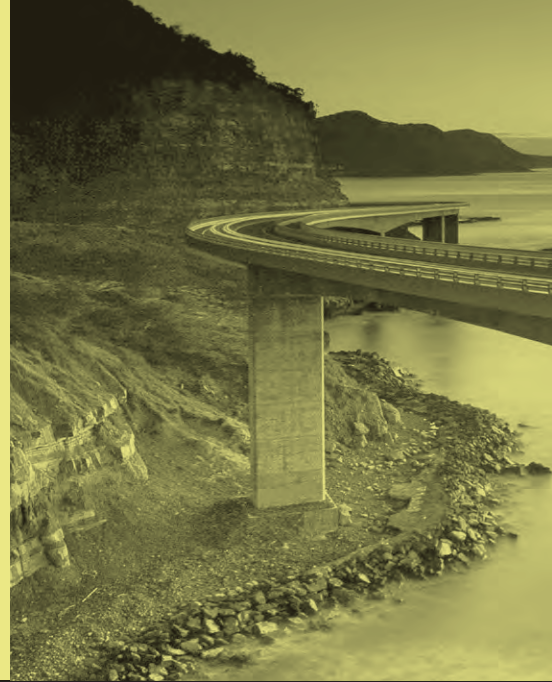


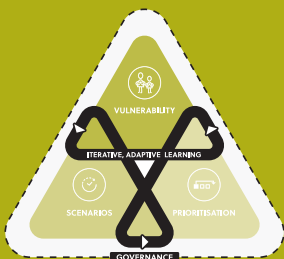
# 01



## Climate and disaster risks:

What they are, why they matter, and how to consider them in decision making

## Introduction



ISBN: 978-1-920996-82-6 (Print)  
ISBN: 978-1-920996-89-5 (Online)

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#### **Acknowledgement**

The Australian Government, Department of Home Affairs and the National Resilience Taskforce acknowledge the contribution of its partners and stakeholders for their ongoing encouragement and expertise. Without the guidance, participation and cooperation of representatives from across the governments of Australia, collaboration with business and institutional partners, and invaluable contribution of community members, this work to inspire new conversations about climate and disaster risk would not have been possible.

#### **Disclaimer**

The information within the guidance provided, and upon which it is based, has been obtained from engagement with a diverse range of stakeholders and sources that the authors believe to be reliable and accurate. The information in the guidance is solely intended to provide a general understanding of the subject matter and not intended to be complete or comprehensive in terms of content or resources. The guidance documents are a first iteration and have not been fully tried and tested. The guidance should be seen as credible and instructive but not authoritative.

The information contained may not be representative of all audiences and appropriate to all situations. The concepts and knowledge contained in the guidance will improve as the ability to engage more comprehensively with audiences such as the Aboriginal and Torres Strait Islander populations matures and as knowledge about the underlying drivers of climate and disaster risk broadens across society. No liability is accepted for any loss or damage arising from connection with the use of information in all guidance documents.

#### **Citation**

Australian Government, Department of Home Affairs. 2019. Climate and Disaster Risk: what they are, why they matter and how to consider them in decision making. 1 Introduction

# Foreword

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The risk landscape is changing quickly, and the stability of natural, social and economic systems can no longer be taken for granted. The scale and seriousness of the momentum of change, requires genuine national collaboration, a broad range of knowledge and strategic guidance on navigating growing uncertainty.

Choices made at multiple levels by a wide range of decision makers in both government and industry interact to affect our vulnerability and resilience. Better decision making, guided by new forms of systemic risk governance, assessment and management are key to preventing and reducing climate and disaster risk.

Led by the National Resilience Taskforce and released in April 2019, the co-developed *National Disaster Risk Reduction Framework* (Framework) sets a common agenda for collective action. This new Framework is in part informed by the report *Profiling Australia's Vulnerability* that reflects a fuller understanding of systemic disaster risk and values, choices and trade-offs.

*Profiling Australia's Vulnerability* brings into sharp focus the reality that hazards lead to disaster where there is exposure of a vulnerable society and where the consequences exceed people's capacity to cope. The report also finds that what we value, and the choices that we make between these values, are different during periods of stability compared with disruption. Understanding this can help reframe how we approach climate and disaster risk reduction efforts into a whole-of-society approach.

The Framework sets a foundation for action for decision makers across all sectors of the Australian economy. It seeks to raise awareness of the causes and effects of climate and disaster risks and to enable decision makers to proactively take steps within their spheres of influence and control to reduce these.

To support its implementation and encourage new conversations about climate and disaster risk, a set of interconnected guidance documents has been developed.

This Guidance is foundational and is a first iteration. It is designed to help decision makers in the non-trivial task of contextualising the systemic physical impacts of a changing climate. In particular, it provides direction on how to call upon knowledge, capabilities and processes to apply climate and disaster risk to governance, strategic planning and investment decisions.

As you *Turn the Page*, you will be contributing to the journey from where we are now, to where we need to be.

**Mark Crosweller AFSM**

*Head of National Resilience Taskforce  
Department of Home Affairs*

# Turning the Page

## Reducing Systemic Climate and Disaster Risk for a Resilient and Prosperous Australia

### Momentum is Building

The risk landscape is changing quickly and we need to break from business as usual.

-  Natural hazards are more frequent and intense
-  Demand is growing to address financial impacts of a changing climate
-  People, livelihoods and assets are more exposed and vulnerable
-  Essential services are increasingly hyper-connected
-  Disaster impacts are long-term and complex
-  Costs of disasters are growing
-  Stability of natural, social and economic systems can no longer be taken for granted

"Where and how we place ourselves on the landscape really does matter."

Fragmented framings of risk

Emphasis is on response and recovery

Decision processes not geared to strategic climate and disaster risk

Knowledge, models, tools and standards becoming insufficient

Growing dependency on infrastructure vulnerable to disruption

System does not adequately discourage the creation and transfer of risk

Where we are now





**Where we need to be**

## We are Aspiring Towards

A systems and values-based mindset reduces climate and disaster risks.

-  Risk-informed sustainable development
-  Substantial reduction in loss and harm
-  Successfully living with natural hazards and a changing climate
-  Reduced intergenerational vulnerability
-  Wellbeing, trust and confidence





# Contents

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## Approach to developing the guidance

This set of guidance documents has been developed through inclusive and participatory stakeholder engagement with the private sector, federal, state and local governments, community groups and research agencies. This consultation involved a national survey, meetings, workshops and focus groups, along with extensive review of published reports, other guidance, journal articles and leading best practice.

It has been constructed by drawing from existing capabilities, resources, decision processes and initiatives to complement existing practices and enable the implementation of the National Disaster Risk Reduction Framework.



# 1. Climate and Disaster Risk

**'Climate and disaster risk' refers to the potential impacts of natural hazards and climate change on exposed or vulnerable people, communities, assets, natural environments and socio-economic activities and services<sup>1</sup>. Climate and disaster risks are systemic risks.**

Climate change introduces novel hazards and disaster risks that incrementally compromise the capacity and stability of natural environments. Widespread coastal inundation due to sea level rise, ecosystem disruption or collapse due to critical thresholds being exceeded (e.g. coral ecosystems), and climate-sensitive vector-borne diseases are a few examples<sup>2</sup>. The accumulation chronic risks such as these can ultimately lead to sudden, catastrophic and often irreversible change. The social and economic risks can be far-reaching for economies that depend on safe and reliable essential water services, agriculture, fisheries or tourism provided by healthy stable ecosystems.

Natural hazards are also changing – and quickly. Unprecedented heatwaves, tropical cyclones, floods, storms, bushfires and drought are regular occurrences. So-called *rare* events are occurring more often and with greater intensity, and some events have characteristics not seen or experienced before. These changes are already negatively impacting the livelihoods and collective wellbeing of communities and economies around the world.

There is also greater potential for harm. Australia's population is growing and ageing. The demand for infrastructure is growing. Existing infrastructure is ageing. Systems that deliver essential goods and services are increasingly interconnected and interdependent. Society is increasingly reliant and hyper-connected to these essential services. We are becoming *more* vulnerable to these hazards.

Despite Australia's world-leading emergency response plans and capabilities, these changes in exposure and vulnerability are already stretching resilience and the capacity of individuals, communities and the emergency services to cope.

There are many challenges created by the uncertain, ambiguous, widespread and chronic nature of these changing conditions. Arguably, among the most consequential and urgent of these is the nation's limited capabilities for assessing, managing and governing the systemic implications of climate and disaster risks.

Current approaches to climate and disaster risk measurement and management are inadequate. Existing knowledge, models and tools are insufficient. This is limiting the development of legitimate, credible options for reducing climate and disaster risk.

These guidance materials are designed to be a foundation to build capability for collective action across all sectors.

A foundation needed to reduce systemic climate and disaster risk for a resilient and prosperous Australia.

## Did you know?

People, agencies and asset owners in many sectors, regions or jurisdictions are either contributing (often inadvertently) to creating climate and disaster risks or are affected by these risks. This is largely because climate and disaster risks have not yet been adequately considered in the choices made about where infrastructure and social and economic activities are located and how they are designed and operated.

<sup>1</sup> This definition is based on the definitions of the UNDRR and the IPCC available respectively at <https://www.preventionweb.net/terminology/view/7818> and <https://www.ipcc.ch/report/ar5/wg2/>

<sup>2</sup> Resources for the Future report available at: <https://www.rff.org/publications/issue-briefs/ecosystem-services-and-climate-adaptation/>



## 2. The need for strategic practices

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**To reduce the impacts of climate and disaster risk, it is essential to understand the decision-making points where risk is created and the things of value that are affected and who bears these costs. There is a need to cultivate strategic climate and disaster risk assessment practices**

Traditionally, a focus has been on empowering the individual or community to increase their resilience – ensuring Australians can ‘bounce back’ from disasters. This is the point where harm is *experienced*, but it is not the only point at which risk of harms are *created*.

Decisions taken at multiple levels by different actors, whether local, state or industry, affect our exposure and vulnerability. These include decisions associated with land-use planning, building standards and infrastructure design, urban and regional development and asset management and investments.

When the systemic causes of climate and disaster risk are not adequately considered in the early stages of decision-making processes, new risks are created and those already embedded in society and the landscape are reinforced.

Important aspects about what people value or aspects of social wellbeing are often ignored because they are difficult to quantify. Many current practices favour economic measures. Human values can be overlooked where they cannot be captured by standard metrics. Existing methods to assess non-economic loss cannot adequately reveal what matters to people in their daily lives, neither today, nor in the future.

Continuing to focus on the specific resilience of particular assets, individuals or communities, to particular known hazards is not enough. Especially when the levers to reduce the causes and effects of these risks are outside the influence or control of those being affected or those mandated to manage risks.

The climate is changing and resource demands of growing populations are expanding. We can no longer rely on the stability of social, economic and natural systems. There is an urgent need to make ambitious collective, transformative decisions in the face of deepening uncertainty. We need to break from business as usual and aspire towards a systems and values-based mindset to collectively resolve tensions about how best to reduce the causes of these risks.

### 3. The Guidance

The first of their kind, this set of Guidance documents is designed to help you consider climate and disaster risk in strategic planning and investment decisions through:

- more holistically understanding the systemic nature of climate and disaster risk using a systems- and values-based approach to assessment and collaboration;
- explicitly revisiting the appropriateness of goals, objectives and decision criteria of relevant stakeholders in the context of changing climate and disaster risk;
- recognising what aspects of uncertainty matter when making strategic long-term decisions and how to apply techniques to make robust decisions in lieu of complete knowledge; and
- understanding what types of knowledge and information are important for different stages of strategic plans or risk assessments.

There are four substantive components to the set of Guidance: Governance, Vulnerability, Scenarios and Prioritisation.

A document containing terms and concepts helps convey the meaning and intent of the core ideas and premises to climate and disaster risk.

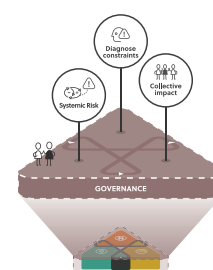
Each Guidance document can be read and applied independently or as an integrated set. Elements within each Guidance document can be used separately if desired.



**Figure 1:** The set of Guidance documents for enabling strategic climate and disaster risk assessment based on iterative and adaptive learning

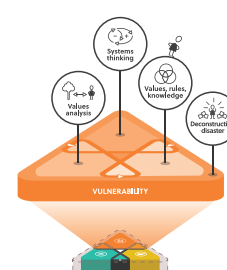
## Guidance on Governance

Introduces the concept of systemic risk governance in the context of climate and disaster risk. It explains some of the limitations of existing risk governance including some traditional risk assessment approaches for dealing with systemic risks. It summarises novel approaches that are emerging to help decision makers diagnose and strategically work towards overcoming the governance barriers that may be preventing them from taking action on climate and disaster risks. A range of roles and responsibilities are also identified that public and non-public organisations can play in climate and disaster risk governance.



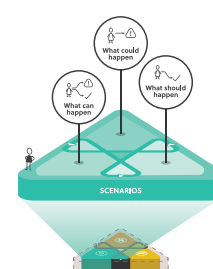
## Guidance on Vulnerability

Focuses on the least understood dimension of disaster risk, namely societal vulnerability, to complement and strengthen existing risk-based approaches. It provides a range of ways to understand underlying causes of vulnerabilities to climate impacts, natural hazards and disaster. It aims to build an understanding of how societal rules, values and knowledge incentivise and inform trade-offs and decisions. Decisions that create or reduce vulnerabilities in interconnected social, ecological and infrastructural systems. The Guidance on Vulnerability provides structured frameworks and a workshop process. It aims to help decision makers, researchers and practitioners work together to understand and assess the root causes and effects of vulnerability, now and in the future. It also helps identify possible priority interventions to reduce climate and disaster risks.



## Guidance on Scenarios

Provides detail about how to develop and apply different kinds of scenarios for different purposes. It explains how scenarios can be used to explore the potential implications of highly uncertain changes in hazards, exposure or vulnerability under a changing climate. It aims to help the navigation of high-stakes strategic and operational decisions. It emphasises the importance of using scenarios to develop aspirational futures or visions that inform goals and decision criteria to guide collective and adaptive actions. The Guidance on Scenarios acknowledges that multiple distinct futures are possible, and there is no way of foretelling which future could come about. Therefore, it emphasises how important scenarios are for enabling robust, low-regrets decisions in the context of such uncertainty. Several questions sequentially guide the user through this guidance (i.e. what could happen, what should happen, what can happen).

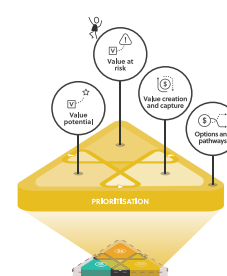


*Note: Some sections of this guidance are technical and have been included for those familiar with scenarios to leverage or evolve their existing use to better support more robust decision making and adaptive learning.*

## Guidance on Prioritisation

This guidance encourages users to revisit, program and project investment objectives by shifting the focus from 'assets' (economics) to 'services and communities' (vulnerability). A Prioritisation Framework is provided that allows users to evaluate interventions ('options and pathways') based on how much they reduce vulnerability ('value at risk') and the economic net benefits created ('value potential').

*Note: Much of this guidance is technical and has been included for decision makers seeking to navigate high levels of uncertainty for large-scale investments to realise social and economic outcomes.*



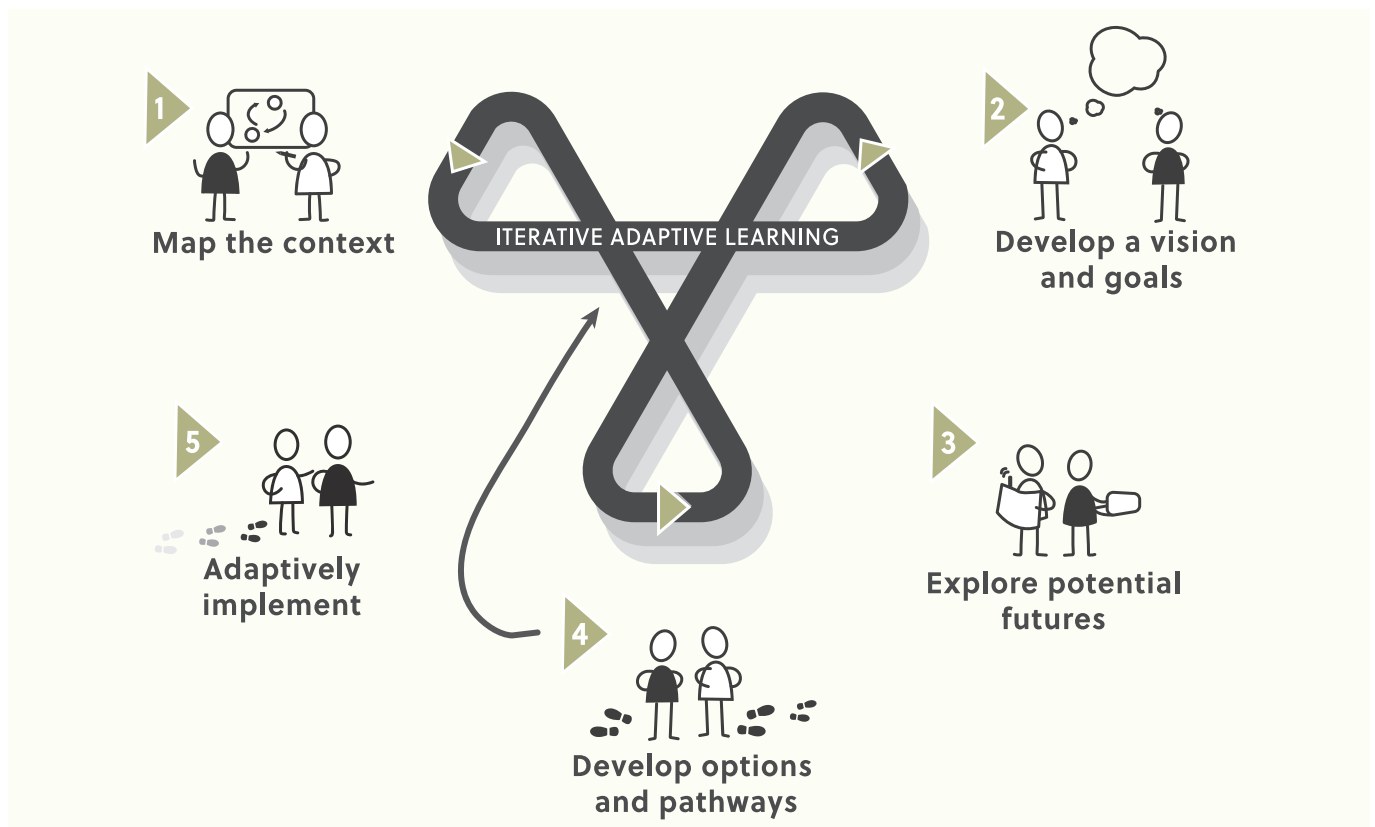


**The application or use of all the Guidance documents, whether in parts, individually or as an integrated set – is predicated on an iterative, adaptive learning approach. Learning by doing.**

This type of learning approach (Figure 2) is essential in an environment where the stability of natural, social and economic systems can no longer be taken for granted. As new risks emerge and known risks change or manifest in new locations, our knowledge, methodologies, tools and standards for assessing and managing risks become insufficient. An iterative, adaptive decision-making and learning approach is needed where no immediately obvious alternatives exist.

The Guidance is designed to support this adaptive approach and continually build capabilities. It does this through providing processes for the structured exploration and discovery of potential climate and disaster risk futures. It also does this in helping to draw implications for the strategic vision and objectives of policies, programs and projects of government and non-government organisations (i.e. iterations between steps 2 and 3, Figure 2).

**We need to work within our organisations and spheres of influence to evolve understanding of climate and disaster risks apply that understanding, and continually adapt our approaches as we learn.**



**Figure 2:** Schematic of the iterative and adaptive decision-making and learning steps involved in assessing and managing climate and disaster risks

## 4. Audiences of the Guidance

**The set of Guidance for strategic climate and disaster risk assessment speaks primarily to government, industry and influential community representatives (e.g. community-based organisations and not-for-profit agencies). It addresses the primary decision makers, who can influence whether risks are created or reduced and affect their potential consequences.**

While all decision makers, practitioners and researchers working to reduce climate and disaster risk will benefit from an awareness of the approaches and concepts described, the primary focus of the Guidance is on *strategic, longer-term* (lifetimes >10 years) *high-value* decisions that are being made today.

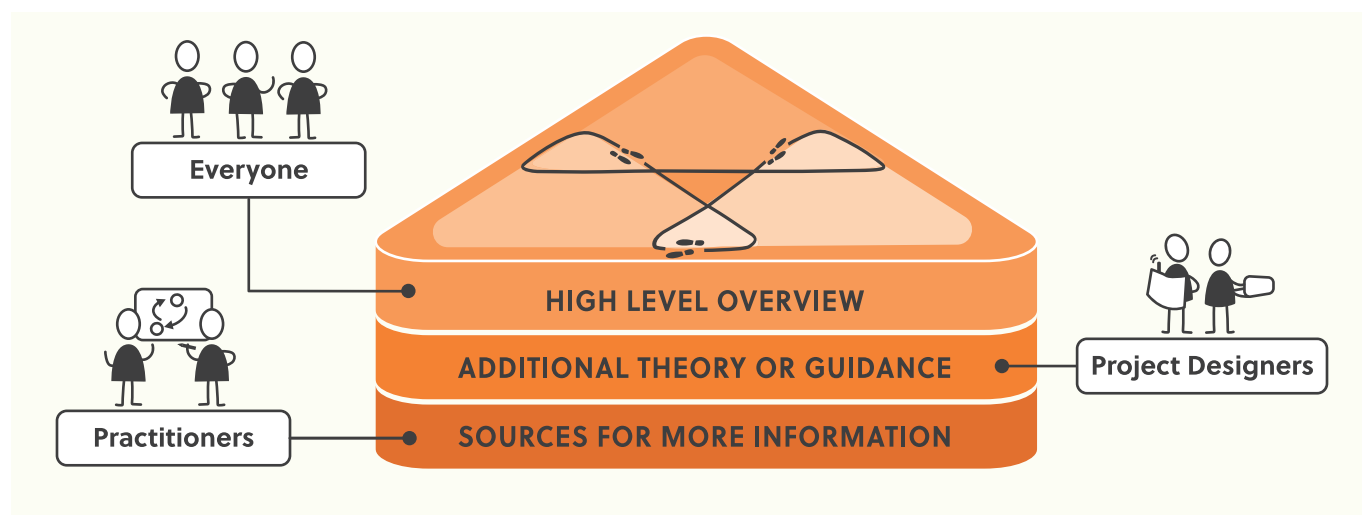
With further work and greater contextualisation, the principles and concepts could be applied to small-scale investments and more localised disaster risk assessments.

The Guidance will have relevance to leaders and assessors of risk in:

- public and private sectors required to develop effective strategic risk assessment and management plans and make complex decisions in the face of inexact (uncertain, ambiguous or contested) information
- those sectors, companies and asset owners of the Australian economy that are required to be aware, understand, disclose and be accountable for their exposure and vulnerability to climate risks, either for legal reasons (e.g. Hutley Opinion<sup>3</sup>) or as required by prudential and corporate regulators and company shareholders<sup>4</sup> (e.g. The Task force on Climate-related Financial Disclosures – refer to Guidance on Governance)
- situations where organisation, assets, sectors or regions are (becoming) exposed or vulnerable to disruption or even strategic/existential threat from climate-related shocks and stresses (e.g. the emergency management, tourism and health sectors).

<sup>3</sup> Updated Hutley opinion on directors' climate risk duties: <https://cpd.org.au/2019/03/directors-duties-2019/>

<sup>4</sup> MinterEllison has prepared a guide on climate risk disclosure to assist boards and their committees: <https://www.minterellison.com/articles/climate-risk-reporting-notes-for-directors>



**Figure 3:** Different audiences of the Guidance on strategic climate and disaster risk assessment

Each Guidance document is structured to provide advice to meet the different needs of a range of users (Figure 3).

The Guidance will be relevant to you as a senior leader or decision-maker, or from an organisation with an interest in strategic risks such as climate and disaster risk ('Everyone'). It will assist you recognise the strategic implications of natural hazards and climate change and to understand how the Guidance could be used within your organisation to do so, and to gain support from others.

Some parts of each of the Guidance documents are a bit technical and are included to provide the additional detail needed when engaging in the more complex and challenging aspects of climate and disaster risk assessment and management.

If you wish to, or have been asked to, commission a strategic climate and disaster risk assessment ('Project Designer'), the Guidance will help you understand the elements and competencies required to do so. It will enable you to effectively commission outside assistance if needed or develop the skills and capacity of employees.

If you are a facilitator or practitioner ('Practitioner'), you can use the Guidance to help deliver your desired outcomes. Additional materials are referenced that can help in either delivering or modifying some of the activities described within, while maintaining consistency with the key principles and elements of good decision making.



A full-page background image showing the silhouettes of a man and a young child holding hands, standing in a field of tall grass. They are facing away from the camera, looking towards a bright sunset or sunrise sky with scattered clouds. A single bird is visible in flight in the upper right portion of the sky.

### Key elements of good decision making

The guidance notes have been designed in order to promote 'good decisions'. Good decisions are defined<sup>5</sup> as emerging from processes in which people are:

- explicit about their goals
- consider a range of alternative options
- consider the implications of trade-offs
- use best available science to understand the potential consequences of their actions
- contemplate the decision from a wide range of views and vantages
- follow agreed-upon rules and norms that enhance the legitimacy of the process and its outcomes.

## 5. Navigating the Guidance

The Guidance documents have been designed to align with and supplement existing sectoral, regional, organisational or jurisdictional decision processes and practices (including but not limited to the National Emergency Risk Assessment Guidelines (NERAG), Climate Compass, the Australian Transport Assessment Framework, the Infrastructure Australia Assessment Framework or other strategy development, planning, project or risk assessment approaches). However, they also provide suggested enhancements informed by current best practice<sup>5</sup>.

There are two pathways through which the Guidance can be used to consider climate and disaster risk in decisions, Pathway A and Pathway B. These are shown in Figure 4. The two pathways allow for a number of entry points to consider climate and disaster risk in the following four decisions processes:

- strategy development
- policy choices and planning
- project prioritisation
- strategic risk management processes

### **Pathway A:**

directly explore strategic and systemic implications of climate and disaster risk on (organisational, sectoral, regional, jurisdictional or project) goals, objectives and intervention options.

### **Pathway B:**

complement existing risk assessment and management practices and indirectly affect the strategic goals, objectives and investment pathways of organisations, sectors, regions and jurisdictions.

### **Pathway A or B?**

The choice of pathway depends on your role, purpose, organisational culture and capacity, and the decisions you need to make.

A quick look-up table has been provided to help you quickly navigate to Guidance of interest.

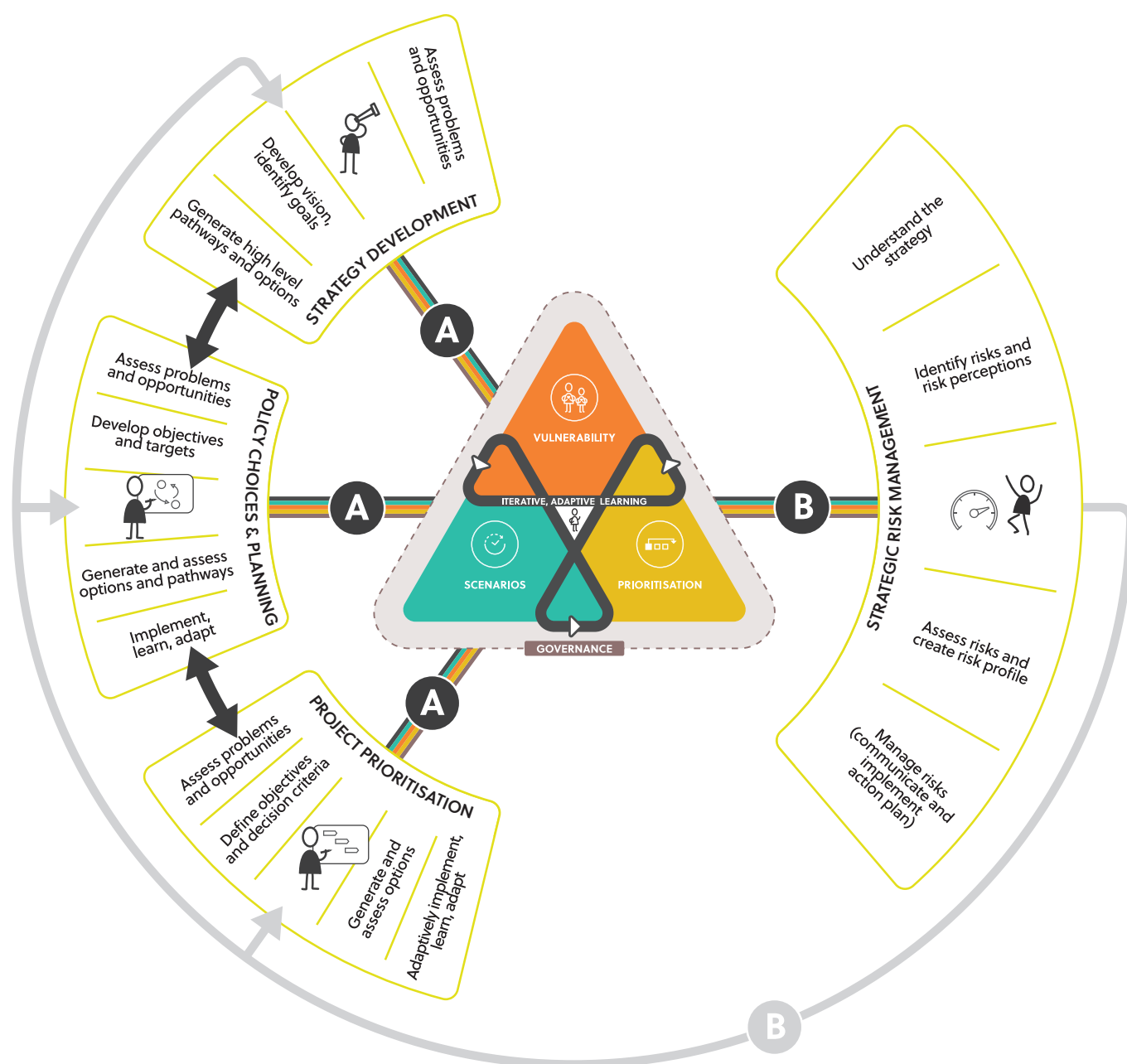
The decision processes within Pathway A and Pathway B have several areas of interest in common. For example, developing a vision, identifying goals and decision criteria, assessing problems and identifying and prioritising options and pathways. However, these common areas or activities generally need to be done at a different spatial scale and level of detail for each decision process.

For example, the development of a strategy provides the higher-level vision and strategic intent that informs the more detailed and targeted development of policies and plans to implement the strategy. The project prioritisation process involves detailed assessments of specific projects to realise a plan.

Strategic risk assessments are generally undertaken after a strategy or plan has already been developed and provides a good opportunity to revisit the appropriateness of the goals, decision criteria or investment strategy in the context of growing external risks such as climate and disaster risks.

**There are two pathways through which the Guidance can be used that provide multiple entry points to enable consideration of climate and disaster risk in decisions.**

<sup>5</sup> This is done where experiences and leading practices in climate and disaster risk reduction provide the evidence base to support such an action.



**Figure 4:** Two pathways – multiple entry points – to enable consideration of climate and disaster risk in decisions



## The Guidance has been designed so that it can be called upon to support all or some of these general steps at different scales and levels of detail.

Some example applications are provided:

- The Guidance on Scenarios and the Guidance on Vulnerability can help decision makers incrementally work through how the uncertain and potentially large-scale effects of climate and disaster risks could affect their agency's or sector's strategic visions, goal or objectives (i.e. Pathway A).
- The Guidance on Prioritisation could be used to help identify opportunities for an agency to create and capture value from mitigating climate and disaster risks (i.e. Pathway A), or to diagnose how certain choices may create or transfer vulnerabilities for others, or how assets or staff may be exposed or vulnerable to changing natural hazards for example (i.e. Pathway B).
- Considering multiple plausible scenarios of the future, described in the Guidance on Scenarios, combined with Guidance on Vulnerability and Guidance on Prioritisation can be helpful to reveal a number of options and pathways that are adaptive or robust for mitigating or reducing disaster risk (i.e. Pathway A or B).
- The set of Guidance could also be used to incorporate greater knowledge of systemic vulnerability into the existing state-based risk assessment approaches using NERAG (i.e. Pathway B), or could be used to draw a disaster perspective and a vulnerability perspective into the steps and approaches described within Climate Compass: A climate risk management framework for Commonwealth agencies (i.e. Pathway B).



## A one-page-stop to help you find the sections in the guidance relevant to you.

### What is climate and disaster risk?

Introduction to guidance:  
Climate and Disaster Risk

1.0

Guidance on Scenarios:  
Natural hazards under  
climate change

4.2

Terms and Concepts

### Is climate disaster risk relevant to me?

Introduction

Guidance on Governance:  
Challenges created by existing  
governance

2.0

Guidance on Vulnerability:  
Values analysis

3.0

Guidance on Scenarios:  
Decisions and uncertainty

2.0

Guidance on Prioritisation:  
Principles of vulnerability

2.0

### Where do I start?

Introduction to guidance

Guidance on Governance:  
Navigating governance  
constraints

3.0

Guidance on Vulnerability:  
Deconstructing disaster  
workshop

2.0

Guidance on Scenarios:  
Different Types of Scenarios

3.0

### I need to understand...

#### ...how to consider uncertainty in my decisions

Introduction:  
Audiences of the Guidance

4.0

Guidance on Scenarios:  
Introduction

1.0

Guidance on Governance: Risk  
matrices (Time to move beyond  
them, or at least repair them)

6.1

Guidance on Vulnerability:  
Systems thinking

4.0

Guidance on Vulnerability:  
Learning into the future

6.0

Guidance on Scenarios:  
Decisions and uncertainty

2.0

Guidance on Scenarios:  
Applying Scenarios to Climate  
and Disaster Risk

4.0

Guidance on Prioritisation:  
Responding to uncertainty

3.0

#### ...how to prioritise investments

Guidance on Governance:  
Overcoming governance  
constraints

3.2

Guidance on Governance: Risk  
matrices (Time to move beyond  
them, or at least repair them)

6.1

Guidance on Vulnerability:  
Deconstructing disaster  
workshop

2.0

Guidance on Vulnerability:  
Applying the values framework

3.6

Guidance on Vulnerability:  
Systems patterns

4.6

Guidance on Scenarios:  
Scenarios of aspirational futures

4.1

Guidance on Scenarios:  
Scenarios of climate and  
disaster risk reduction

4.6

Guidance on Prioritisation

Guidance on Prioritisation:  
Cost benefit analysis insufficient  
on its own

9.1

Guidance on Prioritisation:  
The importance of rates  
of return

9.2

#### ...what tools will help me

Guidance on Governance:  
Navigating governance  
constraints

3.0

Guidance on Governance:  
Collective impact

3.2

Guidance on Vulnerability:  
Deconstructing disaster  
workshop

2.0

Guidance on Vulnerability:  
Values analysis

3.0

Guidance on Vulnerability:  
Systems thinking

4.0

Guidance on Vulnerability:  
Values, rules and knowledge

5.0

Guidance on Vulnerability:  
Learning into the future

6.0

Guidance on Scenarios:  
Different Types of Scenarios

3.0

Guidance on Prioritisation:  
A prioritisation framework

5.0

Guidance on Prioritisation:  
Alternative funding pathways

6.0

