* provides a state-wide progress update highlighting how Queensland is delivering on the objectives of the QSDR and Resilient Queensland. It showcases achievements including case studies and initiatives by our state agencies, local governments and communities.	1. Queensland communities and individuals 2. Local Governments 3. Queensland businesses and service providers 4. State Government Agencies 5. The Australian Government 6. Community-based organisations	The Queensland Government has invested in facilitation and coordination of the roll out of Resilient Queensland and invested in resilience programs across the state.	Resilient Queensland is an example of a successful program as upon its completion, Queensland's resilience needs and the projects / actions / initiatives to address disaster risk will be well known. This enables bespoke programs to be developed that meet local needs. Resilient Queensland has: 8. Enabled locals to tell their unique story of disaster resilience across each of Queensland's diverse regions 9. Helped the state and federal government better understand what needs to be done to improve disaster resilience in Queensland 10. Can be used as an evidence base at a local and regional level to link resilience and mitigation funding to identified needs. However, barriers to implementation include: i. Capacity and capability of stakeholders ii. Limited and unknown availability of funding.	**Goal:** Prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and strengthen resilience. **Priority 1:** Understanding disaster risk. **Priority 2:** Strengthening disaster risk governance to manage disaster risk. **Priority 3:** Investing in disaster risk reduction for resilience.	2017 – Current (under review)

		7. Non-government organisations		Further effort is required to embed disaster risk reduction into business-as-usual activities across all sectors of government.	**Priority 4:** Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction. **Target:** To promote the resilience of communities.	
Queensland State Disaster Management Plan (QSDMP)	The QSDMP establishes the framework, arrangements and practices that enable disaster management in Queensland, and guides disaster management stakeholders through the provision of commentary and directions to supporting documents such as plans, strategies or guidelines. The objectives of the QSDMP are to: • outline the principles of disaster management in Queensland • describe the roles and responsibilities of disaster management stakeholders to support disaster management as legislated in the *Disaster Management Act 2003* *(DM Act)* • outline the arrangements for prevention, preparedness, response, recovery and resilience. Key Actions: development of various assessments and plans: • Assessment and plans (disaster.qld.gov.au) • Queensland Recovery Plan • State Natural Hazard Risk Assessment 2017 • State Heatwave Risk Assessment • State Earthquake Risk Assessment • Severe Wind Hazard Assessment for Queensland • Emergency Management Sector Adaptation Plan (EM-SAP) for Climate Change	State Government Agencies Queensland communities and individuals Local Governments Queensland businesses and service providers	N/A	The QSDMP makes provision for the following, as prescribed in the DM Act: • *Queensland Disaster Management 2016 Strategic Policy Statement.* • The roles and responsibilities of entities involved in disaster operation and disaster management for the state • The coordination of disaster operation and activities relating to disaster management performed by those who have roles and responsibilities • Events that are likely happen in the state • Outlines the priorities for disaster management for the state • Any other matters the Queensland Disaster Management Committee (QDMC) considers appropriate or are prescribed by the *Disaster Management Regulation 2014.*	**Priority 2:** Strengthening disaster risk reduction for resilience. **Priority 4:** Enhancing disaster preparedness for effective response, and to build back better in recovery, rehabilitation and reconstruction.	2018 - Current (Under review)
Queensland Flood Risk Management Framework (QFRMF)	The QFRMF sets the direction for flood risk management in the state and aligns with the National Disaster Risk Reduction Framework, the Queensland Strategy for Disaster Resilience, and has been developed consistent with the principles of the Queensland Emergency Risk Management Framework.	State Agencies Local Governments Bureau of Meteorology Dam Owners Natural Resources Management Bodies River Improvement Trusts Industry stakeholders	Resilience and recovery funding programs assist in the delivery of the QFRMF. Delivered under the QFRMF, a $28m flood risk management package has been approved comprising of upgrading Queensland's flood risk technology, funding flood studies, management studies	In Queensland, governance of flood risk management is based on a collaborative, decentralised model with shared roles and responsibilities. The QFRMF objective is to: • Set the direction for flood risk management in Queensland • Provide clarity around expectations • Outline the roles and responsibilities of all stakeholders involved • Guide and supporting decision-making by councils. In delivering the QFRMF, QRA is developing a state-wide assessment of flood risk that will produce a localised list of flood risk areas, taking into consideration flood exposure, vulnerability, historical flood events, availability of flood studies, flood risk management strategies/plans, flood warning intelligence, and community awareness and education.	**Goal:** Prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and strengthen resilience. **Priority 1:** Understanding disaster risk. **Priority 2:** Strengthening disaster risk governance to manage disaster risk. **Priority 3:** Investing in disaster risk reduction for resilience.	2021- Current

			and intelligence systems.	QRA is also developing metrics to measure progress of the QFRMF implementation towards fostering flood resilient communities in Queensland.	**Priority 4:** Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction. **Target:** To promote the resilience of communities. **Target:** Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments.	
Queensland Strategic Flood Warning Infrastructure Plan (QSFWIP)	The QSFWIP (June 2021) supports communities to better prepare and respond to flood events, and improve community resilience to flood events, through the development of a best practice network of flood warning gauges.	Queensland Flood Warning Consultative Committee, chaired by the Bureau of Meteorology Local Governments Dam Owners Other asset owners	Since 2017, QRA has secured $15.85m in funding for flood gauges and other flood warning infrastructure across Queensland, including $11.7m worth of projects currently in delivery (as at 1 June 2022). Queensland government has committed $5m per year for 10 years for the operation and maintenance of a gauge network. $7m worth of Flood Warning Infrastructure will be installed across 23 impacted council areas from the 2022 SEQ Flood event.	The achievements of the QSFWIP include: • Providing a clear governance structure and approach for Queensland’s flood warning network • Ensuring the flood warning infrastructure network is fit-for-purpose for the flood risk that exists in Queensland • Supporting Queensland communities to better prepare and respond to flood events. • Improve community resilience to flood events through development of a best practice network of flood warning gauges	**Goal:** Prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and strengthen resilience **Priority 1:** Understanding disaster risk. **Priority 2:** Strengthening disaster risk governance to manage disaster risk. **Priority 3:** Investing in disaster risk reduction for resilience. **Priority 4:** Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction. **Target:** To promote the resilience of communities. **Target:** Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments.	2021 - Current
Queensland Disaster Resilience and Mitigation Investment Framework (QDRMIF)	The QDRMIF provides guidance on effective investment decision making and prioritisation to support disaster resilience and mitigation across Queensland.	State Agencies Local Governments Businesses Tertiary sector	The QDRMIF has the flexibility to support the assessment and prioritisation of infrastructure-based resilience and mitigation investments, as well	The QDRMIF enables state agencies to create innovative and transparent pathways to inform resilience investment in Queensland. The framework is not about creating new processes, but rather ensuring coherence across our work and current programs. It is about providing appropriate pathways and guidance to our stakeholders and the community to ensure effective and efficient	**Goal:** Prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and strengthen resilience	2019 - Current

		Community groups and individuals	as non-infrastructure or community resilience measures.	investment in building and strengthening resilience of people, communities, infrastructure and the environment.	**Priority 3:** Investing in disaster risk reduction for resilience **Priority 4:** Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction	
Get Ready Queensland (GRQ)	The GRQ program is a year-round, all hazards, resilience building initiative coordinated by the QRA to help Queenslanders and Queensland communities prepare for natural disasters.	Local Governments Community-based organisations Non-government organisations	The GRQ program provides $2 million annually in funding to the Queensland’s 77 Local Government Areas and one town authority to prepare for disasters. Some projects funded include disaster dashboards, sandbag machines, community clean-up days, continuity training for local businesses, support for vulnerable groups, equipment for evacuation centres, and much more.	GRQ undertakes various state-wide events. Get Ready Week 2021 generated significant national, state and local media coverage with 65 stories across TV, press and digital media outlets delivering the Get Ready message to a potential audience of 1.42 million people. Research shows that the number of Queenslanders with an emergency plan has grown by 40% since Get Ready started in 2013, while the number with an emergency kit has increased by 20 per cent. Challenges involved in disaster preparedness includes changing people’s behaviour towards preparedness. The program requires households, small businesses, and community groups to take a number of steps to achieve the desired disaster preparedness state. Influencing the adoption of multiple behaviour takes time and requires several campaign iterations that build upon the last.	**Goal:** Prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and strengthen resilience **Priority 1:** Understanding disaster risk **Priority 4:** Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction **Target:** To promote the resilience of communities	2019 - Current
Queensland Emergency Risk Management Framework (QERMF)	The QERMF is a framework that is used to identify disaster risks and develop risk management plans and mitigation strategies. Furthermore, it applies a standardised approach to the prioritisation, mitigation and management of risk. The application of QERMF promotes opportunities for collaboration and communication between Government, industry stakeholders and the community. It also promotes the need for identification and communication of residual risk across these levels. The QERMF assists key stakeholders working within Queensland’s Disaster Management Arrangements (QDMA) to review existing natural disaster risk management processes and assist in enhancing resilience as outlined within the Queensland Strategy for Disaster Resilience.	Stakeholders at all levels of Queensland’s Disaster Management Arrangements, including Local Government’s, Local and District Disaster Management Groups, other State Agencies Commonwealth Agencies Other third parties, including not-for-profit enterprises and private companies	Encompassing all investment to date (2015 and promised forward investment) - $10 million. Queensland government supported Phase 1 of QERMF as part of the rollout of Resilient Queensland.	Extensive engagement across Queensland with Local and District Disaster Management Groups – almost 85% of all councils in Queensland have been engaged in a workshop. • Risk assessments across the state have been completed, raising the standard and knowledge of disaster risk reduction throughout the State.	**Priority 1:** Understanding disaster risk **Priority 2:** Strengthening disaster risk governance to manage disaster risk **Priority 4**: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction **Target D:** Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030 **Target G:** Substantially increase the availability of and access to multi-hazard early warning	2017 – Current

					systems and disaster risk information and assessments to people by 2030	
State Disaster Risk Assessment and Prioritisation Program (SDRAPP)	The SDRAPP is an ongoing program of works that aims to provide stakeholders at all levels of Queensland's disaster management arrangements with up-to-date, hazard-specific information and advice. Its major deliverables are the State Natural Hazard Risk Assessment (2017) and the State Disaster Risk Report (SDRR, 2021) – not yet published.	Stakeholders at all levels of Queensland's Disaster Management Arrangements	$70,000	Two flagship reports that report on risks across Queensland, which included involvement and engagement from across Queensland's disaster management arrangements. The SDRR uses a cutting-edge approach which equivocates climate risk and disaster risk. This drives an understanding of current risk throughout the State, but also future Risk. The SDRR provides prioritisations for hazard not only at the State level, but also at the Regional Plan Area and Local Government levels. These prioritisations allow for the coordination of State and local-level disaster risk reduction activities.	**Priority 1:** Understanding disaster risk **Priority 2:** Strengthening disaster risk governance to manage disaster risk **Priority 4:** Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction **Target D:** Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030	2017 – Current
The Severe Wind Hazard Assessment for Queensland (SWHA-Q) AND Severe Wind Hazard Assessment for South East Queensland (SWHA-SEQ)	The SWHA-Q, was delivered as a collaborative project between Queensland Fire and Emergency Services (QFES), the Queensland Department of Environment and Science (DES), James Cook University and Geoscience Australia (GA). Developed in response to the 2017 Cyclone Debbie Review, the projects core aim was to provide realistic and tangible information on the potential physical impacts of tropical cyclones on Queensland communities. The follow on SWHA-SEQ project seeks to better understand current and future cyclone and thunderstorm risk for six major coastal councils in SEQ (from Noosa to the Gold Coast) and the short to long term measures that can be employed to reduce the risk to the community and the infrastructure upon which we depend.	Stakeholders at all levels of Queensland's Disaster Management Arrangements	$2 million	The suite of hazard management tools delivered through the project will enable the emergency management sector, local governments and communities across Queensland to more effectively engage with the current and future risks posed by cyclones, informing long term strategic risk reduction strategies. The SWHA-Q project included development of the Tropical Cyclone Dashboard, which the Department of Environment and Science will publish on the Queensland Future Climate (QFC) website alongside release of the SWHA-Q reports. The Tropical Cyclone Dashboard combines downscaled climate projections with tropical cyclone hazard modelling to allow users to interactively assess current and future tropical cyclone hazards across the State. The project included refinement and implementation of the Tropical Cyclone Impact Model (TCIM), developed in partnership with Geoscience Australia (GA) and the Western Australia Department of Fire and Emergency Services. The TCIM brings together the forecasting capability of the Bureau of Meteorology with the impact modelling capability of GA to provide nationally consistent and near real-time quantitative guidance on the expected impacts of tropical cyclones on residential dwellings. This will support decision making during cyclones, such as evacuations, to keep communities safe.	**Priority 1:** Understanding disaster risk **Priority 4:** Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction **Target D:** Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030	2018 - Current
Tsunami Guide for Queensland (TGQ) State Earthquake Risk	The Tsunami Guide for Queensland and the State Earthquake Risk Assessment provide guidance on risks for Queensland of geohazards, which are low probability but potentially high consequence. They leverage emerging science and modelling within Australia and localise it to the Queensland context.	Geoscience Australia University of Queensland University of Newcastle	Funded through QERMF investment.	TGQ and SERA were developed in 2019 to inform the development of risk-based disaster management plans and business continuity plans in line with the QERMF. In line with the Independent Review of the QERMF, all existing resources are being updated to reflect scientific advancements, lessons from recent events and feedback from disaster managers. Outcomes from the QRRRF funded Tsunami Modelling Project for the Gold Coast will be considered as part of the TGQ update.	**Priority 1:** Understanding disaster risk **Priority 4:** Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction	2019 – Current

Assessment (SERA)				Webinars to raise the level of understanding of tsunami and earthquake risk in Queensland including raising the awareness of these resources have been delivered during FY 21-22. Earthquake vulnerability of pre-1940 unreinforced masonry buildings in Queensland will be conducted through a research collaboration with QUT during FY22-23. This information will inform future earthquake risk assessments conducted throughout Queensland.	**Target D:** Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030 **Target G:** Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030	
Emergency Management Sector Adaptation Plan (EM-SAP)	The Emergency Management Sector Adaptation Plan (EM-SAP) was developed to support the sector to manage the risks associated with a changing climate, and to harness the opportunities provided by responding to the challenges. Led by the emergency management sector, the EM-SAP ensured relevance and the participation of sector stakeholders, encourages sector leadership, and promotes adaptation initiatives.	Stakeholders at all levels of Queensland's Disaster Management Arrangements	$50,000	QFES in partnership with DES and the National Climate Change Adaptation Research Facility (NCCARF), led the development of the Emergency Management Sector Adaptation Plan (EM-SAP) for Climate Change (2018), which forms part of the Government's commitment and action on the Queensland Climate Change Response. The EM-SAP outlines a vision, principles and eight priorities that intend to guide sector climate change adaptation activities and planning to ensure that it is fully engaged with the risks and opportunities of a changing climate.	**Priority 3:** Investing in disaster risk reduction for resilience	2018
Telehealth advancement initiatives throughout COVID-19	Telehealth enabled patients to receive quality care closer to home via telecommunication technology, improving access to specialist healthcare for people in regional communities and reducing the need to travel for specialist advice. During the COVID-19 pandemic, Queensland Health, along with partnering agencies, committed to enhancing the Telehealth service by investing resources into the development of the program, which allowed for individuals to access medical care from home or from quarantine, and assisted with remote healthcare during COVID-19. The realized benefits of Telehealth have also been demonstrated during multiple disaster events in 2022, in successfully providing medical services to communities impacted by natural disasters, such as those isolated by flood events, as well as providing health professionals with remote specialist support when access has been impacted.	Queensland Government Australian Government Queensland Health Primary Healthcare Providers	N/A	Improvements in patient access to health care during a disaster event. Reduced unnecessary travel time and inconvenience to patients, families, carers and health professionals, especially when isolated from health care facilities or unable to leave home. Provides health professionals with access to remote specialist support and education if physical access becomes compromised.	**Priority 3:** Investing in disaster risk reduction for resilience **Goal:** Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030 **Target:** To enhance the resilience of our health systems, including by integrating disaster risk management into primary, secondary and tertiary health care, especially at the local level	2020 – Ongoing
Hospital Safety Index Project Pilot	Pilot of the World Health Organisation (WHO) Hospital Safety Index (HIS) for Queensland Health hospitals to integrate into their existing risk and impact assessment processes. Queensland Health engaged with the World Health Organization to provide training to staff across the system for assessments to be undertaken within their health services.	Local Council Districts Disaster Management Groups Health Service Management	N/A	The initial training was undertaken in 2018 with several Hospital and Health Services (HHSs) across Queensland. The project supports the identification, allocation and management of residual risk from hospitals and facilities to HHSs, and further to the department and other areas of the disaster management sector. Several facilities across HHSs have been assessed and recommendations for infrastructure upgrades have been made, based on the pilot.	**Goal:** Substantially reduce disaster damage to critical infrastructure **Priority 1**: Understanding disaster risk **Priority 3:** Investing in disaster risk reduction for resilience	2018-2020

		James Cook University		A pilot program was initiated in Townsville HHS to assess all facilities and provide recommendations regarding key areas of vulnerability and infrastructure risks. Due to resourcing challenges and delays, the system-wide aim of the project has not been able to be achieved to date. However, this would help Queensland Health to have an overarching visibility of risks and mitigation factors across all health services within Queensland, thereby assisting in the targeting of resilience funding and response activities in the event of a disaster.	**Target**: To reduce mortality and morbidity from disaster by improving resilience of health systems to disasters	
Birdie's Tree	Birdie's Tree supports the mental health and resilience of babies and young children, and their parents and families, in relation to severe weather events and other natural disasters. The resources are helpful in the preparedness, response, and recovery phases of a disaster event. Birdie's Tree has been developed by the Queensland Centre for Perinatal and Infant Mental Health (QCPIMH) - a Queensland Government service hosted by Children's Health Queensland Hospital and Health Service. Birdies Tree has been developed to support the mental health and emotional wellbeing of expectant and new parents and babies and young children who are living in areas susceptible to natural disasters. The resources have been developed to support people across several disaster scenarios, including floods, cyclones, bushfires and pandemics.	Australian Government Queensland Government Children's Health	N/A	Birdies Tree resources have been developed to support people who may be affected by natural disasters. While the stories were originally written for children aged zero to four, they have been found to be beneficial for children who have experienced disruptive events, up to at least mid-primary school age. There are now eight Birdie storybooks available on computer, tablet and mobile phone and are also available across multiple languages: - Birdie and the Flood - Birdie and the Cyclone - Birdie and the Fire - Birdie and the Earthquake - Birdie and the Drought - Birdie and the Very Hot Day - Birdie and the Big Sickness - Birdie and the Virus. Other Birdies resources include: - 'Relaxing with Birdie' – a 15-minute movement routine to help children calm down, manage anxiety, and relax before bed or naptime. - 'Fun With Birdie' – hours of colouring, puzzles and activities to help children process challenging experiences and stay calm through trying times. Birdie's Tree has been nominated for several awards and won the 2020 Resilient Australia National Award Winner.	**Priority 4:** Enhancing disaster preparedness for effective response, recovery and rehabilitation **Goal:** Substantially reduce the number of affected people globally by 2030 **Target:** Enhance international cooperation to developing countries through adequate and sustainable support to complement their national implementation of this framework by 2030 (referring to availability of Birdies tree in multiple languages) **Target:** To prepare or review and periodically update disaster preparedness and contingency policies, plans and programs with the involvement of the relevant institutions, considering climate change scenarios and their impact on disaster risk, and facilitating, as appropriate	2017 - Ongoing
Queensland Coastal Contingency Action Plan (QCCAP)	The plan is based on the comprehensive approach to disaster management incorporating all aspects of the prevention, preparation, response and recovery (PPRR) model as provided in section 4A Guiding Principles of Queensland's Disaster Management Act 2003. This version is a result of a review of previous versions of the plan and addresses recommendations arising from the Cape Upstart oil spill in 2015 and Exercise 'Torres 2018'. It also reflects the changes to the Queensland State Disaster Management Plan. In line with the National Plan, the scope of QCCAP has been extended to include arrangements for dealing with	State Agencies Australian Marine Oil Spill Centre (AMOSC) Bulk Liquids Industry Association (BLIA) Local Governments Plastics and Chemicals Industries Association (PACIA)	N/A	Outcome: preparedness, risk management for risk reduction, capability building for response, recovery and resilience.	**Priority 4:** Enhancing disaster preparedness for effective response, and to build back better in recovery, rehabilitation and reconstruction	Annual Review and exercising

	maritime casualties and adopts the current edition of the Australasian Inter-service Incident Management System (AIIMS2017).	Port Authorities and Corporations				
Waste Management and Resource Recovery Strategy	Includes researching innovative technologies and using recycled materials to construct sustainable resilient infrastructure which benefits the environment, community and economy.	State Agencies Local Government Waste Management and Resource Recovery Sector	N/A	No response provided	**Priority 2:** Strengthening disaster risk reduction for resilience	2019 - Current
Emergency Management Assurance Framework	Designed to embed a culture of continuous improvement and deliver effective programs to mitigate the impacts of disasters on communities. The Emergency Management Assurance Framework (the Framework) provides the foundation for guiding and supporting the continuous improvement of entities' disaster management programs across all phases of disaster management. The Framework also provides the structure and mechanism for reviewing and assessing the effectiveness of Queensland's disaster management arrangements (QDMA).	Office of the Inspector-General of Emergency Management Stakeholders at all levels of Queensland's Disaster Management Arrangements	N/A	No response provided	**Priority 4:** Enhancing disaster preparedness for effective response, and to build back better in recovery, rehabilitation and reconstruction	2014 – Ongoing

Funding programs

The below table provides information on the funding programs available in Queensland to address and reduce systemic risk.

Initiative / Program	Description and key actions	Partnerships / Stakeholders	Investment ($)	Outcomes (achievements, challenges & barriers)	Link to Goal / Priority / Target in Sendai Framework	Currency of initiative (start and end date)
Queensland Resilience and Risk Reduction Fund (QRRRF) and previous iterations of the program.	The Queensland Resilience and Risk Reduction Fund (QRRRF) helps communities mitigate and manage the risks associated with natural disasters. The QRRRF is funded by the Commonwealth and Queensland governments as part of its five-year National Partnership Agreement on Disaster Risk Reduction. QRA has been administrating resilience funding programs since 2017-18, including but are not limited to: • 2017-18 Natural Disaster Resilience Program (NDRP) • 2018-19 Queensland Disaster Resilience Fund (QDRF) • 2019-20 QRRRF • 2020-21 QRRRF • 2021-22 QRRRF	Queensland communities and individuals Local Governments Queensland businesses and service providers State Government Agencies The Australian Government Community-based organisations Non-government organisations	In the 2017-18 NDRP, $14.303 million was available. This comprised of $12.006 million funded 50/50 by the Queensland and Australian Governments for 2017-18, plus savings transferred from acquittal of the previous years' NDRP program. In May 2018 the Queensland Government made a commitment of $38 million to be distributed over four consecutive annual funding rounds for	The QRRRF has been developed to deliver projects that make Queensland communities and infrastructure more resilient to disasters by: 1. reducing the risk and limiting the impact of disasters associated with natural hazards. 2. improving understanding of disaster risk and disaster risk planning. In the 2020-21 round of the QRRRF, more than 80 projects across Queensland have been approved for a total of more than $19 million. Project funded under the 2021-22 QRRRF and MDR will be announced by 30 June 2022. Eligible project types include both infrastructure and non-infrastructure projects and range from road, bridge and drainage improvements, weather monitoring systems and mitigation infrastructure such as detention basins, through to natural hazard modelling, education and communication programs, and bushfire mitigation activities.	**Goal:** Substantially reduce disaster damage to critical infrastructure **Priority 4:** Enhance disaster preparedness for effective response and to 'Build Back Better' **Target:** To promote the resilience of new and existing critical infrastructure	2019 – Current

			resilience. The first funding round was administered in 2018-19 by QRA. This has been administered under the 2018-19 QDRF, and the following three years of QRRRF.			
Betterment Program	The Queensland Betterment Programs are jointly funded (50:50) by the Australian and Queensland Governments, to allow local governments and state agencies to rebuild essential public assets to a more resilient standard to help them withstand the impacts of future natural disasters.	Local Government Department of Transport and Main Roads Institute of Public Works Engineering Australasia and other industry experts	$240 million between 2013 and 2021 towards more than 480 Betterment projects.	Since the first Betterment fund was established in 2013, more than 480 projects across Queensland – valued at more than $240 million – have been approved, helping to create stronger, more resilient Queensland communities. As of July 2021, 334 of the completed projects have been subsequently impacted by natural disasters with 85 per cent having sustained no damage or only minor or superficial damage. Of the betterment projects that have been re-impacted, an investment of $110 million has generated approximately more than $250 million in savings or avoided costs, which is a great outcome for all levels of government.	**Goal:** Substantially reduce disaster damage to critical infrastructure **Priority 4:** Enhance disaster preparedness for effective response and to 'Build Back Better' **Target:** To promote the resilience of new and existing critical infrastructure	2013 – Current
North Queensland Natural Disasters Mitigation Program (NQNDMP)	The $10 million Queensland-funded NQNDMP aims to help councils in North and Far North Queensland reduce their disaster risk and assist in reducing the growth of insurance costs for residents, businesses and the community. Funding is available to 33 local governments and one town authority in high risk, cyclone-prone, coastal areas with population centres within 50kms of the coastline, from Bundaberg north to the Northern Territory border, of which Cairns Regional Council is included.	Local Governments	The NQNDMP funding is a $10 million allocation restricted to 33 local governments and one town authority in North Queensland, with funding capped at $2 million per project.	The objective of the NQNDMP is to deliver projects that aim to reduce disaster risk and therefore may assist in reducing the cost or growth of insurance costs for residents, businesses and/or the community, for example by: 1. reducing or mitigating natural hazard risk; 2. deriving intelligence to enable an accurate assessment of risk; and/or 3. informing delivery of future risk reduction or mitigation activities. Projects are aimed to reduce disaster risk and therefore may assist in reducing the cost or growth of insurance costs for their communities. This includes both infrastructure and non-infrastructure projects. Project funded under the 2021-22 NQNDMP will be announced by 30 June 2022	**Goal:** Substantially reduce disaster damage to critical infrastructure **Priority 4:** Enhance disaster preparedness for effective response and to 'Build Back Better' **Target:** To promote the resilience of new and existing critical infrastructure	2021 - 2022
Resilient Residential Recovery Package	The Resilient Residential Recovery package will provide eligible Queenslanders whose homes have been flooded in the 2021-22 disaster season with a range of options that may include retrofitting, house raising or the voluntary buy-back of homes at high risk from future floods. This is the largest program of this kind ever in Australia.	Queensland communities and individuals State Government Agencies The Australian Government	$741 million (jointly funded by the Queensland Government and the Commonwealth Government).	The program includes: 1. Industry and community education program 2. Resilient household rebuild program 3. Home raising program 4. Voluntary home buy-back program 5. Property level flood information portals The objectives of the Resilient Residential Recovery Initiative are to help the community become more sustainable and resilient by providing funding to support the community: 1. Better understand their flood risk 2. Implement practical solutions, where appropriate, to increase their resilience to future flooding events 3. Accelerate community recovery following the 2021-2022 disaster event/s	**Goal:** Substantially reduce disaster damage to critical infrastructure **Priority 4:** Enhancing disaster preparedness for effective response, and to build back better in recovery, rehabilitation and reconstruction **Priority 2:** Strengthening disaster risk reduction for resilience	2022

				4. Reduce costs for the community and all levels of government following future flood events.	**Priority 3:** Investing in disaster risk reduction for resilience	

Climate

The below table provides details on key initiatives within Queensland that address and reduce systemic risk, specifically related to Climate.

Initiative / Program	Description and key actions	Partnerships / Stakeholders	Investment ($)	Outcomes (achievements, challenges & barriers)	Link to Goal / Priority / Target in Sendai Framework	Currency of initiative (start and end date)
Queensland Climate Action Plan (QCAP)	Sets out the Queensland Government's 2030 and 2050 emissions reduction targets. A range of state agencies are contributing through the Zero Emission Vehicle Strategy (the ZEV Strategy) and Zero Emission Vehicle Action Plan 2022-2024, and through development of the Zero Net Emissions for Transport Roadmap (ZNE Roadmap). Information on these initiatives is provided below.	Whole-of-Government	N/A	Sets whole-of-government emissions reduction targets of: • 30% emissions reduction below 2005 levels by 2030 • zero net emissions (ZNE) by 2050. Outcome: risk management through mitigation of mid-long term climate change risk.	**Priority 2:** Strengthening disaster risk reduction for resilience	Ongoing
Queensland Climate Adaptation Strategy 2017-2030 (Q-CAS) *Part of the QCAP*	Provides a framework to ensure Queensland becomes more climate resilient and manages the risks associated with a changing climate. Included as part of the QCAP. A range of state agencies are supporting the implementation of the State government pathway in Q-CAS through a range of internal climate change risk initiatives to improve identification and management of climate change risk.	Whole-of-Government	N/A	Commits the Queensland Government to working closely with communities, industry and local governments across different regions and sectors to strengthen their resilience and support their decision making and adaptation actions by providing them with the latest science, information and resources. Outcome: awareness, preparedness, risk management for risk reduction, capability building, resilience.	**Priority 2:** Strengthening disaster risk reduction for resilience	2017-2030
Zero Emission Vehicle Strategy 2022-2032 (including *Zero Emission Vehicle Action Plan 2022-2024)*	Aims to reduce 'exhaust' emissions by supporting the shift to zero emission vehicles by 2050. Also focuses on mode shift opportunities, such as use of active transport options. *Note: Exhaust or operational emissions associated with the use of the transport system are the largest source of emissions within the transport sector.*	Department of Environment and Public Works Department of Environment and Science	*ZEV Action Plan* - includes funding of $55 million for two key initiatives over three years, $45m for $3,000 EV rebates and $10m for a public charging infrastructure co-fund.	Commits to targets of: • 50% of new passenger vehicle sales to be zero emission by 2030, moving to 100% by 2036 • 100% of eligible Queensland Government fleet passenger vehicles to be zero emission by 2026 • every new TransLink funded bus added to the fleet to be a Zero emission bus from 2025 in South East Queensland and from 2025-2030 across regional Queensland. Outcome: risk management through mitigation of mid-long term climate change risk.	**Priority 2:** Strengthening disaster risk reduction for resilience	2022-2032
Queensland Climate Ready (QCR) program	QCR is a multi-year program delivering a consistent, whole-of-government approach to climate risk management across policies, processes, investments, services and actions. It focuses on building awareness and understanding of climate change risks within government departments. The Queensland Future Climate Dashboard provides free and easy access to climate projection data for Queensland. Climate risk management tools are available to help households and small businesses through the climate risk assessment process and support adaptation decisions.	Whole-of-Government Griffith University	Internal resources	State Governments Desktop Review provided recommendations for whole-of-government climate change risk guidance and for future internal, departmental climate change risk management actions. Outcome: awareness, risk management for risk reduction and capability building relevant to climate change risk.	**Priority 2:** Strengthening disaster risk reduction for resilience	Ongoing

	The Queensland Water Modelling Network (QWMN) is supporting a number of projects to help understand the potential impacts of climate change on water supply and security. A range of state agencies are contributing to the QCR program as a pilot agency and has completed an internal Desktop Review of the department's climate risk profile and baseline capacity.					
Climate Change Risk Assessments for Infrastructure Projects	Provides guidance on undertaking climate change risk assessments for infrastructure projects. *Engineering Policy 170 (EP170) Climate Change Risk Assessment Methodology* and the associated risk and adaptation assessment framework provide the Queensland Government with preferred methodology and templates for climate change risk assessments for large infrastructure projects.	Infrastructure Sustainability Council (ISC). Industry stakeholders and construction/ delivery partners.	Currently recommended for projects over $100 million.	To date, a total of 66 major transport infrastructure projects (>$100 million) are proposing to incorporate, or have already incorporated, a climate change risk assessment as part of an overall infrastructure sustainability assessment. The use of the infrastructure sustainability assessments for Queensland Governments projects is proposed to be expanded to more projects (< $100 million) in the future. Outcome: awareness, preparedness, risk management for risk reduction, capability building, resilience.	**Priority 2:** Strengthening disaster risk reduction for resilience **Priority 3:** Investing in disaster risk reduction for resilience	Ongoing
Environmental Sustainability Policy	Provides a clear vision for environmental sustainability management which aligns with stakeholder expectations, including reducing environmental footprint and building increased network resilience to climate change.	N/A	N/A	No response provided.	**Priority 2:** Strengthening disaster risk reduction for resilience	Ongoing

Question 4

How have national, sub-national and local public policy, legislation, and governance structures changed to align with the Sendai Framework?

Since the development of the Sendai Framework in 2015, the Queensland Government has incorporated a blueprint for managing disaster risk reduction in its strategies, frameworks, plans, initiatives, guides, funding packages and corporate governance documents, and holds valuable membership on several inter-agency disaster resilience working groups across the at the State and National level. The tables above highlight how Queensland has aligned its approach to disaster risk reduction with the Sendai Framework.

Specific examples Queensland based documentation changing to align with the Sendai Framework include:

- The Queensland Strategy for Disaster Resilience (QSDR) and its implementation plan, Resilient Queensland, provide an overarching framework to empower Queenslanders to factor in resilience measures and activities as they anticipate, respond and adapt to changing circumstances. In 2017, the QSDR was updated to reflect Sendai Framework to incorporate climate change risk and delivers a comprehensive, all-hazards approach to building disaster resilience throughout Queensland.

- Delivery of the Regional Resilience Strategies in Queensland is a published voluntary commitment at the United Nations Office for Disaster Risk Reduction's Sendai Framework Voluntary Commitments online platform. These locally led, co-designed Regional Resilience Strategies support the coordination and prioritisation of future resilience building and mitigation projects right across Queensland. This voluntary commitment provides a shared vision for disaster risk reduction and a clear resilience policy line of sight from locally led resilience initiatives at the community level right through to regional coordination, state and national strategies for disaster resilience, and the Sendai Framework priorities for action, indicators and sustainable development goals.

- The Disasters and Emergency Incidents Health Service Directive (HSD) was reinstated in 2016 and aligns with the Queensland Emergency Management Assurance Framework, and includes the integration of Sendai principles. The HSD ensures Hospital and Health Services develop and maintain capability to effectively respond to disasters and emergency incidents, while driving the continual improvement of disaster preparedness arrangements. This ensures the continuity of business functions and service to the community to mitigate the impacts from existing and emerging threats, supported by an organisational culture that embraces relevant doctrine and cross-agency and community collaboration.

- The Ravenshoe Post-incident review was commissioned as a ‘health service investigation’ following a mass casualty explosion at a café in Ravenshoe in June 2015. The review sought to improve the future public health services in similar situations. As part of the review recommendations, the Queensland Health Disaster and Emergency Incident Plan (QHDISPLAN) was updated in June 2019 to align with the Sendai Framework. The QHDISPLAN’s sub-plans were also updated. The aim of the QHDISPLAN is to describe the Queensland Health arrangements for response to a disaster or emergency incident.

- The Queensland Government routinely conducts reviews, through the Office of the Inspector-General Emergency Management, of its management of disaster and emergency events, as part of a commitment to continuous improvement. Each review highlights successes and recommends areas for improvement which strengthen future disaster and emergency management capability. This also supports a lessons management approach.

- Queensland’s New School Selection Guidelines (land acquisition) include natural hazard principles supporting the decision making for where new school sites are located. This ensures a high degree of safety and resilience from natural hazards including flooding, bushfire, landslide and coastal hazards, noting schools are essential community infrastructure.

- The Queensland Government is also involved in a range of disaster resilience working groups at the State and National level.

Question 5

How and to what extent has the establishment of national and/or local disaster risk reduction strategies and plans resulted in expanded efforts in systemic risk reduction?

The Queensland Government has established a range of disaster risk reduction strategies and plans that have expanded efforts in systemic risk reduction.

Specific examples of this include:

- Resilient Queensland 2018 – 2021: Delivering the Queensland Strategy for Disaster Resilience promotes a collaborative, faciliatory, whole-of-government, multi-level and truly integrated approach to disaster resilience building. It provided the impetus and drive for taking tangible steps to improve Queensland's resilience to natural disasters that provides invaluable lessons for the rest of Australia and the world. Resilient Queensland has resulted in the creation of a Regional Resilience Strategy for each region across Queensland describing what resilience means for that specific region, and what is needed to build resilience. Each Strategy is supported by a detailed local action plan for each local government that specifies actions, projects and initiatives that can be linked to funding over time to sustain effort by all stakeholders. This means Queenslanders' disaster resilience needs are now well known, and the Queensland Government can continue to make tangible resilience improvements to our communities, infrastructure and places over time. Queensland now has a list of locally derived actions that can help shape future investment in resilience in Queensland.
- The State Planning Policy (SPP) 2017 ensures that Queensland's planning system is centred around risk reduction. Risk-based Land Use Planning is prescribed under the SPP, ensuring Queensland's planning system plays a critical role in keeping communities safe. By using an evidence-based risk management approach to planning ensures the continued wellbeing of people, the protection of property, infrastructure and the environment, and encourages economic development.
- The Queensland Emergency Risk Management Framework provides a risk assessment methodology that can be used within disaster management planning at all levels of Queensland's disaster management arrangements. The process applies a standardised and internationally recognised approach to the prioritisation, mitigation and management of risk.
- Queensland's Get Ready Program is a year-round, all hazards, resilience building initiative that is coordinated by the Queensland Reconstruction Authority to help Queensland communities prepare for natural disasters. The program utilises community awareness campaigns that are directed towards reducing community risk.
- The Queensland Flood Risk Management Framework (QFRMF) sets the strategic direction for flood risk management in Queensland and provides clarity around expectations and outlines roles and responsibilities of all stakeholders involved in flood risk management. It articulates a staged approach of collecting data, defining the flood hazard, assessing the risk, and developing an implementation to manage and reduce flood risk.
- The Major Incident Medical Management Support (MIMMS) courses provide health care professionals with the knowledge, skills and attitudes to successfully integrate the health service response into the overall emergency services response to a mass casualty incident. The MIMMS has been adapted by Queensland to clinicians through the Health Disaster Management Unit. The program allows for medical professionals to be deployed both nationally and internationally to support disaster impacted areas.

Question 6

How and to what extent have investments in disaster risk reduction increased since the implementation of the Sendai Framework (2015), and what measures are in place to ensure these investments are risk-informed?

Queensland leads the nation in investing and building resilience in its communities through its flagship Betterment programs and resilience funding arrangements. Queensland is committed to developing strategic and detailed funding guidelines and programs for the allocation of funding for disaster resilience and providing guidance on effective investment decision in disaster risk reduction, mitigation, and adaptation to the changing climate. Since the

implementation of the Sendai Framework, more than 480 betterment projects across Queensland – valued at more than $240 million – have been approved, helping to create stronger, more resilient Queensland communities.

Additional examples include:

- The Queensland Disaster Resilience and Mitigation Investment Framework (QDRMIF) provides guidance on effective investment decision-making and prioritisation to support disaster resilience and mitigation across Queensland. The framework enables state agencies to create innovative and transparent pathways to inform resilience investment in Queensland and to ensure our local and state priorities are also incorporated into this national space.
- The Queensland Betterment Programs are jointly funded (50:50) by the Australian and Queensland Governments and enables the reconstruction of public assets to a more disaster resilient standard. Betterment increases the resilience of our communities to natural disasters, while at the same time reducing future expenditure on asset restoration. Betterment can also reduce incidents, injuries and fatalities during and after natural disasters, and improving asset utility during and after natural disasters. Of the Betterment projects that have been re-impacted, an investment of $110 million has generated approximately more than $250 million in savings or avoided costs.
- The Queensland Resilience and Risk Reduction Fund (QRRRF) is available for eligible applicants to help reduce, mitigate and manage the risks of disasters and to make Queensland communities and infrastructure more resilient to disasters. The QRRRF is funded by Commonwealth and Queensland governments as part of its five-year National Partnership Agreement on Disaster Risk Reduction. Eligible project types include both infrastructure and non-infrastructure projects undertaken by various sectors impacted by disaster events.
- The enhancement of the Telehealth system has provided patient access to medical practitioners, and support for medical practitioners to increase significantly. This virtual platform has been essential in the development of resilience building within disaster prone communities, in particular for regional and rurally based communities. The systems capabilities have alleviated some pressures on medical personnel and disaster management planners to provide on the ground care in disaster zones and to those with patients who may be isolated with ongoing chronic needs, and instead allows for quality care to be provided virtually.
- The Resilient Residential Recovery package will provide eligible Queenslanders whose homes were impacted by the 2021-22 disaster season with a range of options that may include retrofitting, house raising or the voluntary buy-back of homes at high risk from future floods. This package seeks to help the community become more sustainable and resilient by providing funding to support the community. This is the largest program of this kind ever in Australia, consisting of $741 million, jointly funded by the Queensland Government and the Commonwealth Government.

Question 7

What major changes / emerging issues / topics of concern are anticipated in the period to 2030 and beyond which will need to be considered in prioritising, accelerating, and amplifying action to reduce disaster risk?

Major Changes, emerging issues, and topics of concern for Queensland include:

- Limited capacity across the sector to support disaster risk reduction initiatives and understanding.
- A need to change the focus to be more forward thinking – preventing disaster risk creation, rather than retrospectively reducing risk.
- The number of climate-related disasters will almost double with communities experiencing more frequent and more intense extreme weather events.
- Increasingly compounding and cascading events, including the impacts of COVID-19 can hinder the ability for individuals and local and regional communities to recover and build resilience, which increases life-threatening situations.
- Population growth and urbanisation in high-risk areas.

Actions to reduce disaster risk in Queensland include:

- Implementing a systems approach to integrate risk reduction in all planning and decision-making processes towards sustainable development and improved community resilience.
- Identify commercial funding opportunities to supporting long-term disaster risk reduction programs which can leverage existing and future government/non-government programs to fund priority risk reduction programs at both individual and commercial levels.
- Focus on driving individual, community and governmental accountability for understanding, proactively mitigating / reducing and accepting risk.
    - Opportunities to incentivise individuals, businesses and community groups to take pro-active measures to reduce their disaster risk and acknowledge their disaster risk is vital to ensuring appropriate retro-fitting procedures take place.
- Drawing on innovative methods to incorporate disaster risk reduction measures into disaster recovery activities will assist with disaster risk reduction.
- Encourage greater consistency in disaster risk information capability across jurisdictions.
- Identify collaborative commercial options to fund disaster risk reduction programs.
- Collaborate with all sectors and other jurisdictions to improve understanding of the various challenges, opportunities, and processes of sectors involved in building resilience.
- Support local governments and local communities' capability and capacity to contribute to risk information gathering and sharing and ensure that this is represented in decision-making.

Annex K: Prospective Review – Queensland Jurisdictional Input

Submitted by: Queensland Reconstruction Authority

Introduction

The following response is focused on the five questions that consider the forward-looking elements of Sendai Framework's Mid Term Review. The response has a Queensland wide focus and the answers to the below questions are based on feedback received from key stakeholders across the disaster management sector in Queensland.

Question 1: The Sendai Framework states that responsibilities for disaster risk reduction are shared by central Governments and relevant national authorities, sectors and stakeholders. Within your jurisdiction, what must be prioritised to ensure that responsibilities are shared in risk identification and reduction and what measures can be taken to ensure that 'no one is left behind'?

Queensland's disaster Management Arrangements focus on shared responsibility and supports current disaster risk awareness and reduction activities across the state. There is substantial doctrine that supports this including but not limited to the Queensland Disaster Management Act, the Queensland Standard for Disaster Management, the Queensland Disaster Management Arrangements, the Queensland Emergency Risk Management Framework and the Queensland Strategy for disaster resilience. However, to further our ability to reduce disaster risk the following activities should be prioritised:

- Building capability and capacity for local governments and local communities to contribute to risk information gathering.
- Learning from the varied knowledge base of our Aboriginal and Torres Strait Islander Communities in relation to land use management and understanding of country.
- Developing fit for purpose and innovative solutions that are place based by applying a Community Development lens to reducing systemic disaster risk.
- Identifying inter-dependences and working across sectors to solve problems.
- Sharing risk and hazard data to allow us to better assess the risks associated with cascading and compounding hazards and considering the accessibility and digestibility of information and solutions provided to reduce systemic disaster risk.
- Decision making approaches balance different priorities and values of the broader community when making investment decisions which aim to reduce systemic disaster risk.
- Sharing of knowledge and experiences and the application of learnings to improve preparedness for future adversity.
- Acknowledging inherent privilege that exists in certain societies and community groups and implementing decision making processes that overcome biases.
- Cross-sector and cross-border forums to improve our collective understanding of the various challenges, opportunities, and processes of sectors involved in disaster risk reduction.
- Implementing effective stakeholder engagement principles to ensure activities are undertaken that met need and are not duplications of existing initiatives.

Question 2: Within your jurisdiction, what is needed to enable an accelerated reduction of disaster risk and increase in the resilience of people, assets and ecosystems in the remaining period of the Sendai Framework (to 2030) and beyond?

The key enabler for Queensland to accelerate disaster risk reduction and increase resilience is clear leadership focused on developing key policies, strategies and frameworks, and their implementation. The implementation of these policies, strategies and frameworks provides an understanding of challenges and disaster risks faced by Queensland Communities as well as potential solutions to address them. Clear strategies and frameworks with

tangible outcomes assist with focusing and driving approaches to reducing systemic disaster risk and increasing resilience. Activities that could occur to enable the accelerated reduction of disaster risk include but are not limited to:

- Ensuring funding programs are fit for purpose and reflective of community needs.
- Recognising that disaster risk reduction is not purely a 'disaster management problem' and leveraging this to create broad partnerships that enable access to intellectual capital from a number of sources with the aim of creating innovative solutions and reframing challenges.
- Using a collaborative strengths-based approach that is reflective of the community being addressed recognising inherent strengths and challenges.
- Build capability and capacity for local governments and local communities to contribute to risk information gathering.
- Consider how preventing the creation of disaster risk can change the disaster risk reduction landscape and associated outcomes.
- Promote accountability and create methods for incentivising actions related to reducing disaster risk reduction.
- Ensuring there is an effective mechanism to measure reduced disaster risk that can be applied locally, at a state level and nationally.
- Implementing an appropriate valuation method to understand the benefits of investments in disaster risk reduction will create a narrative that allows for prioritising preventative spending.

Question 3: Within your jurisdiction, what needs to occur to empower local action in strengthening disaster risk reduction action?

In Queensland, our disaster management arrangements are driven by a locally led approach. Therefore, there is already substantial action occurring at the local level to support disaster risk reduction activities. This response has previously outlined several programs that support local governments to understand their risk and build resilience including (but not limited to):

- The Queensland Emergency Risk Management Framework.
- The Queensland Strategy for Disaster Resilience and its implementation through Resilient Queensland.
- The Get Ready Queensland.

In addition to these programs there are also hazard specific activities that are undertaken including (but not limited to) the implementation of the Flood Warning Infrastructure Network, prescribed burns, "severe weather season" community clean-up activities and the review of disaster management plans.

To further empower local action to strengthen disaster risk reduction, suggestions outlined in question two above would also apply to this question.

Question 4: In reference to the three questions above, where is this already occurring and what (if any) institutional arrangements need to change to enable this to occur?

The answers to the questions above indicate activities that are already occurring and highlight changes required to enable further disaster risk reduction activities.

Question 5: What are the major changes / emerging issues / topics of concern anticipated in the period to 2030 and beyond which will need to be considered in prioritising, accelerating and amplifying action to reduce disaster risk?

Please refer to the response provided in Question 7 above.

Conclusion

Queensland wishes to remain involved in all future discussions related to the Sendai Framework's Mid Term Review. If there are any queries on the above, or you would like further information please do not hesitate to contact Policy on policy@qra.qld.gov.au.

Please note, Queensland has developed several resilience case studies across the areas of education and preparedness, vulnerable communities, communicating risk, community wellbeing and resilient infrastructure. These case studies can be found at https://www.qra.qld.gov.au/resilient-queensland/resilience-case-studies.

Annex L: Retrospective Review – Northern Territory Jurisdictional Input

Submitted by: Northern Territory Police, Fire and Emergency Services

Please describe the key initiatives within your jurisdiction or domain which have sought to address and reduce systemic risk since 2015.

Since 2015, the NT has sought to address systemic disaster risk through two programs established under National Partnership Agreements, aimed specifically at disaster risk reduction. These include the Natural Disaster Resilience Program (NDRP, 2015 - 2018) and the NT Risk Reduction Program (NTRRP, 2019 - 2023).

Both programs use grant funding mechanisms for disaster risk reduction initiatives that are undertaken by government, local government and non-government organisations. Initiatives must demonstrate alignment to the priorities of the NDRRF (adopted from the Sendai) to be eligible for funding.

Funding allocated through the NDRP was split into three distinct streams;

1. The Northern Territory Natural Disaster Emergency Volunteer Fund; which is aimed at enabling volunteer organisations to address resourcing capacity initiatives;

2. The Northern Territory Natural Disaster Resilience Fund, which is aimed at enabling infrastructure works to contribute to greater resilience;

3. Northern Territory Risk Priority Projects Fund, funding projects that address capability gaps.

The NTRRP is a ‘single stream’ program that focuses on the alignment of the four priorities of the NDRRF. Proposals must address this element in order to be eligible for funding. In contrast with the NDRP, the NTRRP is more concerned with addressing systemic risk through enhanced engagement, policy change and improvement in process and governance.

Standing separately from the funding programs are two significant developments in the governance and processes aimed at reducing disaster risk. Firstly, the 2019-23 Strategic Plan for the Territory Emergency Management Council (TEMC) focuses on disaster resilience by integrating NDRRF. In doing so, the progress of activities undertaken by the TEMC demonstrate alignment with the priorities of the NDRRF, improving the understanding of disaster risk and enhancing governance.

The Northern Territory is preparing to deliver a risk management framework for natural hazards. This will provide decision makers in emergency management with contemporary and accurate information related to the exposures and vulnerabilities posed by natural hazards, to guide and support their actions through a validated process. In doing so, justifications for risk mitigation activities are clear; future disaster risk reduction efforts will be directly related to this framework, funded by the NTRRP or otherwise.

The second National Action Plan discussion paper has been released, and are the primary key initiatives that align with the intent of the Sendai framework. The framework outlines the first and second priorities (understanding disaster risk and strengthening disaster risk governance to manage disaster risk respectively) of Sendai and are underpinned in the NT by the overarching Territory Emergency Plan and all of its subordinate plans and arrangements.

There are many NT Government Department initiatives aimed at reducing risk and building resilience which include the;

- Emergency Shelter Prioritisation Project (ESPP), which is undertaken by the Department of the Chief Minister and Cabinet and establishes a prioritised build program as part of a ten year government commitment to improve tropical cyclone sheltering capacity in coastal communities. The build program is prioritised in accordance with the level of risk to each community.

- On-Farm Emergency Water Infrastructure Rebate Scheme, which provides financial support to drought-affected primary producers for new water infrastructure projects to meet the water requirements for animal welfare needs and horticultural plantings.

- Continuation of the development and delivery of tailored pastoral training courses; which is designed to

assist first and second year employees on cattle stations to understand the unique Territory environment and management techniques that can be adapted to maintain high levels of productivity.

- Production of the quarterly NT Pastoral Feed Outlook; which provides pastoralists with information on feed supplies, seasonal conditions, drought conditions and fire risks for Territory pastoral districts.
- Implementation of an African swine fever preparedness campaign that include the:
    - Facilitation of a Territory whole of government preparedness exercise;
    - Participation in the national decision-making preparedness exercise;
    - An extensive stakeholder communications campaign;
    - Development of a national feral pig response policy;
    - Compliance audits on high-risk businesses for prohibited pig feed; and
    - Enhanced testing capability at the department's Berrimah veterinary laboratories.
- Eradication of the bacterial pathogen and high-priority pest, citrus canker, from the NT.
- Delivery of a holistic review of the bee regulations in the NT in partnership with industry to minimise biosecurity risks.
- Advanced development of the Territory's first Darwin-Katherine System Plan to support the efficient uptake of renewable energy in the Darwin and Katherine regions.
- Refined Home and Business Battery Scheme to improve the equity, efficiency and effectiveness of the scheme which contributes to affordable, clean, reliable and stable energy supply.
- Facilitated establishment of an innovative renewable-hydrogen technology trial in Tennant Creek.
- Supply of underground power to a number of schools in the Darwin area; which provides a more tropical cyclone resilient power supply to critical infrastructure; which includes NT schools that are used as cyclone shelters.
- Replacement of two zone substations in Darwin's coastal area with more disaster resilient indoor zone substations. This includes replacing a number of power transmission towers to increase tropical cyclone resilience and the implementation of vegetation management strategies to reduce the risk of trees collapsing on the above ground power infrastructure during severe weather.
- Upgrade of overhead powerlines in remote communities to an insulated conductor reduces the time taken to restore services if the line comes down during severe weather and improves safety.
- Increase the borefield capacity in the Darwin water supply network to provide an alternate water source should the main water source (Darwin River Dam) be unavailable.
- The majority of remote communities in the NT are reliant on underground sources of water.
    - Power and Water have worked to develop a better understanding of water sources, along with limitations and to increase water security.
    - Renewal of Power and Waters strategic asset management program will include asset management for emergency and disaster risk reduction as one of the areas of focus.
- Establishment of a Climate Health Advisory Committee; which is a multidisciplinary group to examine the effects of climate change on the health of the community, and strategies to mitigate the health impact of climate change.

- The NT Natural Hazards Risk Management Framework recognises heat as one of the major natural hazards that is likely to affect the NT. As the Hazard Management Authority for heat related events, NT Health is leading the development of a NT Heat Risk Register with consideration to the social, economic and environmental impacts of increased temperatures.

- NT Health joined the Global Green and Healthy Hospitals (GGHH) Program in October 2020. The GGHH Program is an international community of hospitals and health organizations working to improve sustainability in the health sector. To date Alice Springs Hospital has implemented a range of initiatives including a LED lighting upgrade and the development of a Waste Action Plan. The Royal Darwin and Palmerston Regional Hospital are exploring ways to reduce pharmaceutical waste along with changing and improving other waste disposal streams. In addition, RDH are working with the Sustainable Healthcare Committee to implement campus greening project to improve the performance of the campus regarding heat mitigation, increase local biodiversity, promote active mobility and provide cool, restorative green spaces for staff and patients to use.

- Better Together Program -The amalgamation of the three NT health systems onto an integrated service providing economies of scale, systems management and staffing in providing a seamless health service across the Northern Territory. This is an ongoing project for a further three to five years with ongoing reviews and continuous improvement initiatives over this period.

- Close the Gap – Northern Territory Implementation Plan. NT Government's Everyone Together Aboriginal Affairs Strategy (launched March 2020) Whole of government policy including 67 measures and 21 primary initiatives under 10 focus areas which included health. NT Aboriginal Health Forum a component of the Aboriginal Community Voice. Working to ensure that actions are aligned and not duplicate effort but identify and develop new initiatives. 10 year generation strategy for children and families in the Northern Territory. The strategy will drive the achievement of improved safety, health and wellbeing outcomes for children, young people and families living in the Northern Territory and reduce the inequities in these outcomes between Aboriginal and non-Aboriginal Territorians.

The following is linked to the Northern Territory Health Strategic Plan 2018 - 2022

- Indigenous maternal and child health programs

- Promote emotional health and wellbeing through building community resilience , supporting local capacity building, reducing mental health issues through ensuring health initiatives are aligned with partner agencies ACCHOs (Aboriginal Community Controlled Health Organisations)

- Strengthened partnerships leveraging capacity with ACCHOs and other Aboriginal organisations in the delivery of improved services closer to home.

- This is an ongoing project for a further three to five years with ongoing reviews and continuous improvement initiatives over this period.

To plan for the Northern Territory's future growth, Strategic Land Use Plans are used to inform the efficient delivery of infrastructure to support sustainable and orderly development. An important element of these plans is to understand an area's risk profile to inform responsible and accountable decision making.

There are currently 47 Land Use Plans which apply to various localities in the NT. Seventeen of these Land Use Plans have been finalised by the NT Planning Commission since 2015, and another two are currently being prepared. Each of these plans has considered and responded to the most recently prepared localised natural risk data, be it storm surge, riverine flooding, waterlogged soils, acid sulfate soils, biting insects, or a combination of these factors.

The NT Planning System is currently undergoing a reform through targeted consultation with the community, developers, engineers, architects and other stakeholders. The first stage of reform, (which was implemented in 2020) introduced overlays into the new Planning Scheme. An overlay is a helpful mechanism to identify a physical or natural constraint that may apply to a parcel of land, and in turn introduces additional requirements that ensure a development addresses that constraint. In 2020, existing flood and storm surge development requirements were converted into overlays under the new Planning Scheme, resulting in:

- Information about these risks being much easier to find within the Planning Scheme; and
- Clarification that overlay requirements sit above and in addition to the zone-related requirements in later parts of the Planning Scheme.

In addition to the above, locality specific controls have been applied to mitigate the known flooding risks to residential land along the suburb of Rapid Creek in Darwin. This land was significantly impacted by flooding during Cyclone Carlos in 2011. Specifically, an amendment to the NT Planning Scheme in 2019 established a framework that will allow specific land owners to redevelop in a manner that improves public and resident safety during a riverine and storm surge flood event.

These controls were based on the recommendations of the Darwin Flood Advisory Committee and were converted to an overlay in 2020. This work has effectively incentivised flood proofing of a flood affected area and promotes the principles of building back better as advocated in the Sendai Framework. Relevant Link: https://nt.gov.au/__data/assets/pdf_file/0007/914857/nt-planning-scheme-part-three-overlays.pdf

The NT does not presently have in place specific requirements for vendor disclosure of natural disaster hazards. Historically, provisions to ensure that storm tide inundation hazards have been noted on the record of administrative interests for affected properties where mapping was available. With the introduction of overlays in 2020 in the NT Planning Scheme riverine flooding is now also noted on the record of administrative interests for affected properties where mapping is available.

What are your major achievements, challenges and barriers to implementing the Sendai Framework since 2015?

Achievements:

In the NT, achievements against the priorities of the Sendai Framework occur largely at a community level through initiatives funded under programs supported by the National Partnership Agreement. Broadly speaking, the majority of recent progress has been focussed on understanding disaster risk and strengthening governance arrangements.

There have been achievements in understanding disaster risk and engaging with the community to advocate a shared responsibility in disaster risk reduction. A notable example is Bushfires NT, which is 'identifying seasonal bushfire potential in the NT through…a risk assessment methodology and…planning and evaluation framework'. The organisation has implemented engagement programs to enhance the community understanding of the risks related to bushfires, serving to share responsibility for the management of these risks.

Other non-government entities, like the Aboriginal Resource and Development Services (ARDS) Aboriginal Corporation, is reducing disaster risk by enhancing messaging in local language through upgrades in the reliability and role of Yolŋu Radio as a key channel for emergency information across East Arnhem Land.

The initiatives noted in response to question 1 are considered achievements and should be referred to accordingly.

- Ongoing strategic upgrades of aerodromes through sealing and other improvements
- Strategic plan for the upgrade and improvement of barge landings, which are key logistic link for remote communities throughout the top end coastal communities
- Upgrading of road links through the Roads of Strategic Importance program which has seen the upgrade and sealing of parts of;
    - Central Arnhem Road including key bridges;
    - Port Keats road including new bridges;
    - Tanami Road;
    - Plenty Highway;

- Tjukurru Road;
- Roper Highway including key bridges;
- Carpentaria Highway;
- Buntine Highway including river crossing improvements; and
- Arnhem Highway.

The finalisation of a NT specific cyclone shelter design brief which sets out the minimum requirements for these types of shelters which includes increased wind resistance to accommodate future needs and allow improved community resilience. Another achievement is the maturation of preventative actions and preparedness plans across potential disasters that can be influenced through governance controls – i.e man-made disasters such as environmental impact, transport incident, infrastructure failure etc

Challenges and Barriers

The Northern Territory is vulnerable to a range of natural hazards and is confronted with an array of challenges related to its geographical size, demography and distribution. As a small jurisdiction with finite resources, there are fiscal challenges affecting the prioritisation of investment in disaster resilience. The Northern Territory relies on funding from the Australian Government to enable investment in disaster risk reduction; particularly in the built environment, where costs are often prohibitively high.

The NT is Australia's third largest geographic area and comprises just 1 percent of the national population (approximately 250,000 people), making it the most sparsely populated jurisdiction, with 0.2 persons per square kilometre. It has 96 Major and Minor remote Aboriginal Communities and 620 recorded homelands. A number of the key linkages between communities within the Northern Territory are susceptible to annual closure due to weather conditions and this is exacerbated during periods of natural disasters.

The absence of private industry from disaster risk reduction efforts in the Northern Territory remains a challenge; engagement in disaster risk reduction from the sector would align more closely with the principle of shared responsibility in the NDRRF and Sendai. The requirement to manage natural hazard risks in the Security of Critical Infrastructure Act may drive change.

A significant barrier in progressing risk reduction is the availability of hazard risk and consequences data. This is both a national and jurisdictional challenge. For example, the consultancy team developing the NT Natural Hazard Risk Management Framework found that sourcing data related to heatwave location and intensity was problematic (national), as was data related to health consequences (jurisdictional). Similar challenges were noted in assessing economic consequences from past disasters, at both the national and jurisdictional level. These barriers are well known and acknowledged in the Royal Commission into National Natural Disaster Arrangements (RCNNDA).

Without access to accurate and consistent data, tracking progress against the targets of the NDRRF (and Sendai) is problematic. Another challenge for the Northern Territory is the ability to report on risk reduction program outcomes due to capacity issues. It was anticipated that the Monitoring, Evaluation and Learning Framework (MELF) proposed in the negotiations for the National Partnership Agreement would ameliorate this, however it was not implemented.

Resourcing the production of fit-for-purpose natural hazard data and mapping remains a significant challenge in providing for improved recognition of natural hazards in NT land-use planning, building and emergency management processes for a place of this size. The remoteness and cultural differences can also present significant challenges for communicating risk.

The Covid-19 pandemic has been a major impost on NT Health resources and has restricted implementation of broad risk reduction strategies. It did identify gaps within NT Health emergency management system which have since improved. Implementation of improved systems will need to be implemented to ensure the knowledge, skill, competency and capability are not lost within the system. Other notable challenges include;

- Reduce direct economic loss through slowing the revolving door of personnel change and the ability to provide seamless health services across the Northern Territory;

- Support of health professions from total burnout due to Covid-19 with timely implementation of robust wellbeing support programs prior to intervention and support services being required;
- Providing resources which allow health care workers time to recover from the past two years concentrated dedicated effort. The economic cost of replacing personnel is exponentially higher than retaining and supporting the existing workforce including relief expansion which can later be absorbed into the workforce as services expand. There is currently a national shortage of a skilled workforce;
- Ability to maintain a pool of trained and experienced personnel and health professionals across multiple skill areas within the health sector;
- Available funding for ongoing professional development within the current economic environment across all areas of health development;
- Lack of available and viable programs which can support ongoing health service initiatives;
- The limited number of people willing to enter the health sector to provide ongoing continuity of health delivery services;
- Ongoing relevance of Sendai in relation to natural disasters; recent events such as the floods in Northern NSW and QLD are challenging theory and practice around disaster risk management and emergency response and recovery to an experienced natural disaster. The sheer unpredictability of a natural disaster means that regardless of how robust a governance and risk mitigation strategy may be, it is often ineffectual or irrelevant for the experienced natural disaster event; and
- Depleted resources; after over two years of a global pandemic along with concurrent natural disasters, there are limited available resources to facilitate the implementation of the Sendai framework. Even what little resources are available, many are rapidly exhausted or stretched too thin to be of meaningful beneficial impact.

What partnerships and initiatives have been most successful in assisting in the reduction of disaster risk?

We have observed productive partnerships with government agencies, due to inherent capability, access to resources and legislative authority, facilitating the achievement of outcomes. There is a strong understanding of disaster risk borne out of legislated responsibility which agencies are compelled to address because of corporate risk and the requirement to maintain business continuity.

While there have been achievements with non-government organisations, these organisations often don't understand the arrangements that support emergency management or how they might contribute to positive outcomes. We have noted funding applications for initiatives that regularly don't sit within the area of responsibility for the applicant. There is also little or no engagement with the responsible entity in developing an application. The Northern Territory has sought to improve this by engaging more intensely with applicants to the program.

More recently the NT Government has commenced dialogue with local research bodies to orientate research projects into areas that will achieve the best results and strengthen emergency management arrangements.

As noted above, the private sector has thus far remained absent from disaster risk reduction initiatives in the Northern Territory.

The nationally overarching National Disaster Risk Reduction Framework, and the National Recovery Resilience Agency facilitated networks (such as the Social Recovery Reference Group) have been the most useful at promoting constructive discussions and cooperation across jurisdictions for all parties involved in the disaster risk reduction process. It is this sharing of knowledge, ideas and motivation that seems to produce the most meaningful outcomes.

The NT Government is actively involved in various inter-jurisdictional processes to promote collaboration in managing natural hazard risks between different levels of government. Our Lands Planning Senior Management team participate in a Heads of Planning forum, which is convened regularly throughout the year and allows senior government officials across Australia to exchange ideas on a range of planning topics, including natural risk.

The NT has robust governance arrangements in place, with well-established collaboration between the planning, building and emergency management sectors. Statutory provisions under the *Planning Act NT* ensure that all NT Government agencies have the opportunity to provide comment on natural hazard issues in regard to development applications, rezoning applications and planning scheme amendments.

The NT Floodplain Management Committee is another valuable partnership, which proactively works to reduce disaster risk. The Committee is a multi-agency committee that has been tasked with the public release of maps for flooding and storm surge.

The National Heatwave Working Group has developed a national heatwave forecast and warning framework which will be of great benefit to NT Health in providing public health awareness and response to heatwaves. Aboriginal Community Controlled Health Organisations – linked to "Closing the Gap" initiative.

How have national, sub-national and local public policy, legislation, and governance structures changed to align with the Sendai Framework?

The structural changes in emergency management and additional funding streams in response to the recommendations out of the Royal Commission into National Natural Disaster Arrangements are expected to enhance resilience and risk reduction for natural disasters.

It is expected the establishment of the Industry Functional Group will improve industry engagement of those not otherwise represented in emergency management structures, leading to more awareness of disaster risk in the longer term.

The NT Planning System is evolving and enhancing it planning policy to ensure, amongst other matters, it aligns with the Sendai Framework. Specifically, in 2020 the NT Planning Commission commenced work on a 'Northern Territory Strategic Directions Planning Policy', which will set high-level directions in relation to a number of key land use planning policy areas. This work will underpin the delivery of future strategic polices and land use plans to ensure they are in line with national policy and best practice as relevant to the Territory's unique context.

Climate Change and Natural Hazards have been identified as key areas of the proposed policy and work has already been undertaken to interrogate how the planning framework can optimise outcomes under the four priorities of the Sendai Framework; and other national frameworks such as the National Disaster Risk Framework. This Policy scheduled for completion by 2023.

How and to what extent has the establishment of national and/or local disaster risk reduction strategies and plans resulted in expanded efforts in systemic risk reduction?

The NDRRF has been effective in ensuring that jurisdictional efforts are consistent with disaster risk reduction priorities at the national level, chiefly due to the fact that the NT has integrated the priorities of the NDRRF into its arrangements.

Department of Industry, Tourism and Trade has submitted a proposal under the Northern Territory Risk Reduction Program for the development of payment policies, procedures and systems which will contribute to disaster risk reduction by way of the Disaster Relief Funding Arrangements, thereby ensuring the NT is able to delivery payments in line with the National DRFA requirements.

How and to what extent have investments in disaster risk reduction increased since the implementation of the Sendai Framework (2015), and what measures are in place to ensure these investments are risk-informed?

The impact of 'trigger' events is noted as a significant catalyst for investment in disaster risk reduction. In the Northern Territory, tropical cyclone Trevor focused community concern on cyclone sheltering capacity, such that the NT Government undertook renewed efforts to address the issue (refer ESPP in Q1).

More broadly, the Black Summer Bushfires and subsequent Royal Commission (RCNNDA) have brought about substantial investment in risk reduction; it is expected that the recent severe flooding in NSW will incur a similar outcome.

While there were initial increases in the years immediately following the development of Sendai, the impact of the COVID19 Pandemic has significantly interfered with this process. Alongside this are the ongoing actual response and

recovery efforts for various natural disaster events which have further detrimentally impacted investment in disaster risk reduction.

Natural hazard mapping in the NT has been focused on flooding and storm surge as priority hazards and significant effort and resources have been invested in recent years to improve the availability of fit-for-purpose mapping for these hazards. Importantly, the release of new or updated flooding and storm tide inundation mapping is typically accompanied by targeted community engagement activities. Recent examples include public engagement programs supporting the release of new flood hazard mapping for the Rapid Creek catchment and revised storm tide inundation mapping for the Darwin Region.

This public engagement is undertaken both to inform affected stakeholders of changes in their local risk profile and contribute more broadly to improved community awareness and disaster resilience as advocated by the Sendai Framework and the NDRRF.

While not constrained to DITT staff, the deployment of NT Government staff interstate to assist with disasters in other jurisdictions is expected to result in experience and learnings that can be adapted and applied in the NT in the longer term.

What major changes / emerging issues / topics of concern are anticipated in the period to 2030 and beyond which will need to be considered in prioritising, accelerating and amplifying action to reduce disaster risk?

Climate change is widely acknowledged as an amplifying factor for natural disasters. There are concerns that funding and governance arrangements will not be sufficient for meeting the challenges presented by climate change.

The competing nature of other programs addressing societal challenges like crime, homelessness and public health often put disaster resilience to a lesser priority. The key for all levels of government and the community is to be more effective in highlighting the risks to our communities and the consequences for complacency or inaction.

The escalating nature of experienced disasters – especially natural disasters that may or may not be influenced by climate change. In the integrated and connected modern world, a disaster in one location/sector/environment/etc often has further reaching consequences than previously experience. These consequences are often highly complex, delivering greater impacts, occurring more frequently and also often lasting longer than historical events of a similar nature (COVID19, War in Ukraine, Australia floods Feb/Mar 2022). The ability to anticipate this connectivity and integration will be crucial in future risk reduction efforts.

Climate Change is an emerging issue and topic of concern for the Territory as it is amplifying the risk profile of some natural hazards, creating new and complex challenges. The effects of hotter temperatures, increased frequency of droughts and more intense rainfall events, and higher evapotranspiration suggest that the future climate that buildings, infrastructure and people have to contend with will be much harsher.

There are forecasts that suggest an average sea level rises of 0.8 metres are possible by 2100. There are expectations that cyclonic activity will intensify, but it is possible that cyclones could be less frequent. More intense cyclones suggest higher rainfall, and in combination with elevated sea levels this suggests greater flooding.

The base data for the storm surge maps, which are used to inform the NT Planning Commission's Land Use Plans and the overlays contained within the NT Planning Scheme incorporate a 0.8m sea level rise by 2100. The overlays in the NT Planning Scheme also include provisions to control development and limit uses on land subject to the flooding and storm surge to reduce risk to people, damage to property and cost to the general community.

Temperature increases are expected to be more pronounced in the north of the Territory with the number of days where temperatures exceed 35° is also expected to increase. Increased temperatures and extreme heat days may add to the intensity of heat island impacts in urbanised communities and thermal performance of buildings subsequently impacting people's comfort, welfare and productivity.

More recent Land Use Plans prepared by the NT Planning Commission have started to include heat mapping and embed heat mitigation strategies to reduce the 'urban heat island effect' (i.e. Central Palmerston Area Plan). Opportunities to promote cross ventilation outcomes in buildings zoned MR (Medium Density Residential) and Zone HR (High Density Residential) are being explored as part of the NT Planning Commission's Designing Better project.

The improvement of the resilience of communities through the provision of infrastructure is an iterative process with steps to improve connection and capacity in communities. This includes the improvements mentioned above but also specific infrastructure such as emergency shelters and improvements to essential infrastructure to allow communities to respond and recover from events.

Build on existing extension work to support cattle producers in the southern and Barkly regions, increasing drought resilience through assessment of carrying capacity, planning for seasonal variations in pasture growth and adopting new satellite technology for real-time pasture assessment:

- Deliver research and extension services for development of the horticulture industry in the Western Davenport Region, expected to support several new farms with a range of new crops;
- Identify opportunities to support plantation forestry through strategic research and development partnerships;
- Deliver research projects for fruit fly, cucumber green mottle mosaic virus, invasive ants, vegetable diseases, and fall armyworm;
- Eradicate the browsing ant from the Territory;
- Work with Australian Government, States and Territories to develop the new National Biosecurity Strategy and build the capacity of industry, the community, government and staff to enhance our surveillance, diagnostics, early detection, and preparedness to respond to future biosecurity risks;
- Position the Territory for the emerging hydrogen industry through the finalisation of a renewable hydrogen master plan; and
- Ensure the Territory's energy systems are agile and support economic growth through finalisation of the Darwin-Katherine System Plant.

Annex M: Retrospective Review – Tasmania Jurisdictional Input

Submitted by: Tasmanian Department of Police, Fire and Emergency Management

Please describe the key initiatives within your jurisdiction or domain which have sought to address and reduce systemic risk since 2015.

The following paragraphs provide a summary of the key risk reduction initiatives that have been undertaken in Tasmania since 2015.

The 2016 Tasmanian Natural Disaster Risk Assessment (TSNDRA) report provided a revised assessment of the state-level risks associated with bushfires, floods and coastal inundation, severe storms, heatwaves, earthquakes, landslides and human influenza pandemics in Tasmania. The overall aim of the TSNDRA was to contribute to disaster resilience by delivering an increased understanding and awareness of emergency risks affecting the state of Tasmania, and provides a basis to inform decision-making across the Tasmanian emergency management sector, particularly in relation to risk reduction and mitigation activity priorities.

Following on from the 2016 TSNDRA, the Tasmanian SES has just completed the 2022 Tasmanian Disaster Risk Assessment (TASDRA). TASDRA is built on the 2016 TSNDRA and has a broader scope, and moved away from categorising disasters as 'natural' or 'man-made' – the distinction between the two is not always clear. TASDRA explores risks relating to the systems that sustain us, including:

- Earth systems – geology and extreme weather
- Biological systems – life systems can also produce pathogens causing pandemics/epidemics, pests and other biosecurity incursions
- Socio-technical systems – major accidents or outages in the infrastructure or technical systems that underpin modern society.

In 2017 Tasmania launched the Tasmanian Emergency Risk Assessment Guidelines (TERAG) to supplement the National Emergency Risk Assessment Guidelines (NERAG). These guidelines and supporting tools were designed to enable users to undertake consistent risk assessments and design strategies and programs to treat the priority risks that they own. The TERAG has had mixed reviews and the Tasmanian SES will be undertaking a review of these documents with consideration of the TASDRA and the work being undertaken to review the NERAG.

Tasmania launched its first Tasmanian Disaster Resilience Strategy in late 2019 with the purpose of building Resilience across the emergency management cycle. The Strategy runs from 2020 to 2025 and the four goals are:

1. Understanding disaster risk – everyone understands the disaster risks affecting them.
2. Working together - everyone collaborates to reduce risks and prepare for disasters.
3. Reducing disaster risk - Everyone reduces disaster risks in ways that have everyday benefits.
4. Being prepared for disasters - when a disaster occurs, everyone knows what to do and can do it.

Work on the next version of the Strategy is expected to commence in 2023. This work coincided with a review of the Strategic Directions Framework for the Tasmanian State Emergency Management Committee (SEMC) and the release of the Tasmanian Emergency Management Arrangements (TEMA), these documents can be found on the SES Website.

In partnership with the Commonwealth Tasmania is a signatory to the National Partnership Agreement for Disaster Risk Reduction. Through this agreement Tasmania has established Natural Disaster Risk Reduction Grant Program (NDRRGP) which is a competitive grants program to support Tasmanian communities to implement the National Disaster Risk Reduction Framework (NDRRF) and the goals of the Tasmanian Disaster Resilience Strategy 2020-2025. Organisations eligible to apply for funding under the NDRRGP are:

- Councils
- State Government agencies

- Not-for-profit organisations with emergency management responsibilities
- Universities and other research institutions.

Tasmania is also supporting the National Flood Mitigation Infrastructure Program with grant deeds in the final stages of approval, this involves a combination of local, state and federal funding to support key flood prone communities in Tasmania. Tasmania is also seeking to participate in the new Coastal and Estuarine Risk Mitigation Program which is aimed at reducing impacts on local communities of natural disasters and coastal hazards, such as storm surges and coastal inundation.

What are your major achievements, challenges and barriers to implementing the Sendai Framework since 2015?

The response to question one identifies the initiatives and actions that Tasmania has undertaken towards achieving the Outcome, Goal, Global Targets, Priorities for Action and Guiding Principles of the Sendai Framework of the Sendai Framework.

To assess the success of these initiatives Tasmania established a Disaster Resilience Monitoring and Evaluation Framework (DRMEF) in 2021 which tracks Tasmanian Government priorities and actions that implement the SEMC Strategic Directions Framework, and the Tasmanian Disaster Resilience Strategy 2020-2025. The DRMEF is intended to be reviewed annually and produced as an internal document not available for wider distribution.

As to the challenges and barriers associated with this work there are two key factors, these are competing priorities and resistance to change. While there is clear evidence that reducing disaster risk is cost effective it is also costly to initiate and this must be balanced with associated costs such as maintaining a response capability and investment in other community needs such as Health, Education, Infrastructure, etc… As to resistance to change this is a complex area and ranges from an individual reluctance to address their personal risks or organisational desire to do things differently.

What partnerships and initiatives have been most successful in assisting in the reduction of disaster risk?

The Grant funding that is delivered through National Partnership Agreement for Disaster Risk Reduction and other initiatives such as the National Flood Mitigation Infrastructure Program and the new Coastal and Estuarine Risk Mitigation Program are the principle financial partnerships that Tasmania uses to reduce disaster risk.

Of note the Tasmania Fire Service undertakes an extensive Bushfire Fuel Reduction Program across the state. The Fuel Reduction Program takes both a multi-tenure and multi-agency approach with the key partners in the program being the TFS, Parks and Wildlife Service and Sustainable Timber Tasmania. A number of other key stakeholders, from local councils to private landowners are also involved in the implementation of the program. This program was rolled out in 2014 in response the Tasmanian bushfires of January 2013 and the Royal Commission into the Victorian bushfires of 2009.

More recently SES Tasmania has received funding to implement a Storm and Flood Ready (SAFR) program to support community level flood and storm resilience. This program is designed to assist communities and response organisations to addresses recommendations from *The Report of the Independent Review into the Tasmanian Floods of June and July 2016* on the need for community planning and resilience to reduce risks associated with flooding. The initial focus of the program is on riverine flooding in high-risk communities. Information from the Tasmanian flood mapping project and local knowledge informs plan development. Where possible the program supports an 'all-hazards' approach to community disaster resilience by coordinating with Tasmania Fire Service's community bushfire safety programs.

Concurrently Tasmania is also working with Non-Government Organisations such as Red Cross Australia and the Minderoo Foundation (along with many smaller organisations) to increase community resilience. The work with Red Cross Australia and the Minderoo Foundation is in its early stages with pilot projects being implemented in selected communities, if proven, similar programs could be rolled out around the state.

How have national, sub-national and local public policy, legislation, and governance structures changed to align with the Sendai Framework?

As identified in Question 1 Tasmania has launched the Tasmanian Disaster Resilience Strategy 2020-2025 which is supported by the SEMC Strategic Directions Framework. Both of these documents were developed to align with the Sendai Framework.

How and to what extent has the establishment of national and/or local disaster risk reduction strategies and plans resulted in expanded efforts in systemic risk reduction?

The lead initiative that demonstrates the implementation of risk reduction strategies in Tasmania is the Bushfire Fuel Reduction Program led by the Tasmania Fire Service. This program uses Relative risk to measure how the risk of bushfire impacts change over time in response to fuel reduction from planned burns and bushfires. It is therefore a useful tool to help with the identification of locations where targeted fuel reduction burning is likely to reduce bushfire risk, and to measure the effectiveness of fuel reduction burning.

If relative risk is 100 per cent, the risk of bushfire impacts has not been reduced and communities are at their maximum level of risk. If relative risk is at 70 per cent, the risk of impacts to life and property have been reduced on average by about a third.

- The statewide relative risk was 76.5% as the Fuel Reduction Program commenced in 2014.
- The relative risk dropped to 71.9% following implementation of the 2020 autumn burning program.
- Tasmania's relative risk in October 2020 was 74.6%.

That means that, on average, the risk of bushfire impacts has been reduced by about third if compared to a scenario where fuel loads were at their maximum (no bushfires or planned burning). But the relative risk to individual communities will vary greatly depending on where the fuel reduction has occurred.

While bushfires also contribute to risk reduction, fuel reduction burning has had the greater role to play in the overall reduction in relative risk to communities. It should be noted that fuel loads will naturally reaccumulate following fire, and therefore relative risk will increase following fire events and in the absence of further burning or bushfires.

Raw data of areas treated as part of the fuel reduction program by LGA locations can be accessed here, this data is current to Spring 2020 (not inclusive).

While preceding the release of the Sendai Framework another example of a successful risk reduction strategy in Tasmania is the mitigation work undertaken to upgrade the Launceston levees which began in 2010. Findings in a Bushfire and Natural Hazards CRC Research Report show that the upgrading of the levee system, completed in 2014, resulted in avoiding losses of about $216 million (had the pre-existing levees failed), which is approximately four times the total investment in the new levee system. This investment in building the new levee system was found to be a sound economic decision based on the estimated costs at the time of decision making, alongside improved estimates of benefits from this study. It is anticipated that projects to be delivered under the National Flood Mitigation Infrastructure Program and the new Coastal and Estuarine Risk Mitigation Program will achieve similar outcomes for the communities in which work is conducted.

How and to what extent have investments in disaster risk reduction increased since the implementation of the Sendai Framework (2015), and what measures are in place to ensure these investments are risk-informed?

Noting that some initiatives outlined in this response were started before the implementation of the Sendai Framework it is correct to say that investment has been driven by an understanding of the risks faced. Recent efforts to deliver the 2022 TASDRA are further evidence of Tasmania's efforts to ensure future investments are risk-informed and the need to understand risk is the first goal of the Tasmanian Disaster Resilience Strategy.

What major changes / emerging issues / topics of concern are anticipated in the period to 2030 and beyond which will need to be considered in prioritising, accelerating and amplifying action to reduce disaster risk?

The key challenge facing the world beyond 2030 is whether the initiatives implemented now will be enough to meet the increasing risk of climate change. Risk reduction efforts being undertaken now do have an eye to the future, but given the trend of more frequent and greater intensity natural disasters questions will remain as to whether current efforts will be enough.

Annex N: Retrospective Review – New South Wales Jurisdictional Input

Submitted by: Resilience New South Wales

1. **Please describe the key initiatives within your jurisdiction or domain which have sought to address and reduce systemic risk since 2015.**
2. **What are your major achievements, challenges, and barriers to implementing the Sendai Framework since 2015?**

The table below presents examples of initiatives and achievements to reduce disaster risk in NSW since 2015.

Initiative / Program	Description and key actions	Time period	Link to Sendai Priority 1. Risk 2. Governance 3. Investment 4. Preparedness
NSW Bushfire Inquiry 2020 and Royal Commission into National Disaster Arrangements 2020	The NSW Bushfire Inquiry was conducted in 2020, following the Black Summer fires. All 76 recommendations were accepted by the NSW Government. In partnership with the Australian Government, over $830 million in funding has been allocated to implement the Inquiry recommendations and the recommendations of the Royal Commission into National Natural Disaster Arrangements. An initial package of bushfire inquiry initiatives, worth $192.2 million over five years, included: • $36 million for a new first responder mental health strategy for emergency services • $23 million in additional personal protective clothing for frontline firefighters • $17 million to retrofit NSW Rural Fire Service (NSW RFS) and NSW National Parks and Wildlife Service (NPWS) vehicles and replace Fire and Rescue NSW (FRNSW) tankers • $8.3 million extension of an integrated dispatch system for the NSW RFS • $9.5 million for the delivery of a strategic fire trail network • $5.4 million enhancements to the NSW RFS aerial fleet and training facilities • $2.5 million improvements to NSW RFS's Fires Near Me NSW app • $2.85 million to deliver critical equipment for 31 multi-agency Emergency Operations Centres In the 2021-2022 Budget, the NSW Government committed a further $268.2 million, co-funded with the Australian Government. Key components of the commitment included: • $65.6 million over four years from 2021-22 for implementation of operational system upgrades and capability improvements • $50.9 million over two years from 2021-22 to extend fleet replacement and vehicle safety retrofits across the fire, rescue, forestry, and national parks fleets • $40.3 million over four years from 2021-22 for the Bushfire and Natural Hazards Research and Technology Program (subject to finalisation of business case and gateway review) • $37.6 million in 2022-23 to extend funding for NPWS fire fighters and NSW RFS mitigation crews; and • $34.4 million over four years for the strategic fire trail network and funding for critical regional Private Land Fire Trail staff	2020 - Current	1, 3, 4

	During 2021-2022 a further $56.5 million was committed by the NSW Government for the construction of six new co-located Emergency Operations Centres and Fire Control Centres at Moruya, Tumut, Hawkesbury, Grafton, Narrabri and Cooma. In the 2022-2023 Budget, a further $315.2 million was committed: • $147.9 million for extending hazard reduction activities • $129.7 million for firefighting tanker replacements and safety upgrades • $27.7 million over four years to upgrade and operate national parks radio infrastructure to enable firefighters to gain critical access to the NSW Public Safety Network • $10.0 million to continue the delivery of critical strategic fire trails		
Natural Disaster Resilience Program (NDRP)	Investment in disaster resilience and risk reduction co-funded by the Commonwealth and state governments. $13.6 million per year for NSW. The NSW Implementation Plan program elements were: • Community Resilience Innovation Program (CRIP) • Emergency Volunteer Support Scheme (EVSS) • State Emergency Management Projects (SEMP) • Bush Fire Risk Management Grants Scheme (BFRMGS) • Floodplain Risk Management Grants Scheme (FRMGS) • Disaster Welfare Non-Government Volunteer Agencies Training Support Funds • Implementation Plan officer • National Capability: Register.Find.Reunite. (NSW contribution to the Australian Red Cross program) • Impact Data Assessment and Sendai Project	2013-2018	1, 2, 3, 4
National Disaster Risk Reduction Fund	In 2020, the NSW Disaster Risk Reduction Fund (DRRF) was established under the National Partnership Agreement on Disaster Risk Reduction (NPADRR) as part of a national implementation of the National Disaster Risk Reduction Fund (NDRRF) to support each state's meaningful progress. Under a joint NSW – Australian Government agreement, $51.8 million of grant funding was made available (with a total $27.1 million Commonwealth contribution). The NSW Disaster Risk Reduction Fund consists of three grant streams: • $17.8 million State Risk Reduction stream • $30 million Local and Regional Risk Reduction stream • $4 million Building Disaster Risk Knowledge stream	2020-Current	1, 4
Floodplain management grants	The Floodplain Management Program provides financial support to local councils and eligible public land managers to help them manage flood risk in their communities. Support provided under the programs usually involves $2 from government for every $1 provided by the applicant. • 2014-15: Grants came from the NSW Government Floodplain Management Program (FMP) and the Floodplain Risk Management Grants Scheme (FRMGS), which was jointly funded by the NSW Government and the Australian Government under NDRP. Under the FMP, 34 grants totalling around $13.8 million were awarded to deal with flood risks throughout NSW.	2014 - Current	3

	• 2015-16: The FMP funded 15 projects totalling $4,934,048 million and the FRMGS funded 7 projects totalling $925,557. Twenty-three projects valued at $7,538,687 were activated from the reserve list for the 2015–16 FMP. • 2016-17: Grants came from 2 programs: the NSW Government Floodplain Management Program (FMP) and the Floodplain Grants Scheme (FGS), which was jointly funded by the NSW Government and the Australian Government under NDRP. The FMP funded 43 projects totalling $4,590,484 million, the FGS funded 28 projects totalling $5,941,325 that were activated from the reserve list. • 2017-18: The FMP funded 51 projects totalling $7,075,987 million and the FGS funded 8 projects totalling $1,769,697 million. Another $979,000 in funding was awarded to 9 projects from the reserve list. • 2018-2019: The FMP funded 18 projects totalling $5,114,565 and the FGS funded 15 projects totalling $1,794,095. Sixteen projects valued at $5,201,958 were activated from the reserve list in March 2019. • 2019-2020: The FMP funded 50 projects totalling $7,264,249 and the FGS funded 4 projects totalling $1,881,585. Seven projects valued at $1,626,190 were activated from the reserve list in February 2020. • 2020-2021: The FMP funded 26 projects totalling $5,361,586 and the FGS funded 10 projects totalling $2,345,330. • 2021-2022: The Floodplain Management Program funded 50 projects totalling $10,036,980.		
National Flood Mitigation Infrastructure Program	The Australian Government established the National Flood Mitigation Infrastructure Program under the Emergency Response Fund to deliver $50 million in 2020-21 and a further $50 million in 2021-2022 to state and territory governments for the construction or improvement of flood mitigation infrastructure. While funding for the program is provided by the Australian Government, States and Territories were responsible for submitting applications for the funds, and for administering the funding in accordance with the bilateral funding agreement. New South Wales is administering $13.37 million received in 2020-21 for 6 projects, and $19.21 million received in 2021-22 for 5 projects.	2020-21 and 2021-22	3
Bush Fire Mitigation and Resilience Program	The Bush Fire Mitigation and Resilience Program assists public landowners/managers and rural fire brigades to carry out bush fire mitigation works throughout the state. • In 2016-2017, more than $11.8 million was spent through brigade mitigation support program funding, and bush fire mitigation and resilience funding. $9.1 million of this was allocated to projects, fire trails and hazard reduction activities in Region East, $1.4 million to Region South, $824,000 to Region North and the remainder to Region West. • In 2017-2018, more than 600 bush fire mitigation projects funded through the NSW RFS were completed by Rural Fire Brigade and Land Management Agencies. There was a total expenditure of nearly $9 million across the state throughout the 2017-18 financial year. • In 2018-2019, more than 700 bush fire mitigation projects funded through the NSW RFS were completed. This program saw an allocation of over $11 million across NSW for the 2018-19 financial year. Of the total allocation, approximately $5.8 million was spent on fire trail works, which includes $1 million as an election commitment. A further $3.7 million was used to support hazard reduction works, with $1.5 million allocated for resilience projects that increase the bush fire protection and readiness of NSW communities.	2016-2020	3, 4

	• In 2019-2020, more than 520 bush fire mitigation projects funded through the NSW RFS were completed. This program saw an allocation of just under $18 million across NSW for the 2019/20 financial year. Of the total allocation, approximately $4.4 million was spent on fire trail works. A further $1.6 million was used to support hazard reduction works, with $2 million allocated for resilience projects that increase the bush fire protection and readiness of NSW communities.		
State Level Emergency Risk Assessment	The State Level Emergency Risk Assessment (SLERA) was undertaken over the period August 2016 to February 2017, and examined a limited selection of hazards, identified through a consultative process. The assessment was a collaborative effort across the emergency management sector and extended on previous work undertaken for the NSW Government 2011 State Natural Disaster Risk Assessment (SNDRA). Priority natural hazards for NSW captured in the SLERA were bush fire, earthquake, East Coast Low, flood, landslide, storm, and tsunami. Additional emerging or less explored hazards have also been incorporated, including biosecurity (foot and mouth disease), heatwave, coastal erosion, Human Infectious Disease Outbreak (pandemic influenza), and infrastructure failure (electricity).	2017	1
NSW Emergency Risk Management Framework	The NSW Emergency Risk Management Framework was developed in July 2017 to provide a common approach and principles for the Emergency Management sector and NSW Government for emergency risk management.	2017	1
A Lessons Management Framework for the NSW Emergency Management Sector	In March 2019, NSW finalised a Lessons Management Framework for the NSW Emergency Management Sector. The Framework was developed to create a consistent and robust foundation for implementing lessons management across the sector. The framework supports the development and delivery of: guidelines, tools and resources for lessons management; guidance on sharing of data, information and lessons; processes for moving towards lessons learned; leadership and cultural requirements to support learning; appropriate governance, monitoring and reporting practices for lessons management; guidance on organisational support for lessons management sponsorship, expertise and champions; and a shared repository of lessons for the emergency management sector.	2019	2, 4
A Capability Development Framework for the NSW Emergency Management Sector	A Capability Development Framework for the NSW Emergency Management Sector was developed to enhance the state's emergency preparedness for major to catastrophic emergencies through the identification of any existing gaps and use of evidence-based risk assessments to help influence, prioritise and justify capability development investment. Key outputs of the Framework include: a list of state level core capabilities for emergency management; process for identifying capability gaps which is influenced by risk; a framework that details the use of the process and defines the core capabilities; and a strategy to support the implementation of the capability development framework.	2020-21	1, 2, 3, 4
Climate Change Fund	The Climate Change Fund was established to address the impacts of climate change, encourage energy and water saving activities and increase public awareness and acceptance of climate change. It was set up in 2007 under Part 6A of the Energy and Utilities Administration Act 1987 and is administered by the Department of Planning and Environment.	2007 ongoing	3

	Key programs under the Fund include delivering energy savings and reducing emissions; delivering reliable, clean, and affordable energy; and increasing resilience to a changing climate. Through the Climate Change Fund, the NSW Government invested $1.4 billion in programs between 2017 and 2022.		
NSW and Australian Regional Climate Modelling	NSW and Australian Regional Climate Modelling (NARCliM) is a NSW Government led initiative that generates detailed climate projections and data for NSW. NARCliM1.0 was released in 2014 and enhanced NARCliM1.5 climate projections were released in 2020. These projections provide new insights to inform climate risk awareness and planning for South-East Australia. Work continues to design and develop the next iteration of climate projections (NARCliM2.0) using the latest global climate models.	2013 - Ongoing program	1
Climate Risk Ready NSW Guide	The Climate Risk Ready NSW program builds the capability of state and local governments to assess and manage climate change risks to protect government assets, infrastructure and services. The program delivers the Climate Risk Ready NSW Guide and nationally accredited training.	2019-2024	1
Net Zero Plan Stage 1: 2020–2030	The Net Zero Plan Stage 1: 2020-2030 is the foundation for NSW's action on climate change and goal to reach net zero emissions by 2050. It outlines the NSW Government's plan to protect our future by growing the economy, creating jobs and reducing emissions over the next decade. The plan aims to strengthen the prosperity and quality of life of the people of New South Wales, while helping to achieve the State's objective to deliver a 50% cut in emissions by 2030 compared to 2005 levels. The plan will support a range of initiatives targeting energy, electric vehicles, hydrogen, primary industries, technology, built environment, carbon financing and organic waste.	2020	3
NSW Climate Change Adaptation Strategy	The NSW Climate Change Adaptation Strategy sets out an ambitious approach to climate change adaptation. The strategy provides a framework that will strengthen and expand action to adapt to climate change now and over the long term. It sets out key decision-making principles and objectives for adaptation, key priorities and a suite of actions, these include: • Develop robust and trusted metrics and information on climate change risk • Complete climate change risk and opportunity assessments • Develop and deliver adaptation action plans • Embed climate change adaptation in NSW Government decision-making. The strategy commits to release the first state-wide climate change risk and opportunity assessment and adaptation action plan in 2023.	2022	1, 2, 3
NSW Coastal Management programs	The NSW Government coastal management framework is designed to manage the coastal environment in an ecologically sustainable way, for the social, cultural, and economic well-being of the people of NSW. One aim of the framework is to manage risks from coastal hazards, such as coastal erosion. Under the framework, local councils prepare coastal management programs (CMPs) that set the long-term strategy for the coordinated management of the coast, consistent with the objectives of the Coastal Management Act 2016. The programs are prepared by local councils in consultation with their communities and relevant public authorities.	2016 - 21	1, 3

NSW Social Cohesion Grants for Local Governments	The NSW Social Cohesion Grants for Local Government seek to identify social cohesion opportunities and challenges in local communities and support local councils and their community partners to deliver innovative solutions.	2022	4
Aboriginal Community Emergency Management Program	The Aboriginal Communities Emergency Management Program Pilot aims to improve preparedness and response to disasters in Aboriginal communities. Under the program, four discrete Aboriginal communities have been engaged in the project to improve their preparedness and recovery, and to build stronger relationships with emergency management stakeholders. As a result of the program, communities have participated in cultural burns to reduce fire load, developed community protection plans, completed mitigation and infrastructure, encouraged Aboriginal people and non-Aboriginal people to be trained as emergency service volunteers, and participated in the local emergency management committees and bushfire management committees to represent their community's needs.	2019-2022	1, 2, 4
Community Resilience, Wellbeing and Recovery Project	In 2020, the Mental Health Commission of New South Wales contracted the NSW Council of Social Service (NCOSS) to undertake the Community Resilience, Wellbeing and Recovery Project to identify the factors which support community resilience and build community recovery following natural disasters, including droughts, bush fires and floods. NCOSS contracted the University of Canberra (UC) to undertake research to better understand what local factors (community assets) contribute to community resilience, recovery, and wellbeing, and how to best leverage and support community assets to take advantage of their role in community recovery. This research included interviews, co-design, and scenario workshops in case study communities from five local government areas (LGAs) (Wentworth, Bega, Forbes, Blue Mountains, and Snowy-Monaro). A range of resources have been developed from the research.	2020 - 2021	1, 4
NSW Get Ready Program	The Get Ready Program includes: • The Get Ready Business toolkit to raise awareness of disaster risk for business and to embed disaster preparedness into business planning. • A communications kit for local councils to use, to raise awareness of disaster risk and to encourage people to prepare. It is designed to help councils build localised all-hazards communications. • An online resource for community service workers to help them help their organisations and clients get ready for emergencies and for recovery.	2019-2021	1, 4
Get Ready NSW Baseline Research Project	The Get Ready NSW Baseline Research Project was commissioned to provide a quantitative analysis and insights into the preparedness of NSW households to respond and react to the threat of a bush fire, home fire, flood, or storm. The survey was designed to provide insights to increase the preparedness levels of households. Households from every local government area (LGA) across the state were surveyed between August and October 2020.	2020-21	1, 4

Hawkesbury-Nepean Valley Flood Risk Management Strategy	The Hawkesbury-Nepean Valley Flood Risk Management Strategy (the Flood Strategy) is a comprehensive long-term framework for the NSW Government, local councils, businesses, and the community to work together to reduce and manage the flood risk in the Hawkesbury-Nepean Valley. The Flood Strategy has been developed by the Hawkesbury-Nepean Valley Flood Management Taskforce in response to the State Infrastructure Strategy 2012–2032 and the 2013 Hawkesbury-Nepean Valley Flood Management Review. The NSW Government established the Hawkesbury-Nepean Valley Flood Management Taskforce in early 2014 to advance the work carried out by Infrastructure NSW and the 2013 Review. This Flood Strategy is the result of the Taskforce's comprehensive assessment of flood mitigation options and was adopted by the NSW Government in June 2016. The objective of the Flood Strategy is to reduce flood risk to life, property, and social amenity from regional floods in the Hawkesbury-Nepean Valley now and in the future. The Flood Strategy's vision is for Hawkesbury-Nepean Valley communities and all levels of government to adapt to flooding by working together to: understand and be fully aware of flood risk; act to reduce flood risk and manage growth; and be ready to respond and recover from flooding.	2017	1, 2, 3, 4
Exercise Deerubbin	In June and July 2019, NSW conducted Exercise Deerubbin, an exercise designed to test a series of emergency management plans, including the establishment and operation of a Mass Care Evacuation Centre and state level recovery. The exercise provided emergency service organisations functional areas and support agencies the opportunity to identify capability gaps; inform development of policy, arrangements and processes: and evaluate interoperability across NSW agencies during a catastrophic flood scenario. All State Emergency Management Committee agencies were involved in the exercise, as well as key stakeholders, including Local Emergency Management Officers, Sydney Olympic Park Authority, Qudos Bank Arena, Insurance Council of Australia, Office of Small Business Commissioner, Destination NSW, and Royal Agriculture Society of NSW.	2018-19	2, 4
Strategic Guide to Planning for Natural Hazards in NSW	NSW has finalised a State-wide Natural Hazards package that encourages strategic planners and councils to consider natural hazard risk in strategic land use planning. The Natural Hazards package includes: • A Strategic Guide to Planning for Natural Hazards in NSW, which highlights the importance of considering natural hazards to reduce the impact they have on communities. • A Resource Kit to support strategic planning process and help plan-making authorities find the information and data they need.	2021	3, 4
Community Protection plans	Within NSW, there are a number of operational and planning documents produced by the various land management and fire agencies that address specific aspects of bush fire risk management. These plans are generally strategic planning documents that set out the particular bush fire management arrangements for a broad area.	2015	2, 4

	A Community Protection Plan (CPP) is a more detailed tactical bush fire planning document prepared at a community level. CPPs provide the public, fire services and land management agencies with easy-to-understand information that is specific to a community. A CPP consists of three maps with supporting documentation. It presents an overview of the bush fire threat for the area, the protection options available to the community, as well as the current and proposed risk treatment works. The CPP also captures any locally important information, including the location of Special Fire Protection Purpose (SFPP) assets, which can be used by local brigades and emergency services during pre-incident planning exercises and firefighting operations. Community Protection Plans have been developed for over 100 local communities across NSW.		
Community Resilience and Response Plan	The NSW Community Resilience and Response Plan (COMPLAN) details the preparedness, prevention, response, and recovery (PPRR) arrangements for a coordinated approach by NSW Government agencies and local government partners to managing and mitigating community harmony risks and improving conditions for community harmony within New South Wales. COMPLAN was developed pursuant to section 13(1)(f) of the Multicultural NSW Act 2000, which authorises Multicultural NSW to provide a single coordination point for integrated responses to issues associated with cultural diversity, and to assist in resolving issues associated with cultural diversity in New South Wales.	2016	2, 4
Critical Communications Enhancement Program (CCEP)	The Critical Communications Enhancement Program (CCEP) is building one of the largest public safety radio networks of its kind in the world. This project is focused on consolidating separate emergency radio networks into one single network (the Public Safety Network), and to increase the state's population coverage to 99.7%. The NSW Government is investing $1.4 billion to expand and enhance the Public Safety Network (PSN). This Critical Communications Enhancement Program (CCEP) will: • provide a single network for emergency services to communicate with each other • coordinate responses to critical incidents and disasters.	2016-Current	3, 4
Preparing Australia Package	In 2019, the NSW Government and the Australian Government agreed to the Preparing Australia Package, which targeted investments in new and existing critical emergency management capabilities to enhance Australia's natural disaster preparedness and community resilience. Under the package, $8.65 million was provided to NSW for the following projects: 1. Commence the phased development of a new National Fire Danger Rating System 2. Expand the trial of Public Safety Mobile Broadband to additional locations, and establish a national project management office in the NSW Telco Authority to implement this capability 3. Implement a regional preparedness program (under the Prepared Communities Fund) to guide and assist local councils to improve disaster management practices for community resilience.	2018-19	3, 4
NSW Critical Infrastructure Resilience Strategy	The NSW Critical Infrastructure Resilience Strategy encourages leaders in business and government to support the NSW community by improving critical infrastructure resilience (CIR) across NSW. The strategy promotes NSW critical infrastructure that can: withstand shock events to continue operating; or be returned to service as soon as possible after any disruption; and respond to long-term stresses.	2018	3, 4

	The strategy has three outcomes: improved infrastructure resilience; improved organisational resilience; and improved community resilience. To achieve these outcomes, priority is given to partnering for shared responsibility around critical infrastructure resilience; preparing for all hazards, not just the ones we can foresee; and providing critical infrastructure services with minimal disruption.		
NSW Water Strategy	The NSW Water Strategy is the first 20-year water strategy for all of NSW to improve the security, reliability, quality, and resilience of our water resources over the long term. It sets the priorities and outlines the implementation plan to delivering on these outcomes. This strategy proposes more than 40 actions across seven priority areas. A key action of the strategy is investing over $500 million to help local water utilities reduce risks in urban water systems through the Safe and Secure Water Program.	2021	3, 4
A 20-Year Economic Vision for Regional NSW	The 20-Year Economic Vision for Regional NSW, released in 2018, sets out the Government's priorities and plans to achieve long-term social and economic success for regional communities across the state. The 2018 Vision was refreshed in February 2021 in response to the changed economic landscape and opportunities that have emerged in regional NSW following the drought, bush fires, flood and COVID-19 pandemic.	2021	3, 4
Future Ready Regions Strategy	The Future Ready Regions Strategy identifies 14 initial commitments to build Future Ready Regions, with the goal of achieving sustainable, secure and healthy water resources, building stronger primary industries prepared for drought, and supporting stronger communities and diverse regional economies.	2021	3, 4

3. What partnerships and initiatives have been most successful in assisting in the reduction of disaster risk?

Successful disaster risk reduction requires strong whole-of-government and cross-sectoral partnerships and collaboration. These partnerships and collaborations can work to reduce vulnerabilities and enhance capacity and capability for resilience across the built, social, environmental, and economic domains.

A range of partnerships and collaborations have been undertaken between NSW Government and the private and non-profit sectors to reduce disaster risks and strengthen resilience. Examples include:

- The Community Resilience Innovation Program (CRIP), which supports grass roots initiatives that encourage collaboration and partnership between local community organisations and emergency services agencies, to enhance local community capacities for resilience.
- Partnerships between the NSW Government, Minderoo Foundation, The Salvation Army, and Australian Red Cross to provide temporary accommodation pods following the 2019-2020 bushfires.
- Collaborations between government, business, and non-government organisations to deliver recovery services including Foodbank, GIVIT, Insurance Council of Australia and insurers, Australian Red Cross, Save the Children, St Vincent de Paul Society, Anglicare, The Salvation Army, Orange Sky, and other regional and local charities in disaster affected areas.
- Engagement of Recovery Support Service providers for bush fire and flood recovery, including Gateway Family Services, Community Links Wollondilly, Barnardos Australia, St Agnes' Care and Lifestyle, and Monaro Family Services.

4. How have national, sub-national and local public policy, legislation, and governance structures changed to align with the Sendai Framework?

NSW Government policies and governance structures have progressively changed to align with the Sendai Framework. Key examples are:

- Planning for a more resilient NSW: A strategic guide to planning for natural hazards, a 2021 strategic planning guide for natural hazards which directly links the NSW planning system to disaster resilience guidance in the national frameworks and the Sendai framework.
- A Capability Development Framework for NSW Emergency Management Sector (2020) which aligns with the international level targets and priorities to prevent new and reduce existing risks under Sendai.
- The NSW Emergency Risk Management Framework, which notes the Sendai Framework and associated national frameworks as providing the context and drivers for change for emergency risk management in New South Wales.
- The NSW emergency management governance arrangements, which comprise of State, regional and local emergency management committees, functional areas, and other entities, reflects the application of the Sendai guiding principles of "empowerment of local authorities and communities through resources, incentives and decision-making responsibilities as appropriate" and "shared responsibility between central Government and national authorities, sectors, and stakeholders".

5. How and to what extent has the establishment of national and/or local disaster risk reduction strategies and plans resulted in expanded efforts in systemic risk reduction?

The establishment of various disaster risk reduction strategies and plans in NSW has resulted in expanded efforts in systemic risk reduction. For example:

The NSW Government and the Australian Government have worked together to expand efforts in systemic risk reduction through the implementation of the National Disaster Risk Reduction Framework and the National Strategy for Disaster Resilience. Under these strategies, significant funding has been committed through programs such as the Natural Disaster Resilience Program (NDRP) and the Disaster Risk Reduction Fund (DRRF) to support risk reduction efforts across all Sendai Framework priority areas.

The Hawkesbury-Nepean Valley Flood Risk Management Strategy has provided a comprehensive long-term framework for the NSW Government, local councils, businesses, and the community to work together to reduce and manage the flood risk in the Hawkesbury-Nepean Valley. Implementation of the strategy represents a significant expansion of efforts to reduce systemic risk in the Hawkesbury-Nepean Valley

The implementation of the NSW Critical Infrastructure Resilience Strategy is driving expanded efforts in system risk reduction through achievement of improved infrastructure resilience, organisational resilience, and community resilience.

The NSW Water Strategy expands efforts in systemic risk reduction through efforts to improve the long-term security, reliability, quality, and resilience of NSW water resources.

The NSW Climate Change Adaptation Strategy (2022) provides a framework that will strengthen and expand action to adapt to climate change now and over the long term. It sets out key decision-making principles and objectives for adaptation, key priorities, and a suite of actions which will contribute to systemic risk reduction.

The 20-Year Economic Vision for Regional NSW and the Future Ready Regions Strategy seek to reduce systemic disaster risk, as part of a wider strategy to achieve long-term social and economic success for regional communities across NSW.

6. How and to what extent have investments in disaster risk reduction increased since the implementation of the Sendai Framework (2015), and what measures are in place to ensure these investments are risk-informed?

Investments in disaster risk reduction have increased significantly since the implementation of the Sendai Framework in 2015. This significant increase has followed the occurrence of unprecedented natural disaster events such as the Black Summer Bushfires, the 2021 Floods and the 2022 Floods.

The conduct and utilisation of various risk assessments, including the 2017 State Level Emergency Risk Assessment (SLERA), ensure that investments are risk informed.

Key disaster risk reduction investments since 2015 (jointly funded by the NSW Government and the Australian Government) include:

- Over $27.1 million between 2015 and 2017, and over $40.7 million between 2016 and 2018 for the Natural Disaster Resilience Program (NDRP)
- $8.65 million for the Preparing Australia Package
- $51.8 million for the Disaster Risk Reduction Fund (DRRF)
- $200 million for the Infrastructure Betterment Fund to support the reconstruction and improved disaster resilience of public assets damaged during the 2021 storms and floods and the 2019-2020 bush fires
- Over $830 million for the implementation of the recommendations from the NSW Bushfire Inquiry 2020 and the Royal Commission into National Disaster Arrangements 2020.

Other investments since 2015, which contribute to disaster risk reduction include:

- $1.4 billion of investments on programs through the NSW Climate Change Fund, between 2017 and 2022
- $1.4 billion to expand and enhance the Public Safety Network, the radio network used by frontline emergency services, government agencies and essential services to communicate during emergencies
- Over $500 million under the NSW Water Strategy to help local water utilities reduce risks in urban water systems through the Safe and Secure Water Program.

7. What major changes / emerging issues / topics of concern are anticipated in the period to 2030 and beyond which will need to be considered in prioritising, accelerating and amplifying action to reduce disaster risk?

The following major changes, emerging issues, and topics of concern are anticipated in the period to 2030 and beyond, and will need to be considered in prioritising, accelerating and amplifying action to reduce disaster risk:

- The proportion of funds being invested in prevention and preparedness initiatives continues to be small when compared to the proportion of funds directed to response and recovery measures.

- Recent large-scale and compounding catastrophic events have diverted resources from prevention and preparedness activities to response and recovery efforts.
- In the ‘prevention’ context – the understanding that changing risk profiles and probabilistic impacts are not well treated in standard cost-benefit analysis. ‘Avoided cost’ features should be highly prioritised in asset planning and design.
- Limited funding to improve the disaster resilience of infrastructure (e.g. betterment).
- Limited availability of current and climate-informed disaster risk information and educational material at a national level.
- The uncertainty created by increasingly frequent climate hazard events and disasters and geopolitical trade tensions will periodically disrupt economies. Government needs to consider how to build a level of resilience into local economies.

Annex O: Infrastructure Australia advocates for systems approach to resilience

Submitted by: Infrastructure Australia

Infrastructure assets, networks and communities are inherently vulnerable to hazards. As the interconnectivity of assets, networks and communities increases, they become more complex and the potential impacts of hazards more uncertain. Natural disasters currently cost the Australian economy $38 billion a year. This is forecast to rise to $73 billion by 2060, due to the increasing frequency and severity of disasters.

Australia's risk management and valuation approaches must adapt to meet the multifaceted challenges of hazard, exposure and vulnerability. Doing this successfully requires a systems approach that emphasises collaboration, shared responsibility and accountability.

To improve disaster risk practices, Infrastructure Australia has produced a series of papers advocating for a systemic consideration of resilience. This is an all-hazards approach that focuses on the capacity of a system to maintain or recover functionality in the event of disruption or disturbance.

It considers the contribution the asset makes to the resilience of the whole system rather than the resilience of the individual asset. Achieving resilience requires a shift in focus from the resilience of assets themselves, to the contribution of assets to the resilience of the system – what we call infrastructure for resilience.

Systemic thinking shifts the focus from the resilience of a physical infrastructure asset to the contribution that asset makes to the resilience of the broader network, provision of critical services, supply chains and cross sectoral systems. It allows interdependencies and vulnerabilities to be considered holistically, within the context of increasing shocks and stresses. This will strengthen the resilience of the asset, network, sector, place, precinct, city and region.

Our work advocating for systemic resilience

A Pathway to Infrastructure Resilience

A Pathway to Infrastructure Resilience recommends a whole-of-system, all-hazards approach to resilience planning that focuses on strengthening an infrastructure asset, network and sector, as well as the place, precinct, city, and region that the infrastructure operates within.

A Pathway to Infrastructure Resilience consists of two advisory papers:

- **Advisory Paper 1: Opportunities for systemic change** identifies 10 directions for transformational and systemic change in infrastructure planning to achieve infrastructure for resilience.
- **Advisory Paper 2: Guidance for asset owners and operators in the short term** identifies a series of short-term actions for asset owners and operators as the first steps towards this change.

The papers aim to create resilient communities that can resist, absorb, accommodate, recover, transform and thrive in response to the effects of shocks and stresses in a timely, efficient manner to enable sustainable economic, social, environmental and governance outcomes.

The pathway described would:

1) **Set and monitor strategic resilience outcomes:** Governance that adopts a systemic view of risk and establishes the accountability and resources necessary to achieve system-wide resilience.
2) **Adopt place-based approaches:** Planning tools and data to consider multiple place-based issues simultaneously and address resilience and community needs.
3) **Manage uncertainty through scenario planning:** A common set of future scenarios to streamline planning and support cross-sector coordination and shared responsibility.
4) **Ensure land use planning and development decisions support resilience:** Planning systems that value and set resilience as policy objectives, incorporate new and emerging data, capture local opportunities and assess strengths and weaknesses
5) **Improve infrastructure investment decision making:** Agreed mechanisms and guidance for quantifying the projected economic, social, environmental and governance implications of the impacts associated with managing uncertainty or resilience.

6) **Value green and blue infrastructure and biodiversity:** Improving the understanding, valuation and governance of green and blue infrastructure. Encouraging the use of green and blue infrastructure to address service needs, such as drainage, stormwater and erosion mitigation, as well as complementary quadruple bottom-line benefits, such as space, habitat and recreational infrastructure.

7) **Improve data needed for informed planning, action and decision-making:** Coordinating, sharing and standardising critical disaster and climate data, including data and information on shocks and stresses, the exposure of people and assets and the vulnerability of people.

8) **Collect and share information on asset and network vulnerability:** Creating a shared understanding of potential impacts to interconnected systems and increasing asset and network owners' understanding of their decisions on interconnected systems.

9) **Build trust through more inclusive decision making:** Including communities and informing them about the risk, uncertainty and tradeoffs related to infrastructure services and their livelihoods, and allowing people's active participation in determining possible outcomes.

10) **Embed traditional ecological knowledge in decision-making:** Opportunities to systematically draw on traditional ecological knowledge to manage land and natural resources, and mitigate-risk.

The 2021 Australian Infrastructure Plan

The *2021 Australian Infrastructure Plan* is a practical and actionable roadmap for infrastructure reform. It is intended to deliver infrastructure for a stronger Australia, and support our national recovery from the still-unfolding COVID-19 pandemic, as well as the bushfires, drought, floods and cyber-attacks that have tested our resilience in recent years.

Infrastructure Australia's vision for 2036 is to have infrastructure that improves the sustainability of the country's economic, social, environmental and governance settings, builds quality of life for all Australians, and is resilient to shocks and emerging stresses.

The 2021 Plan takes the opportunities in the *A Pathway to Infrastructure Resilience* and translates them into implementable, actionable and measurable actions. While resilience is a cross-cutting theme in all chapters, the reforms catalysing a systemic resilience system are discussed in Chapter 2.

Chapter 2 suggests the following outcomes:

2.1 Build community resilience to all hazards by considering systemic risks, interdependencies and vulnerabilities in infrastructure planning and decision-making.

Proposed sponsor: National Recovery and Resilience Agency

Supported by: Department of Home Affairs, state and territory resilience agencies, state and territory planning departments, state and territory infrastructure departments, local governments, state and territory emergency management agencies, state and territory environment departments and asset owners and operators

2.1.1 Create an environment for consistent action by establishing clear cross-sector policy priorities to inform resilience planning, policy prioritisation and reform decisions.

Proposed lead: National Recovery and Resilience Agency

2.1.2 Improve community resilience and coordinated action through a consistent, nationwide, systemic approach to risk identification.

Proposed lead: National Recovery and Resilience Agency

Supported by: Department of Home Affairs and Australian Climate Service

2.1.3 Facilitate joint action by establishing a common, long-term understanding of the potential impacts of climate change, both nationally and locally, that informs land use and infrastructure planning and decision-making.

Proposed lead: Department of Agriculture, Water and the Environment

Supported by: Australian Climate Service, National Recovery and Resilience Agency and state and territory environment departments

2.1.4 Ensure infrastructure decisions consider resilience through clear and harmonised guidance on how projects can address risks and value resilience.

Proposed lead: State and territory infrastructure bodies

Supported by: Infrastructure investment assurance and assessment agencies, state and territory treasuries, industry representative groups, Coalition for Climate Resilient Investment and National Recovery and Resilience Agency

Each of these outcomes is supported by detailed actions described in the 2021 Plan.

The 2019 Australian Infrastructure Audit

The *2019 Australian Infrastructure Audit* strategically defined Australia's nationally significant infrastructure needs over the next 15 years. The 2019 Audit formed the evidence base for the 2021 Plan, while assessing equity, productivity, and value for money considerations in identifying the challenges and opportunities Australia is likely to face.

The 2019 Audit found trends impacting infrastructure planning were creating growing uncertainty. Since publication, Australia has experienced bushfires, drought, storms, floods, coastal erosion, cyber-attacks and the COVID-19 pandemic. These events have highlighted increasing uncertainty and a growing interconnection of Australia's infrastructure, environment, people and places. They have also demonstrated the importance of building infrastructure resilience to safeguard communities, ecosystems and the economy.

The 2019 Audit identified significant challenges hindering these outcomes. It concluded that Australia needs comprehensive resilience strategies and reform that reduce the personal, social, and financial costs of shocks and stresses by improving the resilience of assets and services.

Infrastructure Priority List

The *Infrastructure Priority List* (Priority List) is a prioritised list of nationally significant investment opportunities. It provides decision makers with advice and guidance on specific infrastructure investments that will underpin Australia's continued prosperity. As a national investment pipeline, the Priority List can promote resilient outcomes by identifying and then endorsing proposals with resilience benefits. Relevant examples include:

- Town and City water security outlines a mix of infrastructure and non-infrastructure responses, such as demand management, to efficiently meet agreed service standards for water security in Australia's towns and cities.
- Hawkesbury-Nepean Valley flood management presents a series of proposals and investments to reduce flood risk in the valley.
- Perth and south-western coast water security is a program of water sourcing and water demand management interventions to improve water security. This could include a mix of more conventional water sources and, more innovative reuse and recovery options, to provide additional climate-independent potable and non-potable water sources.
- Enabling Infrastructure for Remote Northern Territory communities' identifies the need for infrastructure upgrades to support resident's sustainable economic and social development.
- Northern Territory remote community power generation program sets out an opportunity to improve the resilience, flexibility, reliability, amenity and sustainability of power infrastructure in remote Aboriginal communities of the Northern Territory.

Annex P: Enabling Resilience Investment Approach: Port Adelaide Enfield

Submitted by: the Commonwealth Scientific and Industrial Research Organisation

The Problem

Securing investment to reduce disaster risks, build resilience, and adapt to a changing climate.

Across the globe attention is now being given to the pressing challenge of how to address communities' vulnerabilities to the risks of climate change and disasters across urban, peri-urban, regional and rural contexts.

The substantial deficit in funding of disaster risk reduction, climate adaptation, and resilience cannot be met by Governments alone. Efforts to catalyse private sector investments have revealed we lack the systems to identify, evaluate, and develop such projects, and to meet the investment requirements of the public and private sectors. This is because of the many fundamental issues (Figure 1) constraining these decision makers from effectively (i.e., credibly and consistently) estimating the future impacts or costs that can be avoided through proactive investments in disaster risk reduction and the additional value that can be generated through investments in adaptation and resilience.

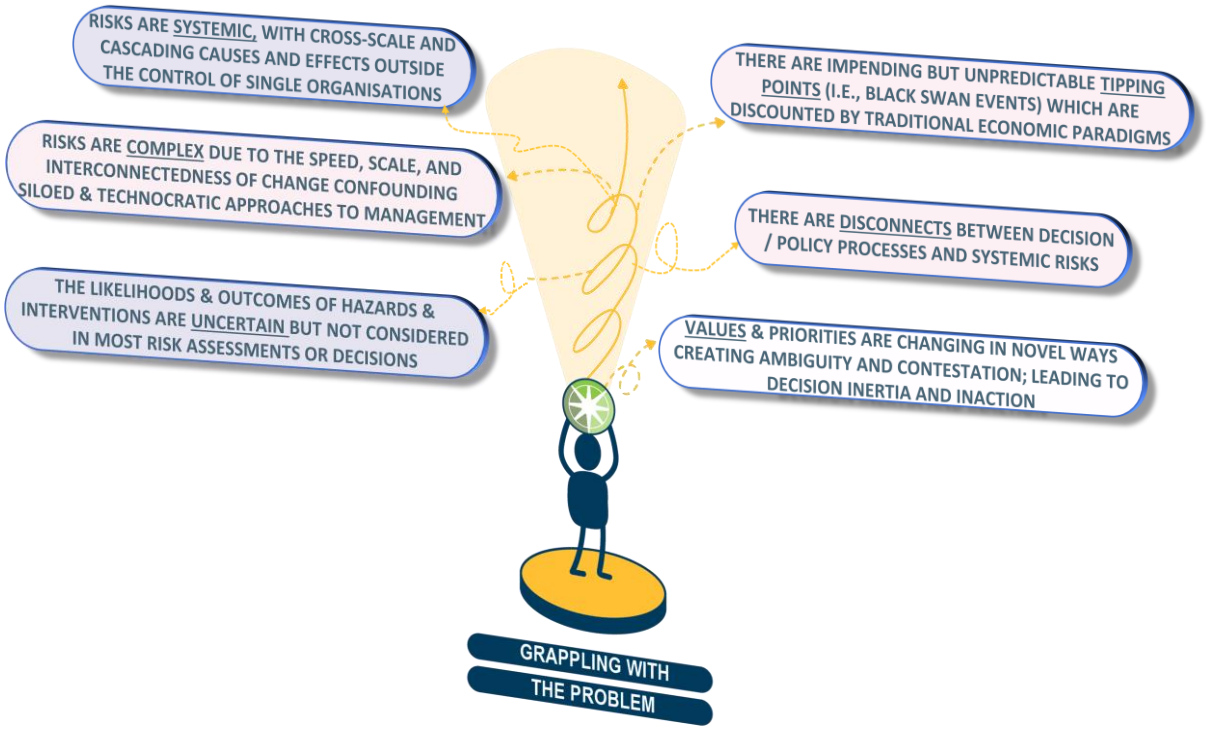


Figure 1. Constraints to effective decision making to secure DRR investments

The Challenges

Included among a host of things needed to support transitioning to a well-adapted and disaster-resilient future are:

- A step change in governance arrangements that enable multi-level and cross-sector/ department anticipatory decision making and clarification of roles and responsibilities for assessing and managing climate and disaster risks;
- Assessment methodologies that are fit for considering the systemic and uncertain nature of climate and disaster risks and for promoting more equitable outcomes (i.e., that overcome the existing bias against areas with smaller populations or less economic activity) from mitigation efforts and investments in resilience across urban, peri-urban, regional and rural contexts; and
- Closing the gaps in knowledge, data and assessment methodologies that account for dynamics and uncertainties in the drivers of disaster risk and the interventions to respond to these risks.

An Innovative Response

The **Enabling Resilience Investment (ERI)** approach is underpinned by deep scientific research and has been designed and developed to facilitate strategic partnerships and new processes, practices and tools for planning and investment to reduce systemic climate and disaster risk. It:

- Describes the processes to generate pathways and options, build investment cases and deliver funding for climate adaptation, disaster recovery and risk reduction and resilience
- Details the steps on how to assess and model the value at risk and the value that can be created and realised under climate-hazard-vulnerability scenarios
- Can be applied at different scales, and as a rapid 'light pass' or detailed investigation

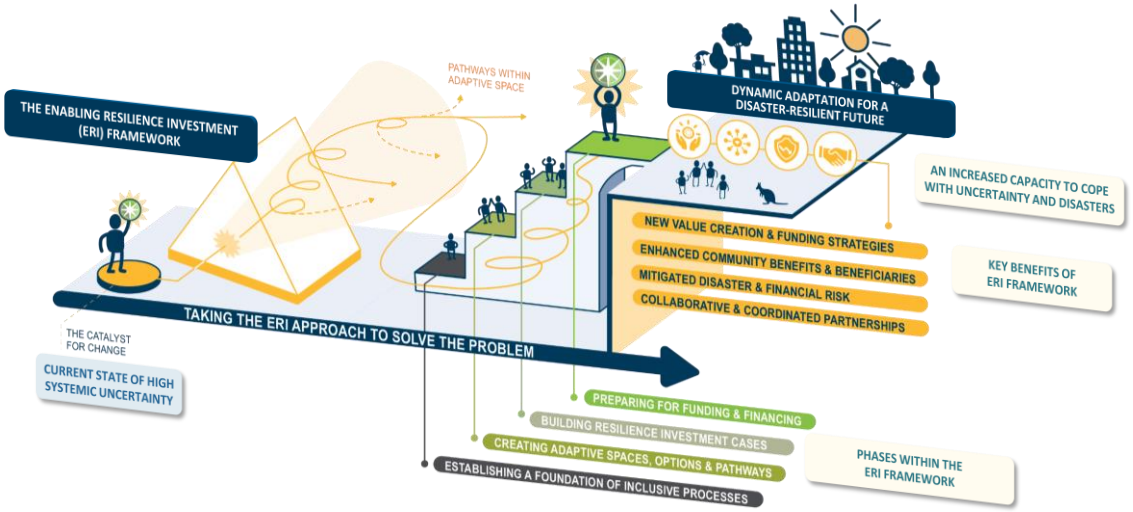


Figure 2. A new approach – the Enabling Resilience Investment Approach – to building the evidence and capabilities for investment in resilience, adaptation, and disaster recovery and risk reduction

The work to date has delivered an initial suite of products and services:

1. A set of leading practices, processes, and approaches, including guidance, data management, stakeholder engagement, adaptive learning, and analytical methods and processes to support and enable diverse sets of stakeholders to undertake place-based assessments of systemic vulnerabilities and resilience and to build their required capabilities in anticipatory governance and decision making for reducing disaster risks and proactively adapting to change.

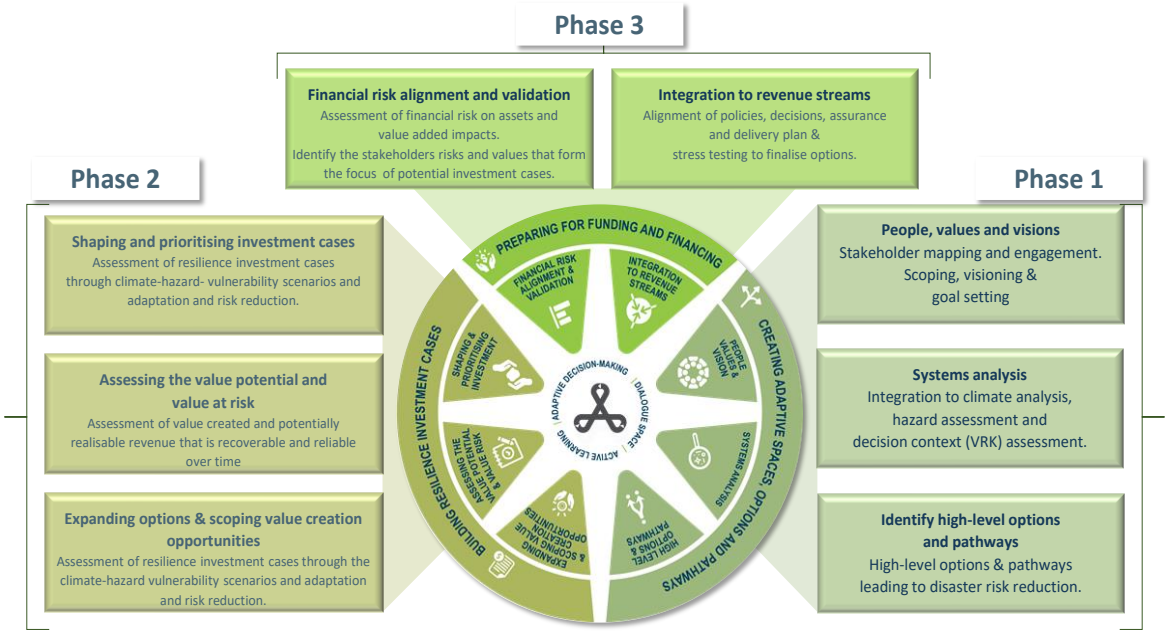


Figure 3. The Enabling Resilience Investment Framework

2. Interactive dashboards and visualisations that allow detailed assessments in real time of:
   a) the relative performance of possible interventions or options under climate, hazard, economic, and funding scenarios

   b) the performance of a prioritised options under specified designs, funding options and climate/disaster risk scenarios.

3. A 'measurement, evaluation and learning' (MEL) framework, encompassing key 'learning narratives' that describe the desired system-wide changes, the assumptions being tested and survey instruments that enables a triangulation of results and promotes integration of stakeholder perspectives and promotes adaptive learning.

Bringing the Enabling Resilience Investment approach to life through place-based initiatives that build transferable lessons and capabilities that catalyse resilience investments

The Enabling Resilience Investment Approach provides the foundational framing, guidance, methodologies, processes, and tools to support federal, state, and local governments, communities, and business to reduce disaster risks, recover from disasters in ways that are resilient and climate adapted, and support sustainable urban and regional development. The ERI Approach is being widely implemented around Australia in partnership with federal, state, and local governments, communities, and industry, to build stakeholder capabilities in anticipatory assessment and governance, address data and knowledge gaps, and facilitate the creation of enabling governance arrangements, in order to catalyse scalable investments in DRR and resilience (Figure 4). Recent applications of the approach to achieve desired outcomes are in the **City of Port Adelaide Enfield in South Australia** and in the **Bega Valley Shire of New South Wales**. The Port Adelaide Enfield case study is described below.

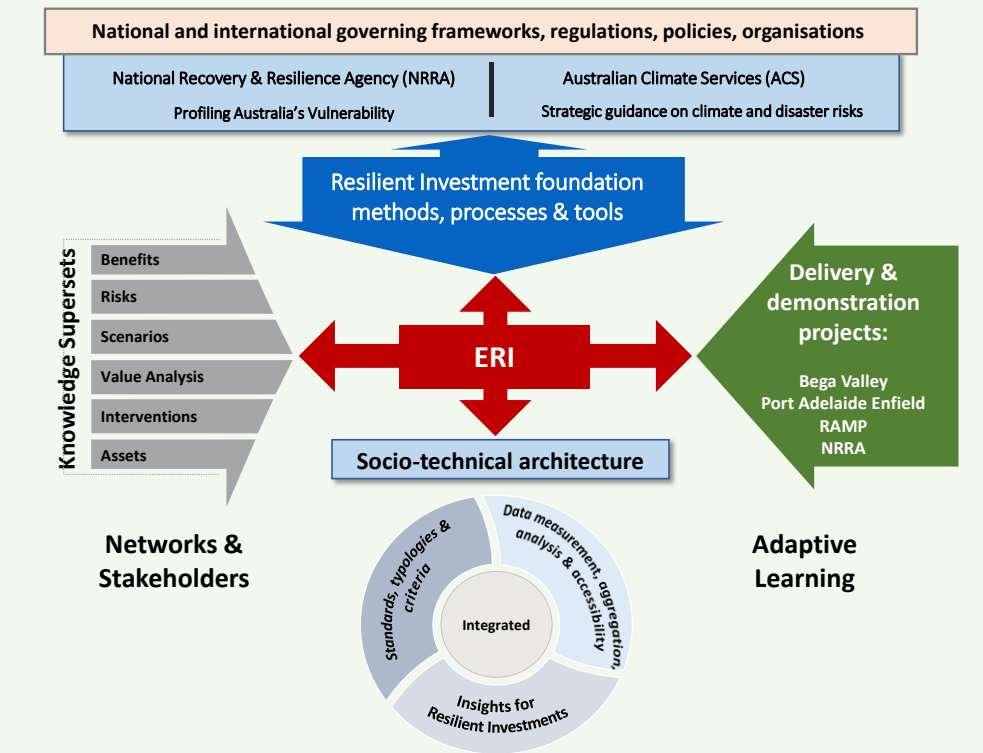


Figure 4. Delivery model of the Enabling Resilience Investment approach

City of Port Adelaide Enfield in South Australia

The Enabling Resilience Investment Approach was implemented in Port Adelaide Enfield to address the issues constraining funding of the prioritised disaster risk mitigation options. The application of ERI built upon the comprehensive disaster risk assessments and adaptation planning undertaken in the region over the previous decade. The purpose of the ERI work was to develop a resilience investment case to catalyse the necessary funding of the prioritised interventions to mitigate the risks of flooding and coastal inundation (e.g., flood levees, raising sea walls, sluice gates).

The work involved the ERI partners (CSIRO and Value Advisory Partners) with support from the University of Adelaide – who had led the previous climate and disaster risk assessments and participatory planning processes – engaging with all levels of the local council and State government agencies across the portfolios of environment, water, infrastructure, land renewal, and climate adaptation. The engagement efforts targeted the public sector with the purpose of building capabilities and demonstrating improved practices in how to develop a resilience investment case for already identified interventions. This targeted engagement was necessary due to the limited 5-month period available to complete the work and was possible because of the inclusive processes previously adopted in the identification of the DRR options.

The ERI project activities focused on addressing the gaps in evidence and building the investment case to meet the needs of funders, including:

- Developing a clear vision for the region as the basis for generating new opportunities for investment that contribute to realising the vision
- Assessing the robustness of the performance of investment opportunities across the range of plausible futures and to ensure these were contributing to building resilience
- Identifying the beneficiaries (community, business), benefits (economic, social and environmental), and funding mechanisms associated with each investment opportunity to inform the design of these options and to shape the investment case
- Developing the resilience investment case for funding.

The outcomes of implementing the Enabling Resilience Investment approach in Port Adelaide Enfield have been to:

1. Deliver a step change to the preparation of a viable business (investment) case to catalyse funding and finance to begin delivering risk reduction interventions in Port Adelaide. The work is now in the process of being adopted by the Australian Government as a proof-of-concept approach to be accessible to a broad set of potential users and project proponents.

2. Generate new networks across state government agencies and between levels of government that are critical for effectively diagnosing complex problems such as disaster risks and for generating system-wide (coordinated and collaborative) solutions.

3. Increase the capabilities and confidence of the project participants to adopt anticipatory and systems-based approaches to risk assessment and management, and to complement these risk mitigation efforts with activities that proactively identify value creation opportunities that attract the interest of beneficiaries/investors to fund or finance disaster resilience.

4. Contribute to building national capabilities in resilience investment by generating: i) scalable or transferable lessons (e.g., guidance or template on how to develop resilience investment cases for flood/inundation mitigation infrastructure); ii) new integrated datasets to support assessments in other contexts with similar characteristics; and iii) integrated assessment capabilities and dashboards to support rapid or detailed assessments of disaster risk mitigation options and value creation opportunities under different climate-hazard-vulnerability scenarios.

The next phase will involve broadening the focus to the wider region and all relevant stakeholders including business, industry, community, and federal government. Efforts will be targeted at creating governance arrangements that support and enable coordination and collaboration across these stakeholders and co-investments in solutions. In doing so the next phase will generate a shared vision for the region as climate adapted and disaster resilient and fundable resilience investment cases for interventions. Find out more information at: https://research.csiro.au/enabling-resilience-investment/.

Annex Q: QRA Cost-Benefit Analysis Case Study

Submitted by: Queensland Reconstruction Authority

Queensland Reconstruction Authority (QRA) Cost-Benefit Analysis of the 2013 upgrade to the Gayndah Water Intake - North Burnett Regional Council

Context

The Queensland Government, through the Queensland Reconstruction Authority, initiated the first Queensland Betterment Fund in February 2013 following Severe Tropical Cyclone Oswald under the new DRFA Efficiencies Framework and is being jointly funded (50:50) by the Australian and Queensland governments. There have since been three additional Betterment programs, with the latest initiated in 2019.

The 2013 Queensland Betterment Fund provided $80 million for assets to be built back better after disasters, enabling assets to be built back to a standard that would be more disaster resilient, reducing risk to the community and future reconstruction costs from subsequent events.

Under the fund, assets such as roads, water supply infrastructure, bridges and drainage systems were identified by local governments for betterment that would provide resilience and risk reduction benefits for their communities.

Including the initial program, Queensland has now approved more than 480 betterment projects across four programs.

The Gayndah Water Supply Intake Station on the Burnett River provides the town's only water supply and supports a population of approximately 2000, as well as local primary industries.

It was severely damaged in 2011 and rebuilt at a cost of $1.2 million, before being re-damaged in 2013, with restoration costs estimated at $3.8 million.

Overview

In 2013 the Gayndah Water Supply Intake Station was repaired as a betterment project. This involved relocating the water intake above the Claude Wharton Weir, building a new submersible-style pumping station and new raw water rising main to the water treatment plant.

Following betterment restoration, Gayndah has since been impacted by four natural disaster events in 2015, 2016 and two in 2017 and has remained functional throughout.

For example, the resilience of the Gayndah Water Supply Intake Station was evidenced in 2015 when it withstood the flooding brought on by STC Marcia and was undamaged.

As a result, it is estimated that while the restoration of the water supply intake cost $2.7 million and the betterment added a bit over $900k, it has avoided losses of over $10 million.

Process

In 2019 QRA undertook a cost-benefit analysis of the betterment project at Gayndah. This involved assessing the cost of a standard build back, plus the additional cost for betterment. This was compared to the avoided losses from extreme weather events that had occurred between 2013 and 2019, which would have been of sufficient intensity to damage the original water supply intake station.

QRA uses a binary equation when assessing whether the asset impacted by an extreme event, with an assessment of either 'yes' or 'no'. If yes, QRA looks at whether it was it impacted more, the same or less than a benchmark level (the level of impact before the upgrade through the betterment program).

QRA then used standardised rebuild costs to estimate the avoided loss from each of the extreme events between 2013 and 2019 that impacted that asset.

The calculation of the benefits achieved at Gayndah were part of a broader program to estimate the benefits of the betterment program overall. Since its inception, the betterment program has been applied to over 480 projects.

Inputs

In order to estimate the costs and benefits for each of the betterment interventions that had been made under the program, QRA needed to collate and collect data from across the state.

In particular, the costs of infrastructure vary across the state. In order to estimate the avoided losses they needed to know cost to rebuild in each specific locality. To address this QRA created benchmark rates and common treatments to restore services, each with associated costs. There were 51 restoration options, e.g. bitumen, guardrail repair etc. and QRA now has a database with estimates of how much those restorations cost across 77 local councils across QLD.

The location and description of the projects also needed to be tracked. A data base of the geolocation of each project and the work done has been created and is maintained. This allows QRA to track when the projects may have been impacted by an extreme event.

Once they identify that a project has been in the path of a natural hazard, agents have access to sites in specific areas to see to what extent the assets have been impacted.

Results

As at July 2021, 334 of the completed projects have been subsequently impacted by natural disasters with 85 per cent have sustained no damage or only minor or superficial damage.

Of the betterment projects that have been re-impacted, an investment of $110 million has generated approximately more than $250 million in savings or avoided costs, which is a great outcome for all levels of government, as well as Australian taxpayers (Information is current as at July 2021).

Impact of the analysis

The key audience for the analysis was initially the state and federal treasuries. They were interested in pay-off periods of the betterment investments. The expectation from QRA was that the pay-back period would be around 20 years, which would be a good result. However, they found that the cost savings are appearing in less than 10 years. Therefore, avoided costs exceeded reconstruction and restoration costs much faster than expected.

Even though the estimate from this analysis are likely an underrepresentation of benefit (as they don't consider broader benefit beyond infrastructure costs) this didn't create limitations. The QRA analysis still helped advocate for additional funding as it makes a compelling case of the value of betterment.

The success of the program and demonstrated value generated has meant there have been several rounds of betterment investment. Since the first betterment fund was established in 2013, more than 480 projects across Queensland – valued at more than $240 million – have been approved, helping to create stronger, more resilient Queensland communities. Other states and territories are now establishing a similar program or approach.

There is also a maturing conversation around betterment, and it is becoming easier to secure requested amounts of funding as it has been proven to benefit state and commonwealth treasuries.

Lesson learnt

It was QRA's first time using the approach, which involved a lot of internal learning.

Data collection and management was a significant effort. QRA created an internal benchmarking team which specifically aligns to this work to understand restoration costs across the state. QRA now has a high level of benchmarking granularity compared to other organisations.

Keeping track of the spatial data associated with each betterment project was also critical as this allows QRA to assess when the assets may have been impacted by natural hazard events. And of course, information on the severity and footprint of natural hazard events was important to understand when and where assets may have been impacted. These data collection and management processes are now established meaning that future effort to estimate costs and benefits will be easier to undertake.

Future opportunities

The current calculation of the benefits of betterment only focuses on avoided infrastructure costs. QRA's work does not include intangible benefits associated with having more resilient infrastructure. This can include social, economic, and environmental benefits such as more connected communities, continuity of telecommunications, road networks and other essential services, increased consumer confidence and business activity, and reduced impacts on the environment (for example, erosion and run off into creek beds and other waterways). If these intangible benefits were included the total avoided cost figure would be much higher. This is an area of future work for QRA.

Betterment has been associated with large, exceptional events. QRA are trialling a betterment program that applies to all councils impacted by any event in a financial year, and they are looking for betterment to become available to all public reconstruction programs.

QRA are also looking at creating a guideline and resilience standard associated with betterment of public infrastructure to further support the expansion of betterment programs.

More information

You can read more about the QRA betterment program here. And the Gayndah Water Supply Intake Station upgrade here.

Annex R: Supporting dairy farmers

Submitted by: the former Department of Agriculture, Water and Resources

Australia invests in rural research and development corporations to support agriculture, fisheries and forestry industries by delivering tangible and practical improvements for their industries. Dairy Australia, the Research and Development Corporation for the dairy industry, is supporting dairy farmers to respond to a changing climate and manage extreme weather events. The following case study highlights these efforts taken to assist dairy farmers.

In 2021, Dairy Australia released its Climate Change Strategy. The purpose of the strategy is to enable a climate committed Australian dairy industry with dairy farms that are sustainable, productive and resilient through cost effective and achievable actions. The Climate Change Strategy articulates a climate commitment and formulates an investment intent and priorities across research, development and extension.

A key priority of the Climate Change Strategy is ensuring that Australian dairy farming systems are able to ADAPT so they can thrive in warmer and more unpredictable climate. Dairy Australia has identified the following actions to deliver this priority:

- Leading the transition towards agile dairy businesses that can anticipate and adapt to climate change, increasing climate variability and the availability of key resources (water, feed, grains, etc.)
- Proactively engage and co-design with dairy businesses to support their unique adaptation challenges
- Delivering high quality climate information and iterative management approaches to inform decision-making in uncertainty
- Supporting the development of climate risk management skills across dairy farmers, service providers and wider value chain.

Dairy Australia has already developed a number of tools and resources to support the delivery of its Climate Change Strategy and help the dairy industry prepare for, respond to and manage extreme weather events. These include:

- Dairy Business for Future Climates: Research findings on performance of Australian dairy farms under predicted climate changes to 2040
- Forewarned is Forearmed: Extreme events preparedness
- Emergency preparedness checklist: helping dairy farmers prepare for and reduce the potential for injury and property damage
- Dairy herd nutrition after major environmental events: Guidelines for farmers to limit the negative impact of flooding events on productivity and nutrition
- Cool Cows: Managing heat stress
- Mastitis control in wet conditions: outlines the four key steps when dealing with mastitis in wet or muddy periods
- Milking through power outages: ensuring milking operations are not overly impacted by prolonged power disruption
- Missed milkings: Advice for managing missed milking due to power outages or other emergencies
- Recovering from floods: Details the actions to prioritise when recovering from floods.

Annex S: The April 1990 Flood in South West Queensland

Submitted by: a representative of the Paroo Shire Council

Heavy rain had occurred over the south west for the two weeks prior to the 20th and 21st April, 1990 when Warrego River floodwaters devastated the town of Charleville. This was unprecedented flooding and as soon as I received the news, I packed a bag and headed for Cunnamulla knowing a huge amount of flood water was on its way south down the Warrego River towards Cunnamulla.

Our home was on the western side of the Moonjare (Mirraparoo) Creek 30kms west of Cunnamulla. It was a boat ride from our back steps to the main road and then east across the flooded creek crossing to where we had a 4WD vehicle parked for transport into town. My husband drove me to Cunnamulla, crossing a number of floodways until we reached the saleyards on the western side of the Warrego River. That was as far as we could go as the river was already in flood covering the Darby Land Bridge and had spilled over its banks spreading out to about three times its normal width.

The SES team then ferried me across the river into town. The current was so strong that our course from bank to bank resembled a large curve as we were swept downstream from the force of the rushing river. At the time I was the Paroo Shire Council's Shire Clerk and it would be two weeks before I was able to return home, although I did have one quick trip by helicopter.

Senior SES personnel from Brisbane had seen what had happened at Charleville and were very worried the same would happen to Cunnamulla. It takes four days for the flood peak in Charleville to reach Cunnamulla. Within that timeframe, the Council workforce was tasked with strengthening and reinforcing the existing small levy bank, constructing extensions to the levy bank in strategic areas and building it all up to a height of 11 metres as it was thought the flood could reach 10.5 metres.

The Council staff worked day and night shifts carting soil and compacting the levy bank whilst also keeping a vigilant watch on the storm water drain outlets where there was some breaching. A canteen was set up in the Shire Hall supper room providing all meals and smokos for those involved, manned by volunteers. Lots of volunteers filled sandbags day and night. The Government's response to the need for sandbags, fuel and other supplies, particularly for the evacuation centre, was very prompt and everyone in the town worked together either helping with the protection of the town in general or helping others secure their possessions and prepare for evacuation. The Army also flew in to lend assistance.

A few days prior to Charleville being flooded, the Council had commenced implementing Stage 1 of its Flood Emergency Plan. This entailed the establishment of an evacuation camp site on the sandhill at the southern end of the town, being the highest point. Establishing the site included building roads, a helicopter landing pad, supplying tanks of fresh water, large tents flown in by the Army, ablution blocks were available nearby and we arranged for large barbecues to cater for large numbers of people. A carpark was also established where residents could park their vehicles out of reach of the flood waters. The evacuation camp site was in place prior to the flood peak reaching Cunnamulla. A further evacuation point was to be arranged at the Airport if there were too many people for the sandhill evacuation point. Army helicopters were available to ferry people over the flooded Warrego River to the Airport and Hercules aircraft were available to take people away if necessary.

On the Sunday afternoon a public meeting was held at John Kerr Park oval where the Council Chairman outlined the procedures for moving to the evacuation centre should it become necessary, particularly those living in low lying areas close to the river and suggested those residents move their vehicles to the sandhill carpark. The community was also advised that if the levy bank was breached by the floodwaters, the town's fire alarm would be sounded as a warning to evacuate immediately.

An Army helicopter with police and a couple of locals with extensive knowledge of the river system flew the river each day to keep tabs on the Warrego River as the flood waters made their way south from Wyandra. After their first flight on 23rd April, they reported that the river was boiling and they had never seen so much water. There was concern from senior government officers about the evacuation centre being safely out of flood reach and it was thought that evacuating people out of the town would be the better option. It was decided to implement Stage 2 of the Flood Emergency Plan and this would commence at dawn the next day 24th April. It caused some confusion when the fire alarm was sounded at 6 a.m. with some people being airlifted to the Airport, but transferring them elsewhere was put

on hold until the daily report from the helicopter flood watch was received. The evacuation process was called off after reports were received from the helicopter that the river had subdued overnight.

Between Wyandra and Cunnamulla are three flood-out areas on the Warrego River, namely; the Widgee, the Cudnappa and the Gumholes/Moonjaree. The river had been at a high level for ten days due to the previous heavy rain in the region. When the latest Charleville flood waters passed south of Wyandra the level of the river was high enough to divert large flows along these three water ways reducing the level that would reach Cunnamulla by almost a metre. A flood peak of 10.15 metres was recorded at Cunnamulla on 25th April. From the air looking west was a sea of water which stretched for about 30 kms. The flood waters that went down the Widgee, Cudnappa and Gumholes/Moonjaree washed out the railway line, fences and stock and flooded homesteads that had not been flooded before but the town of Cunnamulla escaped flooding. There were lots of lessons learned in respect of disaster management from this flood event, many of which have been recognised within the current disaster management framework.

Annex T: Charleville Flood Levee, Bradley Gully Diversion and Warrego River ALERT System

Submitted by: the former National Recovery and Resilience Agency

On April 21, 1990, the Warrego River at Charleville peaked at a record 8.54 metres after substantial and unprecedented rains fell in the upper catchment of the Warrego River. The flood inundated approximately 1,200 homes and forced the evacuation of the entire town. The recovery and clean-up took many years and mitigation works substantially changed the appearance, confidence and economy of Charleville.
Located in south-western Queensland, Australia, Charleville is 780 kilometres west of Brisbane (the capital of Queensland). It is the largest town and administrative centre of the Shire of Murweh, and covers an area of 43,905 square kilometres. Charleville is situated on the banks of the Warrego River and, in the 2016 census, had a population of 3,335.

On April 21, 1990, Charleville residents woke to a scene they had never seen before and have never seen since. Many were caught out by the rapidly rising floodwaters, with many residents being evacuated from the roofs of their homes by Australian Defence Force (ADF) helicopters. With the severe flooding and the town's power, sanitation and water services not functioning, more than 3000 Charleville residents were forced to shelter on high ground at the Charleville Airport hanger and in ADF temporary accommodation when it arrived on site. Since the devastation of the 1990 flood, Murweh Shire Council has undertaken substantial and progressive mitigation works in response to the flood threat(s) of the Charleville community from both the Warrego River and Bradley's Gully.

Mitigation has included the construction of cement and compacted earth levee, raising homes, developing a flood free housing estate, cleaning debris from the Warrego River and Bradley's Gully, and diverting Bradley's Gully into the Warrego River above Charleville.

Major floods from 1990

- 1990 Warrego River peaking at 8.54m - 1:180 year event
- 1997 Warrego River peaking at 7.39m - 1:80 year event
- 2008 Warrego River peaking at 6.02m with Bradleys Gully peaking at 3.2m - 1:50 year event
- 2010 Warrego River peaking at 6.65m with Bradleys Gully peaking at 4.2m - 1:50 year event
- 2012 Warrego River peaking at 7.89m with Bradleys Gully peaking at 2.0m - 1:90 year event

Consequences of flood events

- 1990 - 1180 Houses / all Commercial & Industry - Cost approx. $45m.
- 1997 - 60 Houses / Approx. 50% Commercial - Cost approx. $16m.
- 2008 - 40 Houses / Approx. 10% Commercial - Cost approx $12m
- 2010 - 400+ Houses / Approx. 80% Commercial – Cost approx $100m
- 2012 - 6 Houses (external of the levee bank) / 0% Commercial – Cost approx $600,000

Mitigation and risk reduction at Charleville

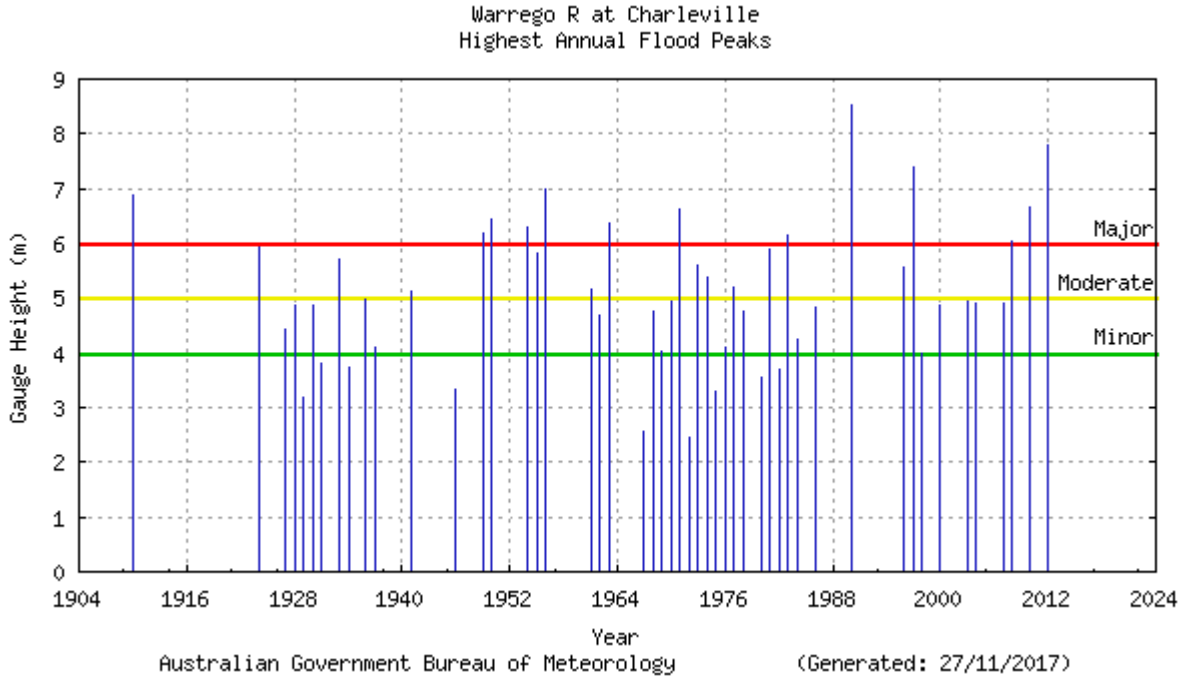
- The construction of 7.2km of Levee Bank in 2011- cost $11.5m
- The construction of a flood free residential estate - cost $3m
- Local Government funded grants for raising homes in flood affected areas at the cost of $8k per home (20 x houses to date)
- Clearing of Warrego River post-1990 (ongoing annual program) and Bradley's Gully post-2008 at the cost of $400k
- The diversion of Bradley's Gully in 2014 – cost $12.8m.

Warrego ALERT System

The Warrego ALERT system was installed in 2013 as a cooperative project between the Bureau of Meteorology and the Murweh Shire Council. The system comprises a network of rainfall and river height field stations which report via VHF radio to base station computers in Charleville. The field stations send reports for every 1 millimetre of rainfall and every 50-millimetre change in river height.

The Warrego network has over 14 field stations, some of which measure rainfall and river height, and some measure rainfall only. The base station computer collects the data and has software that displays it in graphical and tabular form. The data is forwarded to the Bureau's Flood Warning Centre, where it is used in hydrologic models to produce river height predictions.

The Warrego River has a well-documented history of flooding, with records of the larger floods dating back to 1910. The figures below show the significant flood peaks which have occurred at Charleville since records began.



Since the construction of the Charleville Flood Levee and the Bradley's Gully Diversion, business confidence has grown, and residential investment has seen healthy growth in the community. The renewed confidence has the construction, automotive, machinery, and agricultural services industries extremely busy and a critical shortage of trades and general labour in the community.

The new housing estate has grown with very few residential blocks available. There has also been substantial investment in an industrial estate with no available blocks for purchase close to town. The Charleville community has also grown into peri-urban areas, with many of the smaller grazing blocks surrounding the town subdivided into acreage and lifestyle blocks.

Annex U: Coen Airstrip Cook Shire Council

Submitted by: the former National Recovery and Resilience Agency

In June 2021, the National Recovery and Resilience Agency (NRRA) was approached by the Cook Shire Council Disaster Management and Resilience Officer to discuss possible solutions to address the deteriorating condition of the Coen airstrip - as well as the associated risks that this situation presented to the safety and resupply of Coen community during the upcoming wet season with a forced closure of the Coen Airport. Coen lies in the centre of the Cape York Peninsula, part of the large Cook Shire Council. It is a hub of government services with facilities including two shops with fuel outlets, a cafe and takeaway, a medical centre, a hotel, camping and a guesthouse. More information can be found here. In the 2016 Census, there were 364 people in Coen. Of these, 48.9% were male, and 51.1% were female. Aboriginal and Torres Strait Islander people make up 79.8% of the population. The median age of people in Coen was 24 years.

The Director of Infrastructure for Cook Shire Council (CSC) advised that the seal on the Coen Airport runway has failed, and in all likelihood, the runway would be closed over the wet season for safety reasons. This situation has occurred because the bitumen seal on the airstrip has severely cracked, and the landing surface has deteriorated, allowing any rainwater to soak into the pavement underneath, causing the strip to become unstable. To avoid pavement failure, CSC would need to carry out bitumen reseal works by October 2021. To complete these civil works in the time window, CSC would have to start a tender process and schedule contractors as soon as possible.

Coen is a landlocked community during the wet season and is cut off from Weipa in the north by the Archer River and the several rivers in the south. Coen's Airport is the only access during the wet season. If the airstrip is unserviceable, it will impact the Regular Passenger Transport (RPT) Service and commercial and private flights. It would also severely impact any resupply operations due to no road transport available over the wet season. In addition, Queensland Health was organising COVID 19 vaccination clinics for Coen during December. If there were substantial rainfall before this, they would not be able to transport the vaccine via aircraft and seriously impact the COVID vaccination rollout in this highly vulnerable community.

During the 2020-21 wet season, CSC carried out two resupply operations to Coen via the Coen Airport. The Peninsula Development Road was closed at Laura on 4 January and did not open again to transport until May that year. A point of difference: most Cape York Peninsular townships have the alternative option of sea transport, but Coen is entirely landlocked.

The CSC Mayor confirmed that Coen Airport services the 300 residents of Coen and about 60 additional persons from close surrounding cattle stations. But during the dry season – there could be another 1000+ people in the general area between wet seasons travelling to and from the tip of Cape York Peninsular.

There are no close airstrips near Coen except for some cattle station grass/dirt airstrips. And the Coen Airstrip is used by the Royal Flying Doctor Service for health clinics, GP consultations and emergency evacuation. Hinterland Aviation also uses the Coen Airport for their RPT air service five days per week for access to and from Coen by the general public.

The closest seaport to Coen is 200kms away at Lockhart River (Quintell Beach), and the route between Coen and Lockhart River gets cut by two major rivers. So this was not an option for emergency evacuation and reliable resupply in the wet season. There is a recreational boat ramp at Port Stewart, but again, no access in the wet season.

The Director of Infrastructure for CSC advised that the Coen Airport airstrip surface has delaminated with aggregate lying on the surface, which has recently caused propeller damage to a Queensland Police Service aircraft. The runway surface has since been swept but continues to deteriorate with use.

While the strip is useable during the current dry season, at the onset of the wet season, with a significant increase in water, humidity and temperature, there will be saturation and failure of the pavement structure and unacceptable safety risk. As a result, the Council will be obliged to close the Airport, a key transport hub and resupply facility.

The CSC Mayor advised that the estimated for of the rehabilitation of the Coen airstrip was $800,000, and Council has successfully obtained $371,000 in funding under the Commonwealth Government *Remote Airport Upgrade Program* (RAUP). But Council remained unsuccessful in getting additional funding from the Queensland Government to match RAUP funding to complete works on the Coen airstrip before the 2021-22 wet season. Additionally, CSC cannot

access any additional funds from the Commonwealth - as the RAUP Funding Guideline prohibited the commitment of any additional Commonwealth funds towards the project.

In the mayor's words – "we are broke and don't have the funds internally to devote to this critical infrastructure rehabilitation. Council does not raise anywhere near enough own sourced revenue to undertake these types of works unless it is under a grant that funds 100 per cent of the project costs". The Cook Shire Council, like many remote local governments, has delivered deficient budgets for many years and cannot fully fund the depreciation cost of maintaining its assets.

The NRRA entered into conversations with the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications and the Queensland Government through the Queensland Reconstruction Authority (QRA) and the Department of Transport and Main Roads (DTMR) to plead a case for a Queensland Government contribution to fund the remaining $429,000.

The NRRA spoke to the CSC Mayor to check whether he had canvased any assistance from the Director-General of Queensland Transport and Main Roads (DTMR) in accessing additional funding – which he confirmed he had not. Understanding the situation, the NRRA and the CSC approached the DTMR Director-General's office for additional funding. As a result, CSC received a positive response from the Director-General in committing the extra funds to complete the civil works on the Coen airstrip.

The Coen airstrip resealing works were completed in October / November 2021. As a result, the Coen Airport was closed for only one day to complete the project - rather than the entire wet season as was the possibility.

Keeping the Coen Airport open with a safe and serviceable airstrip during the wet season was a great result, and an excellent example of what can be achieved with the cooperation of all levels of government – working together for the common good and growing the resilience of a community.

Annex V: Karumba Beach Protection Works

Submitted by: the former National Recovery and Resilience Agency

In December 2021, the CEO of Carpentaria Shire Council (Carpentaria SC) contacted the National Recovery and Resilience Agency (NRRA), advising that the council was concerned about the erosion of its coastline at Karumba Point. And Carpentaria SC was considering preparing an application to the *Preparing Australian Communities – Local* program to assist in funding protection works for coastal assets along the foreshore of Karumba Point. The Shire of Carpentaria covers an area of 64,121 square kilometres (24,757.3 sq mi), and has existed as a local government entity since 1883. Its two main population centres are the towns of Karumba, a fishing port, and Normanton, the administrative centre, both of which are located on the Norman River. In the 2016 Census, there were 1,958 people in Carpentaria (S). Of these 51.4% were male and 48.6% were female. Aboriginal and/or Torres Strait Islander people made up 41.2% of the population.

Carpentaria Shire Council recently completed a *Coastal Hazard Adaptation Strategy* funded by the Queensland Government and the Local Government Association of Queensland via the $QCoast_{2100}$ program for Queensland Councils along the Queensland Coast. More information can be found here.

Carpentaria SC advised that it had acquired funding from the *Queensland Resilience and Risk Reduction Fund* to help prepare a detailed design, business case, quantity surveyors estimates, and obtain any necessary environmental and planning approvals for the foreshore rehabilitation works.

The Carpentaria SC reported that the Australian Government's announcement of the release of the PAC-L stream funding and the timing of the closing date was a little ahead of where they would have liked to have been in the project's development. As a result, the closing date would make it difficult for the council to complete engineering due diligence and understand the approvals required.

Previous to adopting the *Coastal Hazard Adaptation Strategy*, the public has been dealing with coastal land protection by pushing all sorts of rubble over their back fences to protect their land from the impacts of the sea. These actions are considered unsustainable, and Carpentaria SC needed to do something more permanent. The solutions identified in the *Coastal Hazard Adaptation Strategy* provide the best mechanism for long-term protection and the replenishment of the beach.

While in Carpentaria Shire, NRRA Coordinator-General was provided with a tour of the Karumba foreshore by the Carpentaria SC mayor. He saw firsthand the impacts of severe weather on the Karumba coastal foreshore and the required work to remediate and protect this fragile coastline.

Carpentaria SC advised that were working on obtaining estimates to support the PAC-L application and will struggle to have this lodged in time for the application closure on 6th January 2022.

The NRRA was very aware of some of the coastal erosion issues in Queensland from the discussions the Coordinator-General and the Recovery Support Officer network - had with other local governments along the vast Australian coastline.

The NRRA advised Carpentaria SC that it had firsthand knowledge of North Queensland coastal foreshore erosion in the Cairns region. As the Coordinator-General had toured this area, seen the mitigation works, and had been briefed by Cairns Regional Council (Cairns RC) on their Coastal Hazard Adaptation Strategy and council's coastal foreshore erosion mitigation works.

The NRRA advised Carpentaria SC that it should consider approaching the Mayor and CEO of Cairns Regional Council and enquire whether their engineering department would assist in providing advice from their learnings and any logistics around design and quantity surveying for this type of rehabilitation.

As a result of the conversations between Carpentaria SC, NRRA and the Cairns RC, and knowledge provided by the Cairns RC Manager of Infrastructure Planning and the Coordinator of Drainage Infrastructure Services, the Carpentaria Shire Council furbished an application to the PAC-L program and were successful in obtaining funding for the Karumba Point Shoreline Protection & Revitalisation Project to the value of $1,592,473.00.

Annex W: Goondiwindi Flood Levee

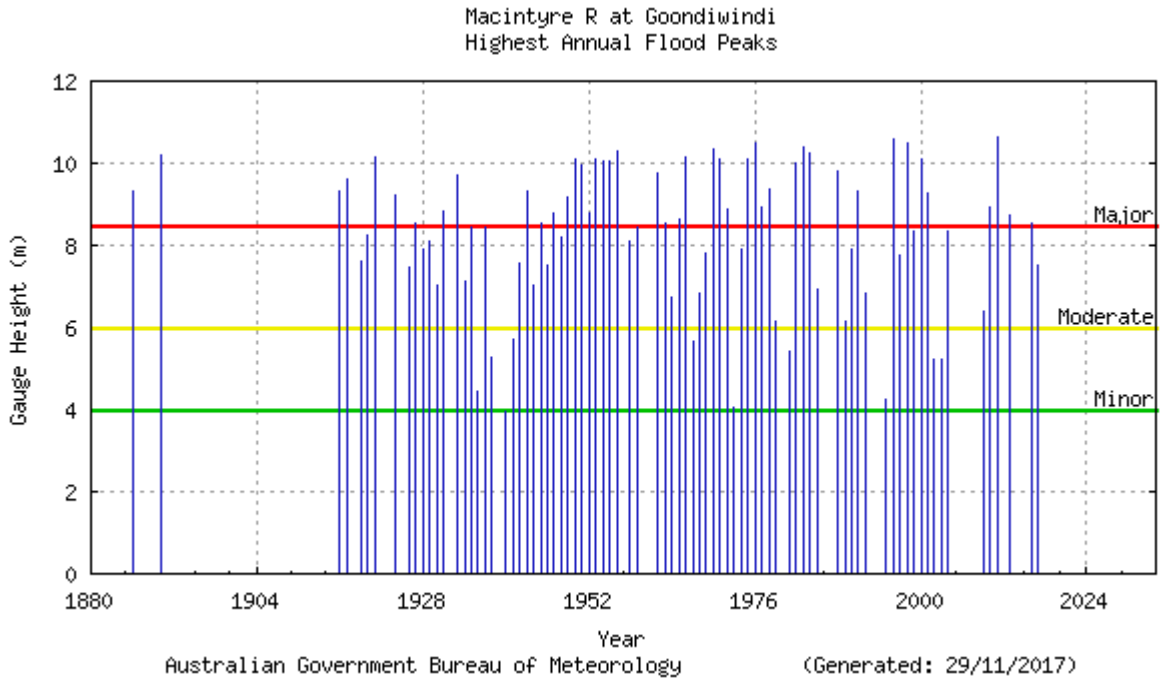
Submitted by: the former National Recovery and Resilience Agency

Goondiwindi is located on the Macintyre River in Queensland near the New South Wales border, 350 kilometres southwest of Brisbane. The Estimated Resident Population of Goondiwindi Regional Council was **10,777** as of the 30th June 2021.

The Macintyre and Weir Rivers drain an area of about 44,000 square kilometres, most of which lies in the southern border parts of Queensland, with a small section of the basin extending into New South Wales. The Macintyre River has three main tributaries - the Macintyre River in New South Wales, the Dumaresq River along the border, and the Macintyre Brook. Major flooding can occur along each of these river systems, causing the isolation of towns and rural lands and severe flooding in the Goondiwindi area.

Previous Flooding

Records of large floods at Goondiwindi extend back as far as 1886, and since then, more than 60 major floods have occurred. In 1956, Goondiwindi experienced three major floods within six months, which prompted the building of levee banks to protect the town. The 1996 flood of 10.6 metres stood as the Goondiwindi record flood until January 2011, when the Macintyre River reached 10.64 metres.



Until an 8-mile levee bank was constructed in 1958 at the cost of 57,000 pounds, Goondiwindi experienced some devastating floods. Every few years, the floods would arrive, causing havoc and loss. Often the only area completely free of water was the sandhill in front of the Catholic Church.

When heavy rain was reported up river, residents and visitors to the area would gather under this tree to read the river height and get the update on the estimated heights and times the flood peak would arrive in Goondiwindi.

You could stand under this tree at any time, day or night, and there would always be people looking at the river discussing the river height, how quickly the water was rising and the potential flood damage to the town. Rumours abounded of massive storms up river, roads being washed away, and the biggest flood ever was on its way. Tall tales were told of previous flood adventures with people staying to swap stores. Subsequently, the tree became known as 'The Tree of Knowledge'.

There is a plaque to Edward Redmond at the Tree of Knowledge which reads: "In 1956 Edward Vernon Redmond, engineer to Goondiwindi Council, submitted a flood prevention scheme for the town. He and his foreman Bill McNulty had survived the flood by boat - marking the height on trees. The levee banks that he designed have saved Goondiwindi from major flooding ever since".

The original levee was 11kms long (8 miles) and, over the years, has been extended to around 27kms to provide more protection as the township has expanded its border. In 2013 Goondiwindi paid tribute to Vernon Redmond and the construction of the Goondiwindi Flood Levee. "Enough is enough", he explained to the then Mayor, Dooley Piddington, and the rest, as they say, is history.

The levee planning and construction weren't without controversy. Some residents even threatened to blow it up if construction went ahead, believing the levee would hold the water out to a stage before giving way and washing the town away.

Redmond backed his judgement, and after a series of heated public meetings, the levee bank was constructed at the cost of 58,000 pounds.

That decision to build the flood levee has paid for itself a thousand times over, according to then Goondiwindi Mayor, Cr Graeme Scheu, who retired at the 2020 local government elections.

The levee begins at ‘Nungwai’ opposite the entrance to the Goondiwindi Aerodrome. It encompasses the Namoi Cotton Gin and the Natural Heritage Water Park before joining on to Kildonan Road and following the river down towards Callandoon Creek before breaking off and heading north to the western end of the Botanic Gardens.

The Queensland Government allocated funds to mark the occasion of the 2011 floods, and the Goondiwindi Regional Council decided rather than: remember the flood peak, why not to include one of the most significant council decisions of all time.

Cr Scheu said that the flood levee is one of the greatest engineering constructions of the time, and the town recognised Vernon Redmond with the naming of a town park – 'Redmond Park'. The severe flooding in 2011 led to significant levee damage and repairs completed with conventional earthworks due to funding constraints.

The official opening of the new and extended Goondiwindi Flood Levee was held on Easter Saturday, 2013 immediately before a fireworks display was held on the old Border Bridge.

The flooding associated with Tropical Cyclone Debbie in 2017 caused the recurrence of damage along previously repaired sections of the levee. As a result, the Queensland Reconstruction Authority provided betterment funding to Goondiwindi Regional Council to undertake works on the Goondiwindi Flood Levee banks. The project includes installing reno-mattresses and gabion structures to repair damaged sections of the levee to improve resilience against scouring effects during flood events.

Since the 1958 construction of the Goondiwindi Flood Levee, it is estimated that there has been 30 flood events above 8.5m that would have entered Goondiwindi town at various levels up to just below the town's 11m levee banks and the 2011 highest flood peak of 10.64m. More information can be found here.

Annex Y: Gender and Disaster Australia

Submitted by: Gender and Disaster Australia Ltd.

Gender and Disaster Australia Ltd. (GADAus) was initially established as the GAD Pod in 2015 to promote an understanding of the role played by gender in survivor responses to disaster – including increased family violence – and to embed these insights into emergency management practice. In 2022, the Federal Dept. of Social Services provided funding to extend the GADAus training and resources across Australia. This responds to Recommendation 22.5 of the Royal Commission into Natural Disaster Arrangements.

Gender and Disaster Australia is the leading organisation to offer education and resources to address the harmful impacts of gender stereotypes in disaster and improve responses to Australia's increasing climate-related disasters. GADAus has demonstrated expertise in gender and disaster research, training and policy. The GADAus Expert Advisory Committee is made up of 12 experts drawn from each state and territory across Australia, and is Chaired by Elizabeth Broderick, Special Rapporteur and Independent Expert, UN Working Group on Discrimination against Women and Girls.

Links to the Sendai Framework:

The Sendai Framework clearly identifies gender and the safety of women and children in its Guiding Principles (especially c,d,f, g, h, j, p. 13). Gender and Disaster Australia has increased public education and awareness of disaster risk in each stage of the emergency management cycle. In accordance with Guiding Principle (j), this work addresses the underlying risk factors of the harms of rigid and exacerbated gender stereotypes that lead to increased mortality both in and after disasters.

Training

Across the country, the GADAus expert trainers and experienced facilitators develop and deliver a range of practice-based resources, case studies, events, and training packages both in-person and online to disaster responders, community members and others across Australia. GADAus currently offers sessions on the exacerbation of rigid gender stereotypes in disasters and the links to family violence, men's self-harm and suicide, and the exclusion of LGBTIQA+ people. Over the past decade, the training has reached over 1,000 delegates from the emergency services sector, local government, faith-based organisations, and disaster-affected communities.

Resources

GADAus has developed a suite of resources to support increased understanding of the impact of gender on disaster experience for women, men and LGBTIQA+ people, and provide practical strategies to improve emergency management policy, planning, decision-making, and service delivery. Of particular note are the Gender and Emergency Guidelines, including Checklists and the 'Disaster is no excuse for violence' postcard.

History and research

Established in 2015 as the GAD Pod, this work is grounded in extensive qualitative research by Dr Debra Parkinson, Claire Zara and others dating back to 2009 in the aftermath of the Black Saturday bushfires. Successive projects have resulted in a wealth of research about the gendered risks, experience and legacy of disasters in Australia, including the impact on long-term disaster resilience.

Titled 'The Way He Tells It: Relationships after Black Saturday', this research was the first of its kind in Australia to identify and examine the link between disasters and violence against women. Adding to a growing body of research globally that shows increased rates of gender-based violence (GBV) in disaster, the first conference on natural disasters and family violence, Identifying the Hidden Disaster, was held in Australia in 2012.

Led by a successful partnership between Monash University Disaster Resilience Initiative, Women's Health Goulburn North East, and Women's Health In the North, the GAD Pod led a range of initiatives until 2021— with critical input from leaders in emergency management, academia, government, and community — to inform gender-inclusive responses to future disasters.

Key amongst these initiatives were research on 'Men and Black Saturday: Risks and opportunities for change' and the accompanying conference, 'Just ask: Men and disaster' (with NDRGS funding); 'Barriers to women in fire and emergency leadership roles' (with DELWP). In 2018, research with lesbian and bi women followed as an adjunct to 'Identifying the experiences and needs of LGBTI communities before, during and after emergencies in Victoria' (Vic. DPC). 'Long-term Disaster Resilience' research was conducted in 2019 (NDRGS); and in 2020, there were three research projects on the impact of COVID-19 and violence prevention (Respect Victoria).

Significant partnerships included the collaborative development of National Gender and Emergency Management Guidelines under NEMP funding; and the 3-year Gender and Disaster Taskforce to 2016, auspiced by the Victorian EM Commissioner.

Future action

The midterm review could apply a gender lens to many of the key areas and reforms addressed in the document. The draft review might consider gender reporting (see the National GEM Guidelines and Victoria's Gender Equality Act as useful tools) to enable gender inclusion and strategies for ensuring women's increased participation. For example:

- Understand disaster risk (p.12): 'Vulnerabilities' could be broadened to include social vulnerabilities with gender as the key, cross-cutting issue. The Programs listed could include targets for women's participation and training and policy to address increased gender inequality in disasters. These include increased domestic and family violence, women's reduced economic capacity and autonomy, and the pressure on men to protect and provide.
- There are opportunities to include gender and disaster training and resources to the many emergency sector organisations noted in this midterm review to increase capacity including community capacity.
- These same opportunities for gender and disaster training, resources and actions could be noted in the Prospective Review.

Annex Z: Data integration to support decision making

Submitted by: the Australian Climate Service

The Australian Climate Service (ACS) was established in July 2021 to support the nation to better understand climate and disaster risks.

The ACS aims to provide this support through:

- Improving access to integrated trusted data, information and expert advice on climate and disaster risks and impacts.
- Building and enhancing national capability in predicting and analysing natural disaster and climate risk and impacts by leveraging the world class expertise of the Bureau of Meteorology, CSIRO, Geoscience Australia and the Australian Bureau of Statistics, as well as collaborating with other governments, research institutes, universities and the private sector.
- Tailoring climate and natural disaster intelligence and brokering knowledge from a range of trusted science sources to support national decision making.

In the short term, the ACS is facilitating collaboration across Commonwealth scientific agencies to integrate climate, hazard, social, economic, built and environmental data, information and expertise. Collaborating across these domains will enable the ACS to provide a comprehensive picture on where the nation is most at risk from climate and natural disasters and the key drivers for the risk.

The ACS also collaborates with the two agencies that lead the Commonwealth's immediate response, relief and recovery during natural disasters (Emergency Management Australia (EMA) and the National Recovery and Resilience Agency (NRRA)). The role of the ACS is to provide accessible and digestible information on the past, present and future climate and natural disaster risk and impacts, and tools to support the understanding of these risks.

To date, the majority of the ACS effort has focused on supporting decision makers in the response and recovery phases of the national disaster continuum utilising available tools and data across the partners. In time, the ACS will develop and deliver new capabilities that:

- Improve the services currently on offer across the ACS partners through automation, increasing the speed of the service, and extending the spatial coverage and/or functionality of the service.
- Develop new, or provide access to, critical services to meet the need of decision makers (i.e., hazard footprint information).
- Develop new analytics that improve the integration of climate and hazard information with intelligence that provides a better understanding of the short term and long-term risks to Australia's social, economic, built or environmental assets.
- Provide easier access to data and information that is tailored for decision making.

A key example of the ACS' integration function supporting decision making is through the use of the CSIRO's Transport Network Strategic Investment Tool (TraNSIT) in understanding the impacts of natural hazards on supply chains. TraNSIT is being used for both operational advice and decision making outlined below but is used to understand the system and future strategic long term actions (as noted in **Annex AE**).

Natural hazards cause significant disruptions to Australia’s freight and supply chains. Disrupted supply chains impact the production and community access to critical commodities, and increases market price, often with long term effects from backlogging and infrastructure repairs.

When considering disaster risk reduction and crisis management, there is a need for:

- Understanding the potential freight and supply chain impacts prior to the weather event for industry/communities to prepare and mitigate some of the impacts, thus reducing downtime
- Transport scenarios and applications to aid industry and community to improve recovery time from disruptions
- Understanding exposure and vulnerabilities to inform more targeted investment or interventions to enable the creation of more resilient supply chains.

The ACS invests in and uses CSIRO's TraNSIT in conjunction with natural hazard information to brief decision makers with an understanding of transport and supply chain impacts of a natural disaster scenario, or from a current event.

CSIRO developed the TraNSIT in 2012, which maps millions of vehicle trips across thousands of supply chains between production and domestic export markets. The ACS has invested in the TraNSIT, enabling the implementation of an automated method to analyse movement of goods across freight and supply chains, from sourcing road closures

in states through to the generation of outputs for daily feeds into Australian Government - in a turnaround time of less than 4 hours. TranSIT is able to show how supply chain impacts evolve daily in response to a natural hazard.

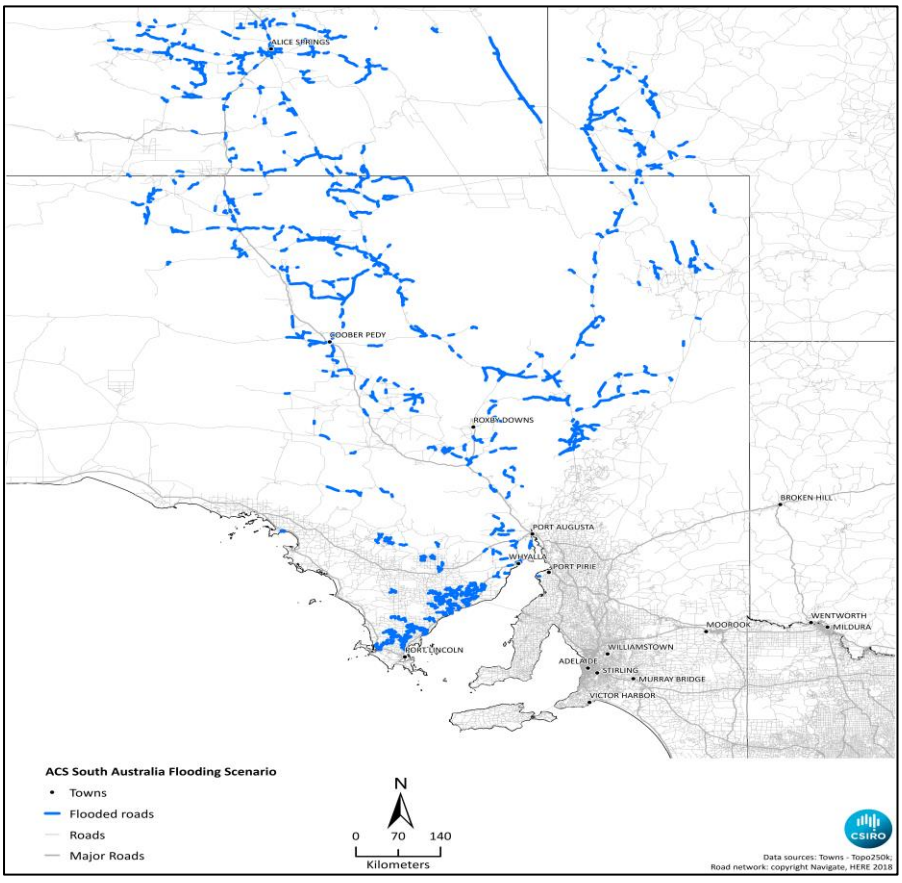
This tool provides the ACS with the capacity to:

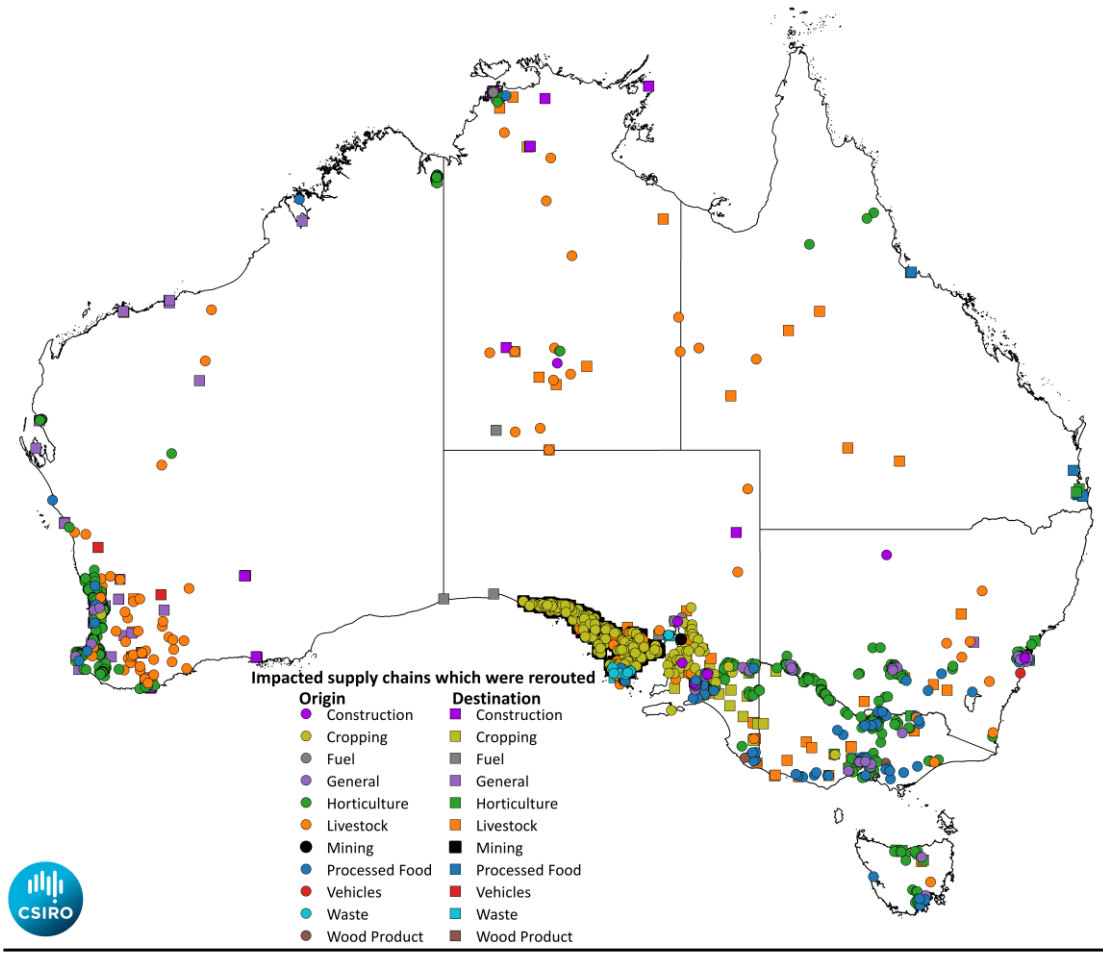
- Quickly generate supply chain and freight impacts to thousands of enterprises for weather scenarios and for current events, which can be used by decision makers in federal and state/territory governments for preparation and near real-time support.
- Identify weak points or bottlenecks in supply chains, which can be used by decision makers to clear backlogs and plan alternative paths. Analysis can be used to plan alternative high-volume freight routes to minimise costs and additional disruptions.

The TraNSIT was used in January 2022 when ex-tropical cyclone Tiffany resulted in significant rainfall to inland south Australia, causing widespread flooding. This directly impacted the major road and rail supply routes between Darwin, Perth and Adelaide. Flooding cut roads including the Stuart Highway linking South Australia to the Northern Territory, and the National Highway linking South Australia to Western Australia isolating many towns and communities. Sections of both the Ghan and Indian Pacific railway were washed away and took several weeks to repair. This caused significant freight delays resulting in shortages for food and goods

The combination of the TraNSIT with forecast and observed conditions enabled the ACS to provide decision makers with near real-time information on how Australia's supply chains were being impacted by the floodwaters as the event unfolded. This provided decision makers with early awareness of potential and realised impacts of the hazard event, enabling them to focus response and recovery efforts, both in the region directly impacted by the flooding, as well as the regions impacted by food and goods shortages.

The figures below shows an extract from transit, highlighting in blue road segments that were predicted to be impacted by flooding. For road freight alone, 2,200 supply chains were expected to be impacted by the flood event and resulting in the need for alternative routes, corresponding to 101,852 tonnes of freight, equivalent to 5,036 trucks. This translated to a total cost of $3.2 million (AUD) and impacts on 2632 enterprises (Figure X), due to the area's role as a north-south and east-west freight route.





Commodity Group	Supply Chains Impacted	Sum of Tonnes January	Cost Per tonne	Impact Cost
Cropping	294	62,581	$21.66	$1,355,389
General	338	13,965	$48.16	$672,603
Livestock	171	5,606	$45.30	$253,934
Horticulture	747	5,173	$38.79	$200,664
Processed food	162	2,601	$76.81	$199,803
Fuel	16	4,899	$34.31	$168,083
Vehicles	58	1,062	$121.98	$129,573
Construction	18	1,492	$63.34	$94,470
Mining	380	3,192	$21.60	$68,950
Wood product	2	1,201	$45.67	$54,834
Waste	14	80	$19.25	$1,543
Grand Total	**2,200**	**101,852**	**$31.42**	**$3,199,846**

In 2021/22, TraNSIT responded to over 75 requests from the ACS and the National Situation Room to produce critical events for the floods between November 2021 and July 2022.

As the ACS matures and new tools such as downscaled climate modelling and improved hazard extent data becomes available, the TraNSIT will be able to be used for scenario planning for the high-risk weather season, as well as for longer term exposure and vulnerability analysis to inform risk reduction initiatives.

Annex AA: Localised work of the NRRA's Recovery Support Officers

Submitted by: the former National Recovery and Resilience Agency

1. **Please describe the key initiatives within your jurisdiction / local area which address and reduce systemic disaster risk.**

Key initiatives are varied, and depend on locations and connection to current and historical disasters. A significant amount of work in the policy, program and initiative space is happening across Queensland and New South Wales, most recently driven by the reoccurring disasters of the last 12-24 months. The east coast of Australia is leading the way in disaster risk reduction with many local governments implementing their own form of risk mitigation in the absence of State / Federal direction.

Local governments appears undecided on the question "Are we succeeding at making Australian communities safer in the face of growing disaster risk?" with it being too early to confirm if risk mitigation implemented in the last 12-24 has been successful or will be successful. However, local government is supportive and appreciative of the initiatives being funded and implemented.

South East QLD

Lockyer Valley Regional Council have undertaken a body of work to update their flood study to enhance their understanding of how a flood would impact their local government region, given the two events that have occurred, this year which builds on from the flood plain study completed after the 2011 flood event. Council are currently waiting for the final report to be presented to Council from the consultant.

Brisbane City Council, Ipswich City Council, Lockyer Valley Regional Council, Redlands City Council and Somerset Regional Council will utilise the Betterment fund under the Disaster Recovery Funding Arrangements to replace infrastructure to a standard that is more resilient to floods. Other Disaster Recovery Funding Arrangements (DRFA) programs being utilised that will reduce risks in the region include the Resilient Homes Package and the Flood Risk Management Program. My region is also utilising the Preparing Australian Communities Program and the Strengthening Telecommunications Against Natural Disasters Package with a focus of reducing the risks from disaster.

Southern QLD

The council's I work with generally have a good idea about where and how their council area flood and although betterment is now allowed under Queensland Reconstruction Authority (QRA) funding, I get the impression that the events have been so close together that the Councils have been busy dealing with the disaster and juggling the paperwork for each event, rather than having the space/time to consider betterment projects.

Goondiwindi Council built a 21km levee in 1956, to protect the town from the MacIntyre river. To date the levee has not been overtopped, however early in the season they had an issue at Inglewood, where the community was required to evacuate to town in the middle of the night. The only safe place available was the Cemetery, with little to no shelter. Council are looking to build a permanent evacuation facility for the town.

Western Downs Regional Council (RC)

Council has undertaken a heavy advertising campaign to encourage people to apply for funding, particularly DRFA & the resilient homes fund. Council are also looking for education materials.

Southern Downs – Leslie Dam, Connolly Dam and Storm King Dam are all sitting at 100%. Dam levels may become more of a concern if there is increasing rain.

Council has undertaken a significant amount of work in the recovery space, they are currently concentrating on Community Resilience with BBQs planned in small towns to encourage better connectivity between people and their neighbours. Council has raised a concern that people (and council) are getting tired from one disaster after another. Where events overlap, the management of the process to work through the disasters separately becomes complex, QRA are aware of this issue. The QLD State of Origin team spent an afternoon in Warwick which was very well received.

Toowoomba RC – After the 2010 floods which resulted in loss of life, the council has undertaken a significant amount of flood resilience work. This has included flood studies for 34 urban areas. The planning scheme now includes land identified as having a flood risk. This and other changes to the planning scheme are to ensure that development in flood risk areas is better controlled.

North QLD | NT

Mapoon Aboriginal Shire Council have put place in several measures to reduce disaster risk including:

- Implementation of upgraded $1.2ML water storage solutions to enhance water security.
- Solar powered street lighting.
- Trialling of SOURCE (renewable drinking water technology) that uses the power of the sun to extract clean, reliable drinking water from the air. With communities often facing contaminated drinking water supplies or poor quality drinking water, this technology offers an alternative source of high quality water and helps communities and households to become more resilient, sustainable and healthy.

Within many Councils across the NT and North QLD, there is limited capacity to look at mitigating risk as many are often completing works from previous weather impacts, or have limited staff capacity to work on grant applications.

Southern and East Coast Tasmania

In my local area, Southern Tasmania and the East Coast, broadly speaking, it appears that there has been an increased understanding and adoption across local government about the impacts of climate change and the associated works that need to occur to reduce the impact and changes to land use planning.

The difficulty of local government in Tasmania is the size. There are currently 29 local governments in Tasmania, many of whom are very small with limited resourcing. Many staff working in the emergency management space are doing this work “off the side of their desk” and are not adequately resourced to do so. It seems that it is a challenge to plan for future events, or in some areas, staff are managing multiple disasters with minimal time in between to plan.

One example of a pro-active council is Kingborough. The main township Kingston, is subject to flooding from the top of the catchment (it sits under Mount Wellington), old storm water systems, predicted sea level rise, coastal vulnerability from increased storm surges and is the most at risk local government from bushfires in Tasmania. Council have been very proactive in supporting community events which enable the community to plan for bushfires and understand what needs to be done to manage properties. Council are aware of the risk of sea level rise to the municipality and are actively considering options to reduce the impact. Council have also been pro-active in managing storm water through the catchment.

It has been really encouraging to see how many successful projects have been funded through the BSGBR and PACP grants. Between the two, across Southern Tasmania and the East Coast, there have been 19 projects funded. It is great to see that in the main, these projects have taken a pro-active approach to improving their community’s local resources and in improving planning for disaster resilience and recovery. Several of the projects may assist local government to make informed land use planning decisions, reducing the risk to their communities.

Historically, many councils in Southern Tasmania have actively managed willows in their catchments, to reduce flooding. Unfortunately, funding for Crack Willow removal is very difficult to access currently and such projects, if done well are very expensive. It would be good to speak to councils who have removed willows, to better understand the impact such works have had on reducing flood risk, and to be able to advocate for assistance for local government and landholder in riparian zones to have access to funding and support for willow management.

Victoria

Numurkah Flood Mitigation Project Moira Shire

- Strengthening Telecommunications Against Natural Disasters (STAND) package – Stage 2
- While drought isn’t a “natural disaster” all of the future drought programs have been received very well and helping shift the mindset about “being prepared” regardless of what the hazard or event may be.
- Drought resilience leadership program – this had a lot of learning about resilience, understanding the community, built and natural environment, systems and personal devolvement.

North Coast NSW

The North Coast region has experienced the effects of cascading disasters such as drought, bushfires (2019/20), pandemic (2020-) and flooding (21/22), as such a considerable amount of funding has been established in the short term through disaster recovery funding arrangements to support the recovery of these communities.

Coffs Harbour

- $12 million Coffs Creek Catchment Flood Mitigation Programme which included the development of four detention basins (last completed 2018) and implementation of flood warning system.
- Regional water supply scheme finalised in 2009 costing $180 million to secure water supply during drought for the Coffs Harbour and Clarence local governments.
- Floodplain Risk Management Study and Plan for Coffs Creek Catchment currently in development
- Online mapping tool that includes flood information for all properties within the Flood Planning Area
- Undertaking a stormwater inflow reduction project to reduce hazard induce risks to the sewerage network – testing commenced August 2020
- Final stage of LED streetlight upgrade involving 1,307 street lights at a cost of $1.26m to save money, energy and reduce emissions commencing in January 2023
- Environmental levy's fund community led initiatives to improve or sustain natural environments – 22/23 funded projects
- Adopted Climate Change Policy 2017
- Hardstand areas installed to make access to water easier during fire emergencies (9 locations)

Coffs Harbour Other

- Red Cross Establishing Community-led Recovery Teams in Ulong, Corindi

Bellingen – full progress report

- Food resilience vision and action plan launched June 2022
- Bellingen Neighbourhood Care Network – delivers reliable and timely information to the community and creates neighbourhood groups to increase community resilience
- Lower Bellingen and Kalang Rivers Floodplain Risk Management Studies completed November 2021
- Disaster Recovery and Resilience Grants - 70 grants were awarded in early February 2021 to strengthen community risk management, recovery and resilience
- Vegetation Mapping - underway
- Network of Neighbourhood Safe Places approved by RFS
- Upgrades to Raleigh Emergency Operations Centre (in progress)
- Bellingen Shire recovery plan to be developed in 22/23
- Community Forum held in response to critical water shortages experienced in the 18/19 drought – ground water study currently underway
- Smart water metering project near completion which aims to reduce water consumption
- Update the Local Emergency Management Committee Risk Assessment (Coffs Harbour and Bellingen) 22/23
- Bridge camera network to provide information to communities during flood events

Nambucca Council

- Community Recovery Network in place
- Section 355 Local Recovery Committee in place
- Council's environmental levy program providing funding for environmental remediation works (ongoing)
- Improved access to information by implementing grant funded programs to improve telecommunications in rural areas (ongoing)
- State of the Environment Report due to be completed in 22/23
- Riverbank erosion rehabilitation program funded by environmental levy (ongoing)
- $100,000 allocated in 22/23 for implementing actions from the Coastal Management Program (ongoing)
- Seawall being built at Main Beach Nambucca to protect community assets and the environment from the impacts of coastal erosion ($3.6 million under Bushfire Local Economic Recovery - BLER) works commenced June 2022
- Bowraville off river water storage project completed in 2015 (cost approx. $25 million state and federal funding) to sure up water supply after the prolonged drought in 2002 left the community with 30 – 60 days' supply just prior to the drought breaking.
- Strategic asset Management Plan to be developed in 22/23
- Data collection regarding the March 2021 flood being undertaken to inform update to flood mapping (commenced June 2022)
- Local strategic planning statement finalised (2020) looks to prevent the creation of risk in relation to land use planning

- Significant number of community development programs undertaken with partner organisations in response to the impact of the 2019/20 bushfires which significantly impacted the Nambucca local government
- Voluntary house raising scheme policy adopted September 2021, EOIs called for in March 2022

Nambucca Other

- Rural Community Futures Program (Foundation for Rural & Regional Renewal - FRRR) provided governance training to Not for Profit organisations.
- Red Cross established community-led recovery team in Valla
- State Government – draft North Coast Regional Water Strategy assess the vulnerability of surface water supplies to sea level rise and saltwater intrusion - priority study sites are Macleay River and Nambucca River Tidal Pools
- Nambucca Valley Landcare – riverbank stabilisation and fish habitat rehabilitation, riparian zone improvements

Kempsey Council

- Flood cameras installed on key bridges
- Recovery action plan – April 2021
- Sewage treatment schemes (Stuarts Point, Grassy Head and Fishermans Reach) eliminate impacts from shallow ground water table on onsite sewage management systems and alleviate the impacts of flooding. Properties to commence being connected from early 2024.
- Delivery program investment of $1.7 million for stormwater drainage and flood plain management
- Local growth management strategy – currently being developed and will inform Local Environmental Plans (LEP)
- Timber bridges replacement program: 56 bridges to be replaced by 2024 state government funded
- Kempsey River foreshore stabilisation – provides protection against erosion and improved ability to restore the area after flood events (ongoing)
- Macleay Rural Voluntary House Raising Scheme (last open for EOIs in July 2021)
- 2021 Lower Macleay Food Risk Assessment and Management Plan completed 2021

Snowy Monaro NSW

The Snowy Hydro Scheme has contributed to the control of downstream water flows, particularly in the Snowy, Murray and Murrimbidgee River's catchment areas. The scheme commenced in the 1950's and provides a series of connected water storage facilities. The ability to control flows has mitigated downstream flooding in these river systems, which was a more regular occurrence prior to the scheme.

On a broader scale, the original scheme along with the current Snowy 2.0 incorporates power generation and storage capacity, through pumped hydro, which ensures there is/ will be adequate power supply in the South Eastern Australia grid during natural disasters and other emergencies.

Valleys and Towong Victoria

Currently Rural Fire Services (RFS) have been more engaged throughout the Snowy Valleys local governments and are undertaking cultural burns.

Northern Rivers and Clarence Valley NSW

Clarence Valley Council have in April of this year adopted a Disaster Resilience Framework which directs Council's comprehensive strategic approach to proactively mitigating disaster risk and reducing impacts, now and into the future.

Clarence Valley Council recognised the need for a Disaster Resilience Framework in the immediate aftermath of the bushfires and commissioned a climate change impact assessment, the climate change impact assessment informs the frameworks resilience strategies, risk mitigation infrastructure and work plan actions. The framework aligns with the National Disaster Risk Reduction Framework four key environments being built, social, natural and economic environments, and will be embedded through Councils integrated planning and reporting framework and operational plan. The disaster resilience framework actions to reduce disaster risks are based on the priorities outlined in the Sendai Framework for Disaster Risk Reduction 2015 – 2030 being understanding the risk, accountable decisions, enhanced investments and resources and governance ownership and responsibility.

Council won a highly commended Innovative Leadership award at the 2022 Local Govt. Awards for the framework. – listed below are the Disaster Resilience Framework and the Climate Risk Assessment Summary adopted by Clarence Valley Council

CVC-Disaster-Resilience-Framework-2021 (1).pdf

Public-Physical-Climate-Risk-Assesment-Summary-For-Policymakers-10_1.pdf

Shoalhaven and Illawarra NSW

The Shoalhaven Council introduction and development of a community awareness system that is satellite based and on view 24/7 at a feature community location. This system maintains constant alerts and updates throughout an incident and provides notification of evacuation orders when mobile phones and land lines have been impacted. The system has just over 32 sites throughout the Shoalhaven and has proven very successful during the two flooding events in 2022.

Cairns QLD

The local governments that are within my region (Cairns, Yarrabah, Tablelands, Mareeba, Etheridge, Croydon and Carpentaria) are very diverse and very different in geographical position and population demographics, and all are at varying levels in regards to disaster risk reduction and their understanding and actions associated with that.
In general, all councils are very aware of the types of disasters they face due to cyclone, flooding and drought and historical data and information supports this.
Due to the 2019 Monsoon event this has now increased the awareness of the changing environment and how extreme weather events are going to occur at a higher intensity and even at a greater rate into the future. And this has encouraged further thinking into improving disaster preparedness.

2. **What partnerships and initiatives have been most successful in assisting in the reduction of disaster risk in jurisdiction / local area?**

Significant numbers of partnerships and initiatives have been identified with the most common themes being collaboration with all sectors and levels of government and cooperation in accepting the shared responsibility of disaster risk reduction. Indication of successful partnership in Aboriginal communities and those that include grass-roots community groups demonstrate that the notion of shared responsibility is resonating at all levels.

Successful partnerships and initiatives are clearly those that engage at all levels and are well planned in being proactive and not reactive. Forward planning by local governments is identified as a priority to help reduce risk when natural disasters occur.

South East QLD

As a result of the 2011 flood event in South East Queensland, the Queensland Reconstruction Authority led the development of the Brisbane River Strategic Floodplain Management Plan which provides a framework to ensure a consistent approach to managing flood risk across the floodplain. It is the most significant floodplain management plan in this region. The measures for the framework include: structural mitigation, land use planning, building guidance, community resilience, disaster management and landscape management. The development of this framework saw collaboration from the Australian Government, Queensland Government, Brisbane City Council, Ipswich City Council, Lockyer Valley Regional Council, Somerset Regional Council and South East Queensland Water (the Queensland Government Bulk Water Supply Authority). The key outputs from this plan include:

- a comprehensive assessment of the economic cost of flooding;
- regional data for a consistent approach to managing the floodplain;
- flood resilient building guides to help reduce the impact of floods on Queensland homes; and
- identification of structural mitigation options to undergo further feasibility testing.

It should be noted that Lockyer Creek (Lockyer Valley local government) was only included as part of the framework due to this strategy focusing only on Brisbane River catchment. This resulted in Lockyer Valley Regional Council leading their own piece of work which broadened the scope and built on their flood management framework to include catchments within the entire Lockyer Valley local government. These pieces of work informed the ongoing work to understand disaster risk, making better decisions, enhancing investment and building better understanding of governance, ownership and responsibilities.

Further to this, flood warning infrastructure across the region has been enhanced since the 2011 flood event and continues to be improved as an ongoing activity. This piece of work builds on the region to better understand disaster risk.

The Quandamooka Yoolooburrabee Aboriginal Corporation partnered with stakeholders on Minjerribah (North Stradbroke Island located in the Redland City Council area) to develop comprehensive bushfire management plans for the three townships Point Lookout, Dunwich and Amity Point. These bushfire management plans are unique in their combined use of traditional fire management practices and modern disaster mitigation strategies. The plans were developed following a significant bushfire event that spread across North Stradbroke Island in January 2014. The bushfire management plans improve community safety on the island, in addition to maintaining the natural and cultural heritage of the landscape and build on understanding disaster risk.

South West Queensland

Local governments have placed different importance on relationships with different stakeholders. Maranoa has a more direct, beneficial relationship with the Bureau of Meteorology than the other Shires. All Shires have a good relationship with QRA and are able to access assistance as required.

The local governments are all involved in other collaborative groups such as SWROC (South West Regional Organisation of Councils), Meeting of the Mayors (10 Southern Queensland Local Government), Western Queensland Alliance of Council (WQAC) which allows for easy sharing of information and the ability to lobby regional issues across Councils.

Southern QLD

The Queensland Reconstruction Authority (QRA) has been very useful, assisting Council's, as well as managing disaster funding arrangements, they dropped a staff member in to Goondiwindi to provide assistance to council after the Inglewood flooding. QRA will do a follow up with all impacted households every 3 months for 1 year to enabling tracking of progress and identification of any reconstruction issues.

North QLD | NT

- The Torres and Cape Indigenous Council Alliance (TCICA) Leaders endorsed in principle a Regional Drought Resilience Plan which was co-designed, developed and produced via a collaborative partnership between TCICA, the Rural Economies Centre of Excellence (via James Cook University), the Queensland Department of Agriculture and Fisheries, Gulf Savannah NRM, Cape York Natural Resource Management (NRM), Torres Strait Island Regional Council, Torres Strait Regional Authority, and key regional stakeholders.
- The purpose of the plan is to identify and plan for ongoing and future impacts of drought across the region and highlight pathways that the region can use to adapt to changes and build drought resilience.
- TCICA has also partnered with Health and Wellbeing Queensland on the development of a Remote Food Security Action Plan.
- In late 2021 Health and Wellbeing Queensland held a series of roundtables focussing on freight and supply chain matters, healthy housing, and economic development for solutions-orientated discussion related to addressing food security in the region. The information gathered during the roundtables is guiding the development of the action plan, which is expected to be released this year.

Southern and East Coast Tasmania

As the RSO, I met regularly with the Office of Security and Emergency Management (Department of Premier and Cabinet). This regular contact has enabled better communication between myself / the NRRA and state government.

The Regional Recovery Planning Exercise that was held in St Helens earlier this year, was particularly well received by all participants. Similar activities across the three emergency management areas of Tasmania would be of value. While the exercise considered recovery after disaster, the nature of bringing people who work in this space together was useful in terms of networking and key learnings from previous events.

A number of local governments across Tasmania are now taking the issue of climate change seriously and adopting recommendations from experts in relation to the impact of increased bushfires, coastal

vulnerability and flooding. It is good to see councils taking a proactive approach to this. There has been an increase in mapping of flood prone areas, coastal vulnerability, tsunamis and bushfires.

The Preparing Australian Communities Program funded project Disaster Smart Tasmanian Communities is expected to be extremely important in improved planning for disasters and has been welcomed by all the of local governments that it will support. Potentially this will be a game-changer in Tasmania.

Red Cross are currently delivering a Disaster Resilience Project across three municipalities – Huon Valley, Hobart and the Tasman Peninsula. This project brings communities together to map resources and assets. The project considers the different ways in which communities can build resilience and has been supported by the local governments in which these projects are being run. The Red Cross also run a program in schools which has been successful, teaching children about emergencies and what they need to do, what to pack etc. Similar in nature to historic education programs delivered by TAS Fire, but broader. This type of messaging is useful when kids come home from school and remind parents about planning for disasters.

Central Highlands Council and Derwent Valley Council have successfully partnered to co-contribute to the Derwent Catchment Project (DCP), which employs several staff. The project works with both councils and landholders to better manage land for drought, flooding, biosecurity issues and bushfire. It is a great example of Council's collaborating with landholders to improve management across a catchment rather than municipal boundaries. The DCP works with all levels of government and land managers.

Victoria

- Having an Australian Government employee based on the ground and working with stakeholders and community
- Having the ability to bring the "national framework", best practice guides and even the language to conversations
- For my most part of my region we are in prevention stage, but at a general individual level, living with the "nothing will happen here" mentality (out of 100 conversations, 80% don't have a plan.
- Having these conversation, working within, and a deep understanding of the community we are (lead by the RSO) developing a community of practice and a "Who is in who the zoo", along with a regional partnership communication strategy. This has come as a request (from stakeholders) in setting up meetings and developing before a disaster happens, flipping to being proactive vs reactive.

North Coast NSW

- The Regional Water Supply Scheme (Coffs Harbour and Clarence Councils) is a great example of what can be achieved with forward planning and cooperation between local governments.
- Bellingen Neighbourhood Care Network - information provision to the community established during COVID provided regular text updates to the community. Now establishing a network of coordinators to work with local groups to establish local communication action plans for emergency and sever weather events.

Snowy Monaro NSW

The partnership between NSW State government, the Rural Fire Service (RFS) and Snowy Monaro Regional Council (SMRC) in the development of a regional RFS Control Centre based out of Cooma in 2021. This facility coordinates bushfire mitigation activities across the region in preparation for upcoming fire seasons, as well as bushfire response when required.

Snowy Valleys and Towong Victoria

The LEMC appears to be the catalyst and gate keeper for any collaborations. Snowy Valleys Council, Towong Shire and Snowy Hydro have been collaborating in undertaking planning of exercises which incorporate the Kosciuszko National Park along with border communities on the Vic and NSW sides.

Northern Rivers and Clarence Valley NSW

When I put this question to council it was communicated to me that in context of recent disasters including bushfires, that it is too early to tell which partnerships or initiatives have been most

successful, however they will be undertaking evaluations and reporting on their findings and lessons learnt to be implemented in future planning.
Shoalhaven and Illawarra NSW The partnership between NSW state government, local council and the Shoalhaven Chamber of Commerce ensured that the project was locally produced and sustainable.
Cairns QLD There has been significant funding initiatives rolled out across the region in response to the 2019 event that has allowed some improved risk reduction projects. QRIDA and QRA have led this process through the NRRA and uptake has been varied across the region. Many organisations have partnered across this time to help deliver the assistance that communities needed during the time and that legacy remains.

3. **What major changes or emerging issues do you think will be necessary to reduce disaster risk in your area, to 2030?**

The requirement to address disaster risk reduction from a regional or district approach, as opposed to a local level. The sharing of responsibility across borders and boundaries, levels and tiers is a priority. With local government being the bottom tier of government, there is concern that they cannot drive initiatives up successfully, without the support from the State and Federal governments to drive from the top down. There is an agreed understanding for consistency in all aspects of risk reduction and that this should not be reliant on competitive funding rounds, but implemented as a standard approach. The increasing concern of the changing climate and for it to be addressed scientifically can be bolstered by data to assist all sectors to address risk reduction.

South East QLD Better collaboration, interoperability and enhancing partnerships across all levels of Government and the private sector will be key for the South East Queensland region to reduce disaster risk. The South East Queensland region would benefit with a regional approach to building disaster resilience and reducing risk but also to share and harness knowledge and best practice in this space. This would then build towards a better understanding of having better governance, ownership and responsibilities in the South East Queensland region.
South West Queensland More consideration to National Strategies for those Border Councils (Bulloo, Paroo, Balonne). As the bottom tier of Local Government groups, some priorities aren't addressed as they are priorities for the subject and neighbouring NSW Councils, particularly in regards to flood affected infrastructure. It is not a State priority if it affects one Queensland Shire only. An example of this is the Castelreagh Highway (Dirranbandi to Hebel) in Balonne Shire, which effectively cuts Queensland residents off from Queensland provided services, with more access to New South Wales available during a flood event. The Flood Gauge Network remains the biggest concern for these Shires, which they have worked closely with QRA on, attempting to address shortage and maintenance of existing gauges. These gauges are an important tool in Bureau of Meteorology (BoM) flood predictions, especially with the loss of local knowledge caused by long term residents leaving the area. Funding for new gauges has been obtained from multiple sources, because BoM cannot / will not fund them, which means that there are multiple owners, and a lack of ongoing funding to provide maintenance. This has led to frustration from local government and the community towards BoM and the predictions that are being issued. Consistent, accessible telecommunications is the biggest change that will hopefully occur. It is expected that the population in isolated areas (ie individual properties) will continue to decline, which means that private resources (ie flood boats, graders, firefighting units), will also be required, placing a greater demand on these to be supplied publically.
Southern QLD As an RSO I have the ability to identify gaps in service delivery and assist local government or other organisations to fill these gaps. This also applies to gaps in knowledge, for example Southern Downs Regional Council (SDRC) is undertaking resilience events. If successful this resilience building activity can be shared with other council areas

North QLD | NT

- Non-competitive grant funding rounds to address identified areas of risk.
- Addressing water security across the Cape and Torres Strait.
- Resolving Bureau of Meteorology radar gap in the Etheridge Croydon areas
- Securing recurrent funding for the Northern Australia Fire Information (NAFI) Service.

Southern and East Coast Tasmania

Realistically local government amalgamations would assist local government in Tasmania. Many smaller councils do not have the resources to actively reduce disaster risk.
Improved training around land use planning for elected members, could be of value. In some local governments where a Development Application is discretionary and goes before Council, the elected members making decisions are not necessarily considering the impacts of disasters. For example, allowing developments to go ahead in bushfire prone areas, with minimal access. Or approving developments in flood prone areas.

A better understanding of the 1:100 year terminology would assist the public in understanding their risk to disasters.

Volunteering in Tasmania is at very low levels. Potentially incentivising people to join volunteer groups such as the State Emergency Services could be useful.
Clear, non-political messaging about the impacts of climate change and increased disasters might assist people in understanding the risks that are predicted to increase, hence people might better invest in their own property, whether through activities such as clearing gutters, through to having evacuation plans in place.

Local Natural Resource Management and Catchment Management Authorities have had information relating to disaster risk such as flooding for many years. Their staff have technical expertise in areas such as vegetation management, hydrology and community engagement yet they are often not resourced to partner with local government. Their funding is very specific and related to Environment Protection and Biodiversity Conservation Act 1999 priorities. Development partnerships with local Natural Resource Management authorities and local government could be beneficial.

An engagement event, held in each of the three emergency management regions, where various scenarios are played out, drilling down to resources required, assets potentially lost etc., would be worthwhile. The NRRA exercise event held in Tasmania recently, was very well received, however an event that assists participants to have an understanding of the processes and implications of disasters would be beneficial. In addition, there were a number of key players missing from the St Helens event, it was decided to keep numbers down, however it could be useful to have more stakeholders in the room together. Particularly in terms of networking and better understanding various roles.

It would be useful to carry out such an activity on both King and Flinders Islands due to their remoteness and difficulty in accessing resources, access on / off the island. Flinders Island was impacted by Black Summer bushfires and the nature of island life adds a raft of complexity for residents and land managers during disasters.

Several municipalities in Southern Tasmania, are growing very quickly. A number of issues are becoming apparent as a result of this, especially access, current roads are not designed for the increased number of people causing bottle necks, storm water management, and changes to hydrology in the catchment. These are difficult to manage as they cross over several jurisdictions, but an approach that considers the risk of development in such areas needs to occur. In addition, changes to land use in Tasmania has implications for hydrology in the top and middle of catchments. As previously forested areas are cleared for agriculture or urban development, there are changes to ground water and surface water flow. Improved training for land use planning staff and elected members to better understand the implications of changes to land use, may assist planning bodies to make more informed decisions.

Victoria

- I am a member of the Goulburn Murray Resilience Task Force (Strategy can be found at this link) Resilience in the Goulburn Murray region - Regional Development Victoria (rdv.vic.gov.au)
- Having a RSO based in community building proactive, trusted relationships in prevention before a disaster, is having a positive impact

North Coast NSW

- Ability for Local Government to use DRFA funding to build back better after a disaster as opposed to current arrangements where they can only reconstructed assets to pre- disaster function.
- Mental health – limited availability of services, significant community demand. Underlying vulnerabilities need to be understood and addressed to improve mental health.
- Data availability and sharing arrangements to allow governments and essential service providers to plan for future hazards so they can adapt their infrastructure to the expected climate changes. For example, data on expected sea level rise impacts can inform placement of new infrastructure and forward planning of investment to relocate infrastructure that will be impacted in the future.
- Local and State Governments need to work together to look at planning reform around flood prone land
- Federal government could provide leadership through NEMRRA and AIDR to develop disaster risk reduction strategies for local governments across the country.
- Further investigation into public - private partnerships to address underlying exposure and vulnerabilities in communities to reduce disaster risk.
- Reduction in volunteers is an issue for regional emergency services organisations, Red Cross, Lifeline and other community organisations. Much of the response and recovery is undertaken by these organisations, if they are not properly resourced there is a significant risk.

Snowy Monaro NSW

The relationship between the National Parks, relevant Forestry Corporations, Snowy Hydro, Private Land Owners, Rural Fire Services (RFS) and local government, when it comes to bushfire mitigation and response strategies, requires improvement. Since some of these entities are responsible for large areas of land within the local government, a more collaborative approach would be beneficial to all parties.

Snowy Valleys and Towong Victoria

The resilient Towns Initiative led by UNSW are including Emergency Service agencies such as State Emergency Services and Rural Fire Services (RFS) in their preparedness planning workshops with community. This is providing communities with good access to local commands and allowing them to collaborate in greater detail on their own personal and community planning.

Northern Rivers and Clarence Valley NSW

The adoption by Council of a Disaster Resilience Framework including the commissioning of a climate change impact assessment has provided the strategic guidance to council to implement risk mitigation strategies and risk reduction actions for the Clarence Valley Council local government area, ensuring that strong partnerships and good governance arrangements are in place and will provide for the support to be successful in its actions and objectives.

Shoalhaven and Illawarra NSW

The relationship between the NSW Parks, Forestry Corporations, and crown land to ensure neighbouring communities are protected through proper management and preparation ahead of next bushfire season.

Cairns QLD

Continue to ensure that local communities are consulted and kept up to date with all information and knowledge needed to allow this to happen. The delivery of information needs to be relevant and access to assistance needs to be clear and easily accessed.
Continued improved collaboration between all levels of government and organisations.

Annex AB: Australian Sustainable Finance Institute Roadmap

Submitted by: the Australian Sustainable Finance Institute

Enabling resilient communities

The 2019/20 Summer bushfires, Covid-19 and the recent successive floods of 2022 have demonstrated how vulnerable Australians are to acute shocks. While Australia has well-established welfare arrangements for old age, unemployment and health, the same provisions do not exist to support individuals through traumatic events.

The process of recovery from Covid-19, bushfires, floods and droughts needs to be rapid and have real impact at the national, regional and local level. This will require a horizontally and vertically distributed and deliberative model of economic recovery.

Central to this model are place-based recovery strategies, which simultaneously respond to and engage the nuances of 'place' and local communities while being aggregated across a regional scale to maximise the investment footholds required by private and institutional investors. A key component of a successful place-based recovery strategy is community participation. At the heart of all successful place-based partnerships are engaged and informed communities. Effective coalitions or partnerships between key stakeholders are vital if impact is to be successful.

Place-based interventions require investment in community infrastructure from multiple sources, including private sector funding. Rigorous measurement and evaluation of outcomes/impact (both program and population data) need to be built into the business from the start.

This distributed deliberative recovery model has two macro indicators of success: firstly, short- to medium-term recovery that kick-starts key local and regional supply chains, and secondly, long-term resilience, which means that future shocks are substantially less capable of disempowering our social systems.

Arguably the most critical stakeholder in this is local government. As it stands, local government is a wholly untapped partner-resource in the creation of new aggregated and place-based markets and the delivery of sustainable development outcomes at scale.

Examples of previous financial system innovations include the Municipal Association of Victoria's Local Government Funding Vehicle212 that was established in 2014 and enabled 33 councils to access cheaper sources of funding following the GFC. As part of a partnership approach, local authorities would need to confirm clear local economic recovery priorities and investment opportunities, including social procurement, redesign service procurement processes to enable the identification and building of place-based partnerships, and design integrated business planning models that enable convergence and the establishment of social enterprises. Local authorities have the opportunity to become brokers and drive alliances between profit-for-purpose/not-for profit /profit-only businesses and investors to ensure agency exists to deliver specific social and environment impact outcomes.

These types of innovative approaches can provide fit-for purpose investments tailored to specific community needs after recovering from disasters.

Recommendation 22

Australia's financial system participants support the establishment of community finance that can be accessed by place-based groups, including clubs and social enterprises, as part of a place-based community resilience strategy. This should include collaborative initiatives with local government partners, development of standardised documentation that can reduce the costs for social enterprises to access finance, and support for credit guarantees and other measures that reduce the risk of financing and investing.

Income contingent loans (ICLs) are identified as a mechanism to support individual resilience. ICLs are typically used to alleviate credit constraints for those facing tuition costs. An example is the Higher Education Contributions Scheme (HECS). The salient advantage of ICL schemes over alternative funding sources is the absence of default events that can have lifetime impacts on individuals who are subsequently unable to access credit. ICL schemes can be designed to link repayments to level of income, which can be verified through the Australian Taxation Office (ATO). The benefit of ICL schemes for education has been to reduce the impact of risk aversion on the participation decision. Proponents have argued that ICL schemes can be used in a variety of applications, including revenue contingent loans (RCL) for farmers and small businesses, or income contingent loans for land swaps or "disaster-proofing" homes.

Recommendation 23

*Work with Australia's financial system participants to develop income and revenue contingent loans as a mechanism to support individual and community resilience to acute shocks as well as chronic threats to climate and health, which amplify the impact of acute shocks on the most vulnerable***.**

Climate and sustainability services

Financial institutions make decisions based on the ability to accurately assess and price risks, which is based on historical data. If past experience is no longer a reliable guide to the future, then there is a need to develop new models to support decision making. Limitations with existing valuation tools, mainstream practices and lack of quality data challenge the sector in being able to respond to the new risks and opportunities presented by climate change and environmental and social issues.

Partnerships with government provide an opportunity for data to support delivery of economic, social and environmental outcomes. Private and public sector collaboration is required to progressively build commonly agreed, trusted and accessible data sets suitable for decision-making.

Recommendation 18

Environmental and social externalities are valued by financial institutions. To support this, Australia's financial system participants help to compile national- and state-level data sets by developing general principles and guidance to allow financial system participants to measure and assess multiple capitals including soil, water, education levels and gender diversity. Guidance would address how common metrics can be integrated into investment decisions and risk analysis, including, for example, determining impacts and dependencies, and materiality.

Annex AC: Australia's international efforts at gender-responsive disaster risk reduction

Submitted by: the Department of Foreign Affairs and Trade

Australia is working at the global and regional level to advance gender-responsive disaster risk reduction in policy and programs. Australia has supported three important developments:

- The exclusion of women and marginalised groups in disaster management has been verified by research conducted by UN Women and UNICEF[2], confirming huge gaps at all levels of disaggregated data.
- The critical actions agreed across the UN following the joint UNDRR, UN Women and UNFPA Beyond Vulnerability report[3], funded by Australia, include ensuring a gender-responsive Midterm Review of the Sendai Framework and enhancing UN support to Member States to promote gender-responsive implementation and reporting of the Sendai Framework, including through the collection of sex, age, income and disability disaggregated data.
- Australian policy engagement in the Agreed Conclusions of the 66th Commission for the Status of Women (CSW) which break new ground by exploring the nexus between gender, climate change, environment and disaster risks. Australia was pleased to see indigenous issues, disability, women's peace and security, and women's economic empowerment presented as interconnected issues within the DRR, climate change and environment nexus.

The Women's Resilience to Disasters Program (WRD) is progressing solutions based on this research and the CSW Agreed Conclusions. In January 2022, the program launched a global Knowledge Hub - the first "one-stop-shop" for gender-related disaster, climate change, and resilience knowledge, research, publications, tools and expertise. This platform elevates women's voices and perspectives on disaster risk reduction and resilience. Resource collections address the 18 issues critical to closing the gender gap. The broader WRD program has also provided technical inputs and advocated for change internationally.

UNDRR's Women's International Network on Disaster Risk Reduction (WIN-DRR), supported by Australia, is a professional network supporting women working in DRR and has four components:

- Building the evidence base on women's decision-making in DRR through research, documenting good practice and case studies, and disseminating this information widely;
- Strengthening leadership capacity through professional opportunities, leadership training, mentorship and peer-to-peer support programs for women working in DRR;
- Supporting institutions to enhance women's leadership by adopting policies that support women and remove barriers to advancement; and
- Recognising women's achievements through support for conference and event participation and presenting the annual WIN-DRR Leadership Awards.

The Women's Weather Watch networks established by Fiji and Vanuatu with Australian support are an internationally recognised success story. The networks have supported the provision of real-time situational updates through SMS, messaging and local radio across these countries with extreme weather and drought warnings from meteorological offices. More recently, the networks have been used to provide messages about COVID-19, handwashing and social distancing, including scaling up the modality to support Papua New Guinea.

[2] Gender and Age Inequality of Disaster Risk, UN Women / UNICEF, 2019

[3] Beyond vulnerability to gender equality and women's empowerment and leadership in disaster risk reduction: Critical actions for the United Nations system, UN Women / UNFPA / UNDRR, 2021

Annex AD: Australian Red Cross

Submitted by: Australian Red Cross

Red Cross in Australia has a strong commitment to Disaster Risk Reduction. Since 2015, we have taken a range of actions to help people and communities prepare for disaster, build capacity in organisations, and influence the policy agenda. This has been supported by the investment over $28million of donor, philanthropic, corporate and government support into our programming.

Our work contributes to, in the main, Priority 1 Understanding Risk, Priority Action 24(m): *To promote national strategies to strengthen public education and awareness in disaster risk reduction, including disaster risk information and knowledge, through campaigns, social media and community mobilization, taking into account specific audiences and their needs*.

We are pleased to offer the following report.

1. Please describe the key initiatives within your jurisdiction or domain which have sought to address and reduce systemic risk since 2015.

Red Cross' works across Australia within each State and Territory. Our work fits within State and Territory Arrangements. Our risk reduction work focuses on helping people prepare to manage the short-, medium- and long-term disruptions to their lives caused by disasters. Our work is consequence informed. We take as the starting point the long term, psychosocial impacts of disaster as these are what disrupt people's hopes, goals and aspirations.

We aim to support individuals and communities to be better prepared to reduce the psychosocial impacts of emergencies. This is done via the delivery of practical education and training packages, the distribution of information resources, and contribution to policy, planning and practice at the local, state and national levels through the provision of best practice and evidence informed advice.

Red Cross also conducts disaster preparedness campaigns. We work to help communities to take action to improve their resilience, whether it is through community level planning or community mobilisation. Our work is also focussed on capacity building organisations to work with their clients, and the broader EM sector. We also seek to influence policy and practice using evidence and insights informed policy submissions, interventions and conversations.

Individual Preparedness

Since 2007, Red Cross' flagship preparedness program has been Emergency RediPlan. It is a national, non-hazard specific community engagement program through which aims to build the resilience of households and neighbourhoods. Emergency RediPlan is a 4 step, person centred approach designed to assist individuals and households create their own personalised emergency plan and prepare themselves for the longer-term psychosocial impacts of an emergency.

Emergency RediPlan consists of a mobile phone application (Get Prepared), planning templates, activity sheets, booklets, face-to-face information sessions and facilitated household and community planning sessions. In addition, Red Cross also offers training to service providers and carers who work with people more at risk to the impacts of emergencies, such as the frail, aged or those who are socially isolated.

RediPlan resources have been designed to assist people to prepare for any type of disaster, rather than focusing on any one, specific hazard. All Red Cross preparedness activities have been designed to complement the work of other emergency services agencies, who provide the technical expertise about the hazard, and to collaborate with communities and service providers.

In 2021, Red Cross released research, *Understanding Preparedness and Recovery A survey of people's preparedness and recovery experiences* that demonstrated the benefits of taking preparedness action in reducing stress during and after emergencies, which was then positively linked with reduced self-reported recovery from disasters. An evaluation of the Perth Hills preparedness project by Curtin University also demonstrated positive impact of preparedness activities (more details below).

In addition to these person centred, strengths focussed generic, messaging, Red Cross has also adapted it's work and approach for people experiencing homelessness in South Australia, through the Out of the Storm project, Aboriginal and Torres Strait Islander Communities in Northern Territory with the Reimagining Resilience Project, and with Culturally and Linguistically Diverse Communities in Queensland.

A regular annual national campaign is also conducted in September of each year. The campaign aims to raise awareness about the importance of disaster preparedness and drive action in people. It is also supported by local level community activations, supported by Red Cross volunteers and members.

Child Centred Risk Reduction
Red Cross also undertakes disaster preparedness education with primary aged children, with its internationally recognised Pillowcase Program. Initially established with support from the Global Disaster Preparedness Center and Walt Disney Company, this program targets children in Years 3-4 and helps them understand risk, how they can manage their own stress, who they can go to for assistance, and to identify what is important to them (and use a pillowcase as an evacuation kit). The delivery of the program is aligned with the bushfire and Natural Hazards CRC's Child Centred Risk Reduction Best Practice Framework.

Community Disaster Resilience
Red Cross has identified community-based resilience as an area of strategic importance. This priority builds on work commenced in 2015 in Victoria, with the development and implementation of the RediCommunities project in the Grampians Region, which worked with Great Western, Elmhurst, Pomonal, Dadswells Bridge and Moyston communities to help them identify risks and take community level action. In northern New South Wales, another approach has been taken with the Community Resilience Teams, which facilitates a process in communities to develop a team that looks to solve local problems. In Western Australia, the approach has been taken to work closely with local governments to deliver a range of preparedness-based activities. In South Australia the approach has been to take to use community development in the Community led Emergency Resilience Project. A consolidated model has been now developed with five elements:

- Scope & Engage;
- Determine Community Strengths, Needs, Risks & Priorities;
- Prioritise, Plan & Action;
- Embed Sustainability; and
- Monitor, Review & Improve.

Each part is crucial, but the process is not designed to be linear. The practitioner will start by scoping and engaging with the community, but once a diverse group of community members has formed, that group will lead the work, with the practitioner simply facilitating the process. The model is being tested in Tasmania and South Australia.

This work aligns with the National Disaster Risk Reduction Framework's National Priority 4: Governance, ownership and responsibility, Strategy C Support and enable locally-led and owned place-based disaster risk reduction efforts and through this contributes to Priority 2 of the Sendai Framework for Disaster Risk Reduction, Strengthening disaster risk governance to manage disaster risk.

Community Mobilisation
Increasingly, we see that more people want to engage with our humanitarian work but may not fit the traditional role of volunteering (long term, fixed hours). They are seeking opportunities for spontaneous volunteering – actions that create high impact and can be flexible in their delivery. *50 Ways to do more good* is a key resource to grow engagement and involvement from our community in the work of Red Cross. Community based preparedness is one of the key actions people can take, these actions are within the top 10 of all actions that are taken.

Humanitech
Humanitech, an initiative of Australian Red Cross, is a think+do tank working at the intersection of humanitarian action and technology. In collaboration with partners across sectors, including founding partner the Telstra Foundation we are developing insights into the social implications of frontier technologies, creating or amplifying solutions with the greatest potential for social impact, and influencing so that technology serves humanity by putting people at the centre and in control.

Sector Capacity Building
Red Cross also focuses upon sector capacity building in the disaster risk reduction space. One of the key activities of Red Cross in this area is as a partner with the Australasian Fire Authorities Council in the delivery of the Australian Institute for Disaster Resilience on behalf of the Australian Government. Red Cross was part of the successful initial tenderers, and as part of the contract deliver 1 Volunteer Leadership Program per state and territory around the country, helping build capability in volunteer leaders. There have been 42 workshops since 2015, reaching over 1000 participants.

Red Cross also contributes to the Disaster Resilient Education Strategy Group as well as being part of the Australian Handbooks Advisory Group to steer the Australian Handbooks Series. Red Cross has also contributed, as members of working groups, to following Handbooks:

- Evacuation Planning Handbook
- Community recovery Handbook
- Spontaneous Volunteers Handbook
- Australian Emergency Management Arrangements Handbook
- Systemic Risk Handbook
- Community Engagement Handbook

In South Australia, Red Cross has led, on behalf of the South Australian Government, the development of the People at Risk Framework. This framework provides overall guidance for how State and Local governments, businesses, nongovernment organisations, community groups and individuals can work together to strengthen the preparedness, safety and wellbeing of people who are most at risk in emergencies.

Elsewhere in the country, (WA, Victoria, New South Wales, as well as South Australia), Red Cross has been facilitating workshops with community service providers in aged care, dis ability, and CALD sectors to equip them with the capacity to undertake preparedness activities with their clients.

Policy Influence
Australian Business Roundtable for Disaster Resilience
Red Cross was a founding partner in the Australian Business Roundtable for Disaster Resilience and Safer Communities. This Roundtable draws CEO level membership from Insurance Australia Group, Optus Australia, Westpac, Munich Re, and Investa Property Group. The Roundtable has produced 6 reports that call for greater activity and investment in disaster risk reduction. Red Cross were heavily involved in the development and delivery of the report Economic Costs of the Social Impacts of Disaster.

National Disaster Risk Reduction Framework
Red Cross made a significant contribution to the drafting of the National Disaster Risk Reduction framework. This work commenced with a major contribution to the Profiling Australia's Vulnerability workshops, synthesis workshops and reports, through to helping steer the co-design workshop of the framework in 2018 and the subsequent drafting of the framework. Red Cross contributed the paragraph on the long and complex nature of disasters impacts as a major driver of the need to address disaster risk. Since then we have contributed to the drafting of the Monitoring and Evaluation Framework, and the first and second National Action Plans.

Research
Red Cross has been a major contributor to the research agenda set out by the Bushfire and Natural Hazards Cooperative Research Centre, and the follow-on Natural Hazards Research Australia. Red Cross has contributed to the Australian National Disaster Resilience Index Project, the Out of Uniform Sustainable Volunteering Project, Child Centred Risk Reduction Project, and was lead end user on the Recovery Capitals Project. In addition, Red Cross has been a partner in the University of Melbourne's Beyond Bushfire's research program examining the 10-year health and wellbeing trajectory of people affected by the Black Saturday Bushfires in Victoria in 2009.

2. What are your major achievements, challenges and barriers to implementing the Sendai Framework since 2015?
2.1 Resilience building
Since 2015:

- 110,000 people have taken action as a result of Red Cross' engagement with them on preparedness.
- The Ready Week preparedness campaign has reached an average of 9 million people per annum.
- The Pillowcase Project has reached 58898 students, held 2292 sessions and engaged 772 schools.
- 69 communities have had Red Cross actively work with them to build disaster resilience.

Evaluation of Out of the Storm Homelessness Resilience Project
The Out of the Storm program successfully increased the reach of information of extreme weather events to people in the homeless community of Adelaide. Relevant information about extreme weather was provided directly to people via the information posters and through the conversations with the peer workers. Peer outreach workers documented 466 conversations about extreme weather with people experiencing homelessness and this format was a vital contribution to the positive evaluation of the project.

The emergency kits provided essential items to help physical preparedness. The peer outreach workers distributed 278 emergency kits. The response to the emergency kits was overwhelmingly positive:

- I can use everything in here. I really needed one of these [the beanie]. (Person receiving an emergency kit).
- People loved it [peer outreach and the winter emergency kits]. They really appreciated it because it was free and it was very helpful. (Peer worker).

The co-designed map of the Adelaide CBD was particularly useful for people new to Adelaide. One peer worker noted:

- [He] wasn't interested in the kit themselves but loved the idea, living in a car; came back to Adelaide hoping for work, took a photo of the map and wanted information where to shower. (Peer worker).

Evaluation of whole of community project in the Perth Hills (WA)

The 2021 Wooroloo Bushfires in Western Australia caused extensive damage, with significant and enduring impacts for the Perth Hills community. Australian Red Cross have delivered whole-of-community emergency preparedness programs and resources in the Perth Hills since 2015 to support community-led readiness in an area at high risk of multiple and compounding hazards. An evaluation of the program was undertaken by Dr Elizabeth Newnham and Dr Peta Dzidic from Curtin University post bushfires as it represented an opportunity to demonstrate impact of the program on people's disaster experience.

Survey respondents reported **high levels of emergency preparedness** with a large range of bushfire preparedness activities reported. Most participants (63.9%) had used their emergency plan during a bushfire, and reported that plans:

- were effective in reducing harm to themselves and their family during the emergency,
- increased confidence in responding to the emergency,
- increased knowledge about what steps to take, and
- prompted earlier evacuation.

The most frequently cited ongoing concern following the bushfires was mental health difficulties, although reported levels of psychological distress were consistent with Australian norms. High levels of community connectedness were reported, but some groups in the community were perceived to be less engaged.

Community Disaster Resilience – Tasmania

A pilot project began in February 2022, working alongside three Tasmanian communities to strengthen resilience. 163 people were supported with the facilitation of 12 resilience planning workshops. The following excerpts from a local news article highlight that community members see value in the process already:

- "I believe this pilot program is an important one, given the challenges we face in a changing climate around flood, fire and weather events, as well as things like cyber-attacks and pandemics. Getting a local perspective on who may be vulnerable in the community, where the strengths and weaknesses are in communication and connection, and what resources and amenities are important to protect in an emergency is crucial to the community's resilience in coming through any disaster."
- "Regarding the ability of the initiatives' ability to hold up against real emergency situations, time will tell. This was not intended to be a 'one and done' type of process, but to be a template process that is developed and refined over time, as new situations are encountered, gaps identified, and community changes incorporated."

Community Disaster Resilience – South Australia

South Australia is currently running CDR programs in 17 communities, including one focused on youth and another on Culturally and Linguistically Diverse communities. South Australia currently has:

- 17 participating communities
- 254 community leaders engaged in workshops/project
- 324 actions created by participants which were tabled in their Community Disaster Risk Reduction Plans

68 actions prioritised throughout project including:

- Psychological first aid
- New resident packs
- Deisater risk reduction calendars
- Pillowcase sessions
- Market stalls
- Community facebook
- Know your neighbour
- Features in local newspapers
- Preparedness events

- Community notice boards
- Community response plans

Impact

Community connectedness is a significant resilience measure and can be critical in determining a community's ability to respond to and recover from a disaster. Many community members indicated that while they may have initially felt quite connected to their community due to their involvement in other committees and/or activities, this project allowed them the opportunity to work with members of the community they wouldn't normally work with. They also stated that through the workshops many of their assumptions were challenged due to the information provided by fellow participants.

A number of participants indicated that Red Cross were prepared, knowledgeable and approachable in regards to the support they provided. Members from the CALD project indicated that they appreciated the fact that Red Cross provided workshops that were empowering and drew from the strengths of the community to come up with their own solutions.

- "It can be challenging to galvanise a group to work towards the same goals, but community connectedness is at the heart of this program. Residents have a role to play just as much as the services that will come to assist in an emergency."
- "The value of Red Cross' support has been immense to catalyse conversations and action and ensure community feel supported and are heard."
- "The people of Kangarilla are doing the work in advance so they are prepared to make decisions and take action should an emergency arise, it's amazing to see how the Kangarilla community has broadened its awareness about the various things that can happen in an emergency. There's a lot of local knowledge held in the community and the project is capturing it for everyone's benefit".

Students getting involved in Community Disaster Resilience

The Community-Led Emergency Resilience project worked with students from Kangarilla Primary School to seek their contribution to the Kangarilla Community Disaster Risk Reduction Plan. A workshop was held with the year 6/7 class with the aim of generating ideas about the kinds of emergencies they may need to prepare for and how to build resilience for themselves, their peers and the broader community. A youth leadership group was established with some members presenting their ideas at the following leadership group meeting. The leadership group endorsed a youth-led awareness raising campaign with plans to develop campaign posters & flyers. Young people were successful in writing an article for the local newsletter and becoming "App Ambassadors", supporting adults to download the Red Cross Get Prepared app at local events.

Community Disaster Resilience- New South Wales

In NSW there are currently 33 (24 of these located in Tweed Heads LGA) established Community Resilience Teams. Red Cross staff and volunteers are actively engaging with an additional 15 communities who are in various stages of formalising engagement and communication strategies to suit their community's needs. It is estimated that 15,000 connections have been made with locals. The popularity of this approach is increasing, with communities and Councils are now approaching Red Cross asking to work with us. Positive feedback has been received about the work:

- 'Our CRT has brought community together, people who were once disconnected have now connected with the community' – CRT member, NSW
- 'There is opportunity to work with caravan park communities in the area. Lots of interest for the emergency guide that was developed from formal and government agencies. Red Cross presence gave people a sense of support that they did not receive from other agencies or organisations.'

2.2 Advocacy
Sustained advocacy, individually, as well as part of the Australian Business Roundtable has seen an increase in investment in Disaster Risk Reduction from the Australian Government through the Emergency Response Fund ($50million p.a), the Preparing Australia Program ($120million, p.a) and most recently the new government's Disaster Ready Fund ($200Million).

2.3 Humanitech
The Humanitech Lab Innovation Program was launched in 2021 to explore new approaches to designing and developing technology, where the benefits are shared equitably amongst society and the potential for harm is

reduced. The Humanitech Lab 2021 Cohort supported six organisations using emerging technologies to address community problems caused by climate change, disasters and emergencies, inequity and injustice.

The 2021 Cohort includes projects with FloodMapp who are collaborating with Red Cross Emergency Services and multiple Queensland LGAs to develop Flood Intelligence tools for organisations serving their communities in times of emergency, and Climasens who are collaborating with Red Cross Emergency Services and the Red Cross Red Crescent Climate Centre to build a climate risk mapping product that spanned social vulnerability, asset and infrastructure climate risk assessments. The selection process is underway for the 2022 Lab Innovation Cohort with a further 6 finalists to undergo the program this year.

3. What partnerships and initiatives have been most successful in assisting in the reduction of disaster risk?
As mentioned above, Red Cross partnered with AFAC (in the lead) and the Bushfire and Natural Hazards Cooperative Research Centre to launch and operate the Australian Institute of Disaster Resilience on behalf of the Australian Government. The Australian Business Roundtable is an excellent example of a partnership among corporates and the not-for-profit sector to influence government policy and investments. Red Cross has been a partner in the Bushfire and Natural Hazards Cooperative Research Centre and now the Natural Hazards Research Australia. This has benefitted the work that we do by providing evidence to support our programming.

Since 2015, Australian Red Cross has partnered with the Insurance Australia Group, in a Shared Value Partnership to develop and launch the Get Prepared smart phone application. One of the IAG brands has supported Red Cross' preparedness work.
Jaguar Landrover are a global partner of the International Federation of Red Cross and Red Crescent Societies. JLR have supported the preparedness work of Red Cross, as well as the Preparedness Campaign. They also support our post disaster recovery work.

The NAB Foundation support our community led resilience programming in Burra, Warooka and Seaford/Moana in South Australia.

Red Cross has been a partner with the University of Melbourne's Child and Community Wellbeing Unit since 2009 to undertake the Beyond Bushfires research into the health and wellbeing trajectories of the Black Saturday Bushfires, as well as the Recovery Capitals Project, a new framework for managing recovery.

4. How have national, sub-national and local public policy, legislation, and governance structures changed to align with the Sendai Framework?
Our organisational work in Disaster Risk Reduction, which is guided through our Strategy 2025, is now aligned with the Sendai Framework for Disaster Risk Reduction and the National Framework for Disaster Risk Reduction.

5. How and to what extent has the establishment of national and/or local disaster risk reduction strategies and plans resulted in expanded efforts in systemic risk reduction?
Red Cross notes that the National Disaster Risk Reduction Framework has been a positive development in clearly setting the goals that the nation needs to reach to reduce disaster risk by 2030. As part of the development of Red Cross' Strategy 2025, community-based disaster risk reduction has been prioritised as a key plank in us achieving our goals of Communities are strong and resilient and have capacity to anticipate, respond to and recover well from disasters.

6. How and to what extent have investments in disaster risk reduction increased since the implementation of the Sendai Framework (2015), and what measures are in place to ensure these investments are risk-informed?
Red Cross has invested over $28.2 million in Disaster Risk Reduction since 2018, enabling both the provision of individual and community resilience, as well as enhancing preparedness for effective response and recovery. This is a combination of public donations, philanthropic and corporate funding, and government funding. In addition, there has been significant funding that has supported recovery programming after the 19/20 bushfires, Cyclone Seroja, and the more recent flooding events.

Our advocacy work both as an organisation and with the Australian Business Roundtable for Disaster Resilience has contributed to an increased investment of $170million per year from the Australian Government in Disaster Risk Reduction. This was achieved through the June 2013 release of the Roundtable's white paper, Building our Nation's Resilience to Natural Disasters, leading to the Australian Government asking the Productivity Commission to inquire into the efficacy of national disaster funding arrangements and take into account the high priority of effective mitigation.

In 2017, Red Cross created the position of National Resilience Adviser, a technical adviser with the responsibility to identify and promote best practice in disaster resilience, and inform our policy and practice development. This role provides media commentary on disaster resilience issues, as well as input into projects and policy development.

7. What major changes / emerging issues / topics of concern are anticipated in the period to 2030 and beyond which will need to be considered in prioritising, accelerating and amplifying action to reduce disaster risk? *Please provide links if available.*
Through the submission to the development of the second National Action Plan for the National Disaster Risk Reduction Framework, a number of emerging issues and challenges were identified:

- An increased appetite for collaboration across the emergency management sector.
- Increased investment and a groundswell of interest in building disaster resilience, particularly as climate change impacts are becoming difficult to ignore and linked with major recent disasters of the Black Summer bushfires, and the flooding events of 2022.
- There is a growing body of research and evidence that is validating our ways of working and informing our programming. This is supported by our increasingly rigorous monitoring and evaluation efforts, which more effectively measure our impact.

There are also several challenges as we see it:

a) The need for predictable, long term, sustainable funding and investment towards areas with highest risk and impacts, with a particular focus on community resilience building.
As noted above, there has been a significant improvement in the funds available to disaster risk reduction and community resilience building with the creation of the Preparing Australia Grant Program, and $50 million a year being allocated from the Emergency Response Fund towards resilience measures, and the new Disaster Ready Program. However, with disaster risk increasing under a changing climate, more needs to be invested in reducing risk.

In line with recommendations from various reports and inquiries over the past decade, Red Cross continues to support the need for an investment of at least $200 million per annum to be matched by the states and territories.

Further, in accordance with our submission on the Emergency Response Bill 2019, the funds available from the investments in the fund should be solely targeted towards disaster risk reduction and should be made available for both structural measures and non-structural measures. This will provide a predictability for funding. Funding must be available over longer timeframes (3-5 years) as this is the horizon for which change is realised for non-structural measures such as community-based risk reduction and resilience building initiatives.

Preparing Australia Grants for individuals must be targeted towards those with lower financial capacity. It is well known in practice and research that people without financial capacity are more at risk to the impacts of disaster.

They are more likely to be living in higher risk zones, because of cheaper housing, and they may not have the financial capacity to either move out of harm's way or take protective actions such as household mitigation and preparedness measures or insurance coverage. Their financial circumstances may mean that they are unable to effectively evacuate in time, as the events surrounding Hurricane Katrina highlighted in 2005.

b) Stronger sector coordination, especially among community resilience building initiatives.
As we prepare for a future of more severe and more frequent disasters because of climate change, there is a need to ensure that disaster risk reduction is as coordinated as possible, across local, state and national government levels, and is centred on the needs of individuals and communities, informed by evidence and ensuring no one is left behind.

The current governance arrangements, with the National Emergency Management Ministers Council (elected officials) and the Australian New Zealand Emergency Management Committee (senior officials), is no longer fit for purpose to oversee the complexity of disaster risk reduction. Without representation from civil society, business, research, technical experts, as well as input from government agencies with responsibilities for land use planning, community services, health services.

There has been a significant expansion of community resilience risk reduction efforts across the country, with established parties like us and the Foundation for Rural and Regional Renewal, as well as new entrants such as Minderoo Foundation and Disaster Relief Australia. But this comes with the risk of duplication, multiple points of entry, repetitious and onerous application processes for individuals, and organisations working at cross-purposes or in a competitive way. Equally, there is little systemic focus upon on urban risk, Australia is an urban nation.

The recent Building on Momentum report prepared by the Humanitarian Advisory Group for the Australian Red Cross interviewed numerous sector stakeholders and found that not only is there an appetite in the sector for leadership and coordination, but there is also a strong sense that Red Cross is the right organisation to step into this role. It showed that our national scope, our trusted reputation, and our technical expertise make us well positioned for this kind of work.

Sector coordination should be intersectional in nature, and integrate work being done in climate change adaptation and disaster risk reduction, as well as state, territory and local strategies and implementation planning. Success in this area will require a whole of government, business and society approach to disaster risk reduction and climate change adaptation.

c) Setting of targets and transparency for reporting of efforts to reduce risk.
We strongly recommend the establishment of targets for each of the National Risk Reduction Framework's identified priorities. Additionally, a formalised mechanism to ensure transparency and accountability, such as annual statements to parliament, or annual reports demonstrating progress against the established targets would address a significant gap in the previous action plan.

In this regard, all parties will need to consider how resilience will be measured, from a baseline perspective but also how and if it is being 'built' given the challenges of climate change impacts on lives and livelihoods. It will need to consider what success looks like from a whole of government and community perspective, amongst a diverse range of individuals and groups. We have developed a monitoring and evaluation framework, which has identified indicators to be used to measure individual and community resilience.

d) Access to hazard risk and impact data for all agencies, as well as research on return on investment for social resilience building measures.
We recommend the development of more complex, nuanced and intersectional data and evidence collection. The Sendai Framework highlights the importance of collecting, analysing, managing and using displacement data to understand short and long terms needs and vulnerabilities, capacities and strengthens of affected individuals and groups. It also advises mainstreaming disaster risk data and assessments into local development plans to ensure safe and secure housing and protection from harm in the case of extreme hazards.

Disaster risk reduction has been identified as a shared responsibility among a range of actors, including governments, non-government agencies, businesses, communities etc., therefore comprehensive data to help decision making should be available. To undertake its programming, Red Cross has relied upon purchasing hazard risk data from a third party to determine targeting for our work. The cost of accessing such data is significant for a not-for-profit like Red Cross, and other community organisations would face similar limitations.

The Australian Business Roundtable for Disaster Resilience and Safer Communities in 2014 called for an open-source data platform that was available to all Australians to help them make risk-based decisions. This data will facilitate open innovation but should follow responsible data practice to guarantee balance, fairness and protect privacy and safety.

We recommend any platform follow the following Principles for Digital Development:

- Design with the user
- Understand the existing ecosystem
- Design for scale
- Build for sustainability
- Be data driven
- Use Open-Standards, Open Data, Open Source and Open Innovation
- Reuse and improve
- Address Privacy and Security
- Be Collaborative

Additional guidance from the Australian Red Cross' technological think+do tank, Humanitech's The Future of Vulnerability: Humanity in the Digital Age report includes:

- People more at risk and civil society need to be central to this work
- Multistakeholder collaboration at all stages is critical
- Regulation that is relevant as technology changes, and in varied contexts, with an eye toward the varied uses and misuses of data is critical
- The trust of people more at risk must be earned
- A collaborative, accountable humble approach to frontier technologies has transformative potential to put humanity first.

These data gaps are especially critical given the increasing frequency and intensity of disasters due to climate change. There is a critical need for research to help the sector understand the cost benefit **return on investment** of disaster risk reduction, particularly those that focus on social resilience (non-structural). There is a growing body of evidence on the impacts of disasters, and increasingly on the impacts of climate change. However, we do not understand the health and wellbeing impacts of the complex and cascading disasters we are experiencing now and will experience further under climate change, and how to reduce their risk profile. There is tremendous value in helping organisations that work in disaster risk reduction to measure the impact of their work. This evidence will form a strong basis and demonstrate the importance of disaster risk reduction to communities. In particular, there is a need to evaluate and quantify social return on investment for non-structural measures and social resilience measures.

Conclusion
Red Cross has made a significant contribution to reducing disaster risk over the past 7 years. This is of high priority to us as the world becomes more uncertain. We would be pleased to elaborate on any of the content.

Annex AE: The Road and Rail Supply Chain Resilience Review

Submitted by: Bureau of Infrastructure and Transport Research Economics, in the Department of Infrastructure, Transport, Regional Development, Communication and the Arts

Overview

All Australians depend on strong and resilient supply chains. The impacts of COVID-19, natural disasters and a growing freight task have shown the increasing importance of Australian on-land supply chains, and their critical importance to the national economy, and the lives and livelihoods of Australians. Understanding which supply chains are of national importance, the risks they face, and how government and industry can work to mitigate these risks is essential to ensure supply chains remain resilient and fit-for-purpose now and in the future.

A review into road and rail supply chain resilience (the Review) is being undertaken by the Bureau of Infrastructure and Transport Research Economics in the Department of Infrastructure, Transport, Regional Development, Communications and the Arts.

The Review will:

- Define and determine key risks to critical supply routes – routes that transport large quantities of freight or are critical to supply of essential goods or services across Australia;
- Identify key risks to critical supply routes in the short, medium and long term — including weather events or natural disasters, limited alternative routes, and limited and difficult to access alternative transport modes;
- Assess the potential vulnerabilities in critical supply routes;
- Complete a stocktake of recent relevant work by government and industry intended to identify and mitigate Australian domestic road and rail supply chain risks;
- Identify data generation, capture and use requirements necessary to assess, inform best-practice and improve road and rail supply chain resilience;
- Determine the critical routes at highest risk of failure; and
- Develop and present pragmatic options for governments to mitigate or address risks to critical road and rail supply chains, in alignment with the Government-agreed framework to identify and mitigate critical supply chain risks.

The focus of the review is on Australia's road and rail infrastructure and linked infrastructure. Matters such as international supply chain vulnerability, costs of freight, the transport workforce and critical inputs to the transport sector are outside the scope of the review.

Process

Industry stakeholders, advocacy groups and government agencies will be engaged widely in a variety of meetings, interviews and information sessions on the work of the Review. The Review will also work closely with the Freight Industry Reference Panel and internal expertise.

The Review will utilise CSIRO's Transport Network Strategic Investment Tool (TraNSIT) to undertake scenario modelling to identify and assess disruptions to critical supply chain routes across Australia's road and rail network. This will provide insights into the impacts on freight disruption, the cost of detouring freight, the amount and type of freight that was obstructed and the subsequent level of impact on communities.

The Review will also assess existing natural and human induced risks and the threat they pose to Australia's road and rail supply chain infrastructure. This analysis will then be used to develop a risk framework to assess the likelihood and consequence of particular hazards on critical road and rail supply chain routes identified through TraNSIT.

Output

The Road and Rail Supply Chain Resilience Review will conclude and report to government by December 2022.

Annex AF: Climate Change Initiatives

Submitted by: the Department of Climate Change, Energy, the Environment and Water

Current policies and initiatives which seek to mitigate future climate change by driving the transition to net zero to achieve the 2030 target to reduce greenhouse gas emissions by 43 per cent below 2005 levels, to achieve out net zero emissions by 2050 target include:

- A $20 billion investment in Australia's electricity grid to rewire the nation, unlock greater penetration of renewable energy and accelerate decarbonisation of the grid, complemented by an additional $300 million to deliver community batteries and solar banks nationwide.
- An investment of up to $3 billion from the new National Reconstruction Fund to support the manufacturing of renewables and the deployment of low emissions technologies, which will broaden Australia's industrial base, bolster regional economic development, and boost private investment in abatement.
- A new Powering the Regions Fund to support the development of new clean energy industries and the decarbonisation priorities of existing industry. The fund will also prioritise building the workforce skills and capability required for the clean energy transition. The Australian Government will invest a further $100 million to train 10,000 New Energy Apprentices in the jobs of the future and establish a $10 million New Energy Skills Program to provide additional training pathways.
- The introduction of declining emissions baselines for Australia's major emitters, under the existing Safeguard Mechanism, will provide a predictable policy framework for industry, consistent with a national trajectory to net zero and supporting international competitiveness.
- Australia's first National Electric Vehicle Strategy to reduce emissions and accelerate the uptake of electric vehicles, including by establishing a new Driving the Nation Fund, while also doubling the Australian Government's investment in charging and refuelling infrastructure to $500 million. The Australian Government will also introduce an electric car tax discount and establish a real-world emissions testing program to help consumers make more informed choices about the fuel efficiency of their vehicles.

Annex AG: The National Bushfire Intelligence Capability

Submitted by: the Commonwealth Scientific and Industrial Research Organisation

A systemic national approach to bushfire hazard and risk

What is NBIC

The National Bushfire Intelligence Capability (NBIC) was co-designed as an innovative science-policy partnership by the disaster risk reduction function of the Commonwealth Government, currently housed in the National Recovery and Resilience Agency (NRRA), and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to provide national information products and services for bushfire hazard and risk assessment.

Aligned with the National Disaster Risk Reduction Framework (NDRRF, Australia's implementation of the Sendai Framework for Disaster Risk Reduction), NBIC primarily supports the objective of improved understanding of risk, through the production of bushfire hazard potential information.

It is being developed as:

- an integrated national socio-technical system that brings together people and data to analyse and assess current and future bushfire risks and impacts for more informed local and national decision making;
- a science-driven capability that produces and maintains a suite of authoritative national bushfire data and mapping products; and
- a multi-level collaboration network underpinned by governance mechanisms that enable effective risk management decision support and the capture of lessons learnt to inform preparedness, response and risk reduction efforts.

Why NBIC was developed

The NBIC was established in response to the devastating 2019-20 bushfires in Australia that resulted in significant loss of life, wildlife, property and had long-lasting impacts on communities across Australia. A Royal Commission into the National Natural Disaster Arrangements following the bushfires concluded that an improved national approach was required for many aspects of natural disaster management. The Commonwealth Government identified the NBIC as the means to implement and support several Royal Commission recommendations.

How NBIC is designed

NBIC interacts with and provides outputs to multiple networked national capabilities, including the Australian Climate Service (ACS) which currently provides funding for NBIC. It also concurrently works with a network of state and territory agencies. The aims of this multi-level collaboration are to:

- unify on-going efforts by CSIRO and other collaborators in providing individual state and territory agencies with bushfire hazard quantification and risk decision support including data layers and methodologies;
- share, harmonise and refine information resources and expertise to inform national disaster risk mitigation programs and policies;
- provide best available nationally consistent bushfire hazard potential data to state and territory stakeholders for use in different decision-making contexts.

NBIC user groups

NBIC aims to provide best available science and evidence-based information and expertise to support the integrated understanding of bushfire hazard potential and risk across four key stakeholders, or user groups:

User group	National Bushfire Intelligence Capability products and services
National policy and program designers (national level)	• Nationally consistent hazard and loss potential maps (current state to long term), based on climate-adjusted fire weather severity potential.
Land use planners and planning agencies (national, and state and territory level)	• Best available, nationally consistent estimation of reasonable worst-case bushfire severe potential, at any location with a resolution relevant for decision support at the individual asset level. These will be long-term

	climate adjusted products, regularly updated to include changes in vegetation extents, climate models and weather reanalysis products. • Translation of these severe potential maps for planning decision support and the declaration of bushfire prone areas (at state and territory level).
Land managers (primarily at the state and territory level)	• Provision of estimates of current seasonal fuel state adjusted for fire history and regrowth according to weather experienced since fire. • Nationally consistent estimation of reasonable worst-case bushfire severity potential for that season based the current fuel state layer and assumptions around reasonable worst case fire weather (not linked or adjusted for short to medium term weather forecasts).
Emergency managers (national, and state and territory level)	• Provision of high resolution seasonally adjusted vegetation and fuel attribute layers to support fire spread simulations for situation awareness. • Provision of high resolution reasonable worst-case vegetation and fuel attribute layers to support scenario modelling of future loss events. • Provision of climate adjusted reasonable worst-case fire weather for use in scenario modelling of future loss events. • Provision of a post bushfire loss context survey capability to capture lessons learned and inform immediate recovery efforts.

These user groups have, to varying degrees, employed different data sets and/or different bushfire weather assumptions for their decision making. Given this variability in data and its use, it has been a challenge to produce a nationally consistent view of risk needed to inform the design of national mitigation and disaster risk reduction policy and programs. A key goal of the NBIC is to enable a shared understanding of bushfire hazard and risk, underpinned by consistent data.

In this context, the NBIC supports Sendai and NDRRF priorities in the following ways:

- Establishing governance mechanisms that include representatives from Commonwealth and state and territory agencies to enable a more consistent and strategic approach to the production and dissemination of information and support decision making at local and national scales (supports *Sendai Priority 2 – Strengthening disaster risk governance to manage disaster risk*).

- Providing climate-adjusted long-term probable worst-case fireline intensity information products that can be used to assess bushfire risk and resilience benefits more accurately to support business cases for investment in mitigation (supports *Sendai Priority 3 – Investing in disaster risk reduction for resilience*).

- Ensuring planning maps in bush-fire prone areas are based on the most relevant up-to-date climate-adjusted bushfire weather projections and efforts to 'build back' reflect current understanding of hazard potential over the life of the building through the application of appropriate building and planning codes (supports *Sendai Priority 4 – Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction*).

A socio-technical approach

More than a technology platform, the NBIC is being co-designed as a socio-technical system. This reflects the institutional and sectoral complexity that the NBIC navigates to achieve its goals of supporting:

- States and territories by providing best available information on bushfire hazard for use as inputs for updating state planning maps based on current hazard information;

- Commonwealth Government by providing nationally consistent information that not only informs national policy and programs but also supports coordinated, integrated disaster risk reduction efforts by sharing common information with state, local and other users to inform their decision making; and

- Integrated disaster risk reduction efforts by producing and delivering information in ways that reflect the mandates, institutional arrangements, and shared responsibility across all levels of government, the private sector, and local communities.

This approach recognises that disaster risk reduction requires the use of consistent information to inform a shared understanding of bushfire hazard and risk which, in turn, enables more coordinated action across sectors and levels of government.

To this end, the design of the human dimensions (social architecture) of the NBIC is based on an in-depth understanding of the respective roles and responsibilities of key stakeholders across government the private sector and community to effectively reduce bushfire risk. Specifically, those in land use planning, land management and emergency management are both providers of input data and users of the output data to inform decisions on land use planning, building codes, fuel management and other risk reduction activities including hazard event preparedness, prevention, response and recovery.

Practically, NBIC is being co-designed and implemented using three interdependent architectures which continue to evolve through:

Social architecture

The NBIC adopts a collaborative national approach between states, territories, and the Commonwealth to develop nationally consistent bushfire hazard and risk information.

The governance framework includes an NBIC Board and Representative Council, a Technical Committee and Task Groups to support the development of appropriate governance and participation mechanisms and to enable data providers and data user communities to interact and collaborate.

Governance arrangements are designed to foster participation and decision making with all stakeholder groups. NBIC strategic and technical governance mechanisms have been wired into broader institutional arrangements for bushfire disaster management and risk reduction so that NBIC products can be used in policy, program, and operational decision-making contexts to drive collective outcomes.

A service capability will enable applied science to support policy reform and optimise resource allocation and investment decisions. It will combine deep knowledge and understanding of bushfire hazard and risk management with the NBIC's emerging analytical capability.

CSIRO contributes to the NBIC design process with science-informed methods to ensure workflows deliver a reliable and credible evidence-base for decision makers to consider and action. NRRA is positioned to access, assess, and respond to bushfire intelligence at a national level, while NBIC Council members are situated to access, assess and respond to bushfire intelligence within their jurisdictional and sectoral contexts (and across jurisdictional boundaries as and when required).

Information architecture

Bushfire hazard and risk information products will be delivered based on consistent data, models and assumptions with local preference (e.g. return periods, climate model assumptions and timeframes). Tailored, modular workflows using data and science-informed modelling for bushfire hazard and risk will enable actionable insights in short and long-term horizons.

The key products will be a series of national bushfire hazard maps showing fire severity potential under different weather conditions, climate, and other assumptions. National spatial data layers produced and used as inputs to the hazard map will be made available for other uses such as estimated seasonal fuel loads, historic fire spread data, building loss potential as a seasonal and long-term product and hazard class layers for triggering key planning and building decisions. The NBIC will support and align with other national bushfire data standards being developed under the Australian Fire Danger Rating System (AFDRS) initiative.

While the information and visualisation products are the most obvious outputs from this initiative, ongoing benefit is generated through data standardisation and continuing information governance.

Technical architecture

The NBIC involves the creation of a digital platform to enable the rapid co-development, evolution, testing and, delivery of national extent products and associated services for use at all levels of scale. It includes development of data access, management, security and production facilities from and between jurisdictions and national agencies.

Data management will involve the aggregation and integration of a nationally consistent standardised baseline and derived data layers that inform and support the estimation of bushfire hazard potential. Information access, computation and visualisation capability will include geospatial dashboards for decision makers, a web portal to access spatial data layers and computation tools. Access to underlying data and analytics and the resultant spatial

information products will be enabled via an Application Programming Interface (API) for machine-to-machine interaction.

Through this systemic national approach to bushfire risk, NBIC's design will enable consistency and long-term support for operational and strategic decision making that is tailored to diverse needs, relevant sectors and end users.

For further information:

NBIC: https://research.csiro.au/nbic/about/

Contact Us: NBICGeneral@csiro.au

Australian Government

ANNEX TO:

AUSTRALIA'S NATIONAL MIDTERM REVIEW OF THE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015-2030 REPORT

Are we succeeding at making Australian communities safer in the face of growing disaster risk?