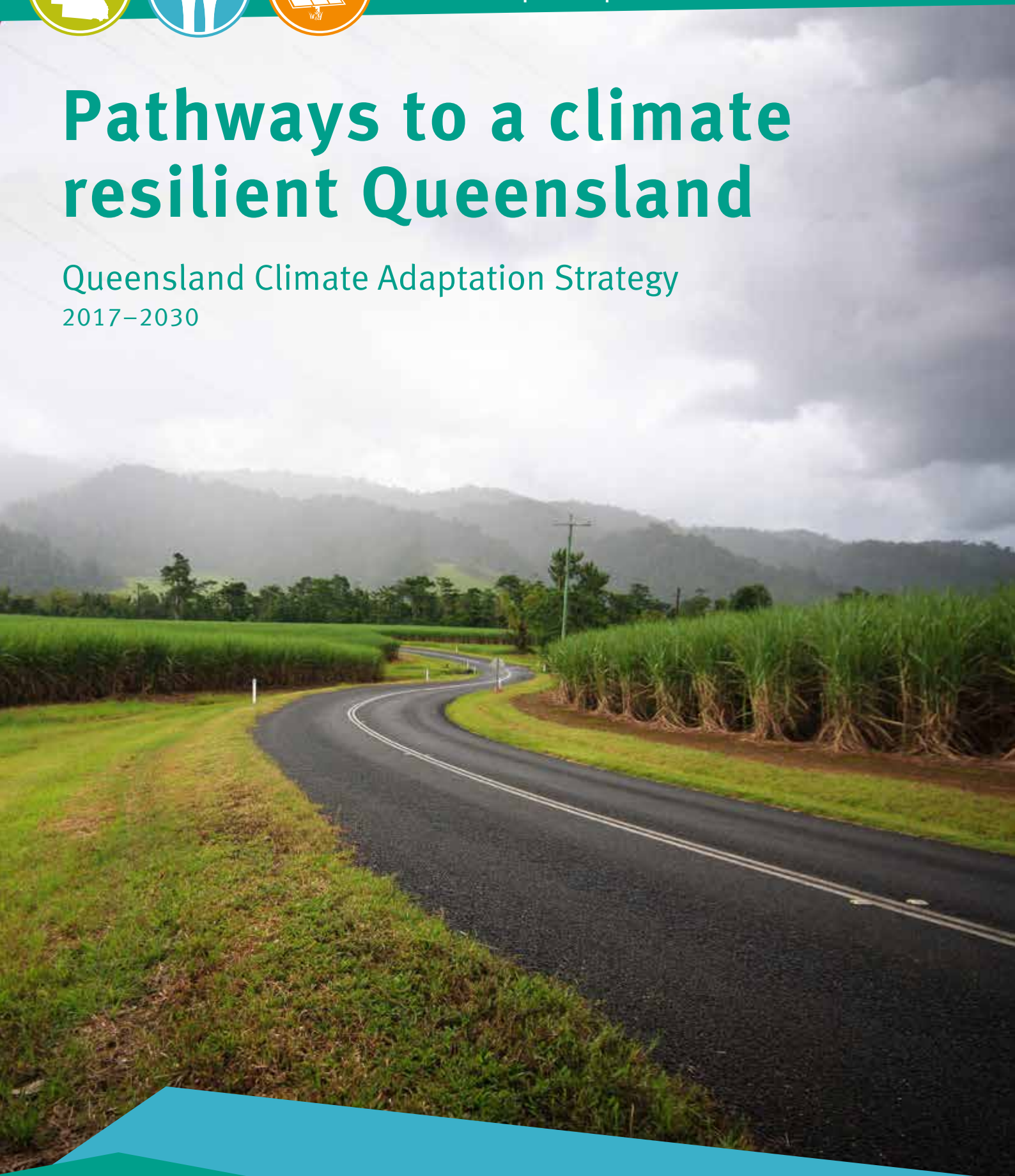
Department of Environment and Heritage Protection

UNDERSTAND | ADAPT | TRANSITION

Pathways to a climate resilient Queensland

Queensland Climate Adaptation Strategy
2017–2030



Climate Change

Queensland Government

Minister's Foreword

Queensland's climate is changing and adaptation action is essential for the continued prosperity of our communities, our environment and our economy.

The Queensland Climate Adaptation Strategy (Q-CAS) is a central component of Queensland's Climate Change Response, together with the Queensland Climate Transition Strategy that will guide our transition towards a zero net emissions economy.

The Q-CAS will help Queenslanders prepare for current and future climate changes by understanding the impacts, managing the risks and harnessing the opportunities.

The Queensland Government is leading by example, embedding adaptation actions in its policies and planning to protect critical infrastructure, public assets and services.

We will continue to work 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.

I would like to acknowledge the contribution of the Q-CAS Partners group, which has been instrumental in the development of this Strategy and will continue to provide a leading role in its implementation.

Successful adaptation relies on everyone playing their part and committing to a process of continuous improvement to help protect the people and places we love and Queensland's way of life.

Steven Miles MP
Minister for Environment and Heritage Protection and
Minister for National Parks and the Great Barrier Reef

Q-CAS Partners' Foreword

The Queensland Climate Adaptation Strategy Partners group was established to work with the Queensland Government towards the development of a Queensland Climate Adaptation Strategy (Q-CAS). The Partners, listed on page 4, include leaders from industry, community, and research sectors, who agreed to work together with Queensland Government to prepare a collaborative adaptation strategy. It has been an honour to hold the position of Chair over the past couple of years and be part of the development of the Strategy.

The development of the Q-CAS has been informed by a set of core principles around the central rule that adaptation is best achieved through collaboration, with responsibilities shared between all levels of government, industries and communities. Since the group's inception, the Q-CAS Partners have provided their expertise to build on the innovation and actions already underway within the members' various organisations and sectors. They have done this by fostering a partnership with government, and working within and across sectors and regions, to:

- host a large scale South East Queensland Adaptation workshop to gather innovative adaptation ideas,
- develop two pilot Sector Adaptation Plans for the agriculture and built environment and infrastructure sectors, and
- launch a Queensland Climate Resilient Council program.

These actions could not have been achieved without the expertise and dedication of the Q-CAS Partners. The members have also given their time and resources, amongst other things, to review draft Q-CAS material, provide meeting spaces, and facilitate meetings and workshops.

The Q-CAS Partners have developed into a valuable inter-organisational and inter-sectoral network that shares best practices, ideas and experience. The partnership has set an excellent example of how collaborative problem solving can be applied to deal with climate risk.

We are now at a time when we see the private sector proactively responding to climate change, and the Q-CAS Partners are committed to continuing to work together as we proceed towards the implementation of the Strategy.

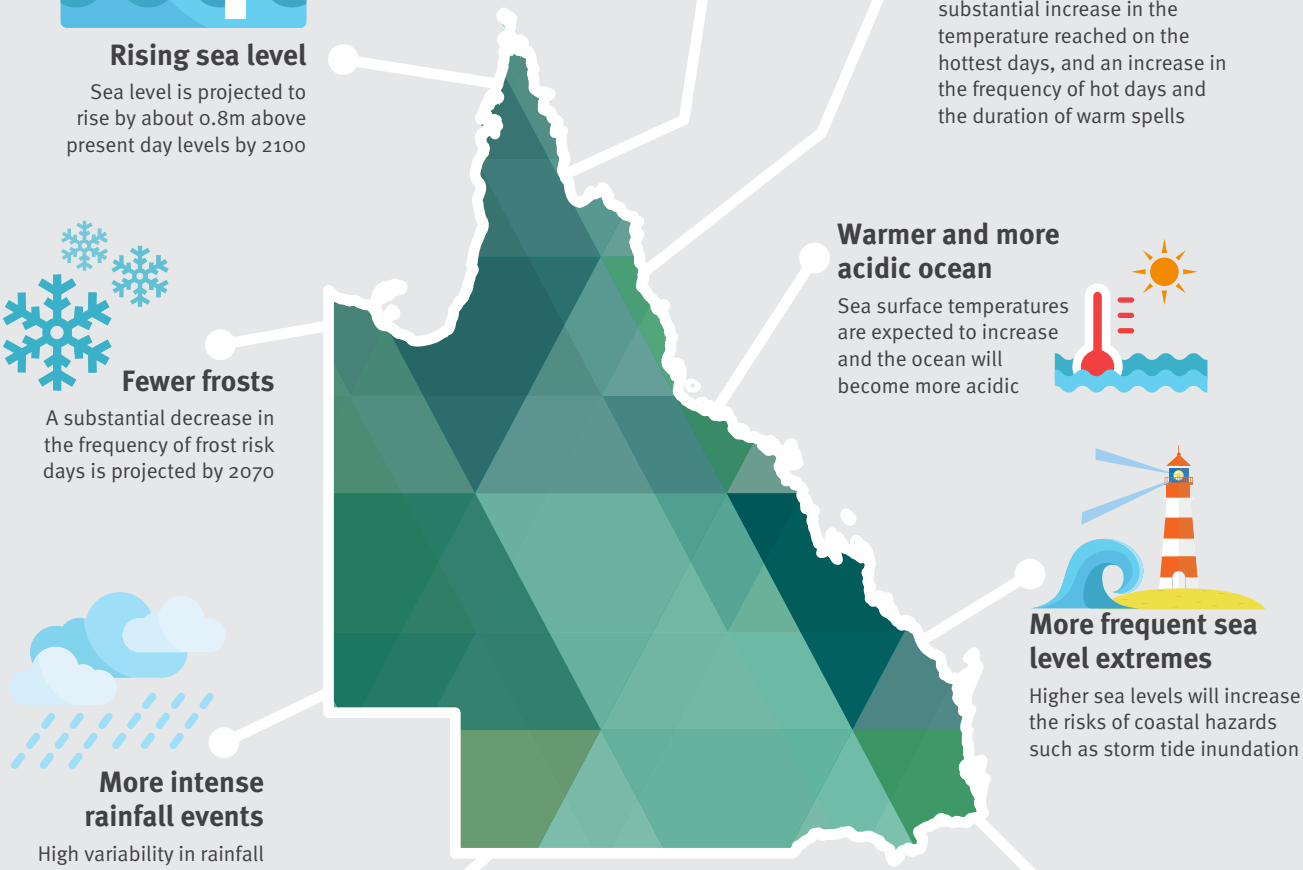
Mark Baker-Jones,
Partner, DibbsBarker
Chair, Q-CAS Partners

Q-CAS Partners

The Q-CAS Partners are representatives from local government, business, industry and the community, who recognise the need for everyone to take action to deal with climate impacts. The Q-CAS Partners meet regularly to promote climate adaptation action within their sector and to collaborate with representatives from other sectors and interests.

- AgForce
- Chamber of Commerce and Industry Queensland
- CSIRO
- DibbsBarker
- Ergon
- Green Cross Australia
- Growcom
- Insurance Council of Australia
- Lendlease
- Local Government Association of Queensland
- National Climate Change Adaptation Research Facility
- Office of the Queensland Chief Scientist
- Planning Institute of Australia
- Property Council of Australia
- Queensland Conservation Council
- Queensland Council of Social Services
- Queensland Council of Unions
- Queensland Farmers' Federation
- Queensland Resources Council
- Queensland Tourism Industry Council
- Queensland Youth Climate Coalition
- Red Cross
- Regional Groups Collective
- Seqwater
- Stockland
- Suncorp
- Torres Strait Regional Authority
- Volunteering Queensland
- World Wildlife Fund

AS QUEENSLAND'S CLIMATE CHANGES, WE CAN EXPECT:



Higher temperatures
Maximum, minimum and average temperatures are projected to continue to rise

Hotter and more frequent hot days
There is likely to be a substantial increase in the temperature reached on the hottest days, and an increase in the frequency of hot days and the duration of warm spells

Rising sea level
Sea level is projected to rise by about 0.8m above present day levels by 2100

Warmer and more acidic ocean
Sea surface temperatures are expected to increase and the ocean will become more acidic

Fewer frosts
A substantial decrease in the frequency of frost risk days is projected by 2070

More frequent sea level extremes
Higher sea levels will increase the risks of coastal hazards such as storm tide inundation

More intense rainfall events
High variability in rainfall will continue. The intensity of heavy rainfall events is likely to increase

More drought
By late this century, under a high emissions scenario, it is likely that the south of the state will experience more time in drought

Harsher fire weather
Climate change is likely to result in harsher fire weather in the future, reflecting fuel dryness and hot, dry, windy conditions

Average temperatures in Queensland have already increased by approximately 1°C over the past 100 years. [1]	Between 2011 and 2016, 45 extreme weather events have caused $13 billion in damage to public assets and infrastructure.[2]	Insured damage to private assets in declared disaster events is valued at $8.6 billion in the 10 years to 2016. [3]

Queensland in 2030
In 2030, under a high greenhouse gas emissions scenario, Brisbane's climate is projected to be more like the current climate of Bundaberg, and the climate of Cairns more like the current climate of Cooktown.[4]

[1] Climate change data and projections are based on Climate Change in Australia data from CSIRO and the Bureau of Meteorology. More detailed information on these and other climate variables is available at *www.qld.gov.au/environment/climate/climate-change*.
[2] Queensland Reconstruction Authority
[3] Suncorp
[4] Climate Change in Australia (Bureau of Meteorology and CSIRO).

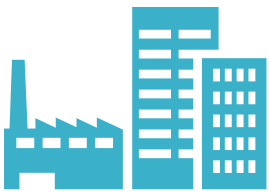
Climate risks and opportunities

Climate change is an amplifier of existing climate variation and will affect Queensland's diverse communities, regions and industries in different ways, presenting both opportunities and risks.

More frequent sea level extremes may increase the risk of coastal hazards such as storm tide inundation and erosion events, resulting in increased clean-up and maintenance costs. Flooding events could affect critical infrastructure such as water, sewerage, storm water, transport and communications, and some inland areas are likely to face increased bushfire risk. These changes may increase the cost of insurance to business and the community.

Degradation of the natural environment and biodiversity loss are threats to Indigenous cultural values and practices. Sea-level rise will pose a challenge for low-lying coastal communities.

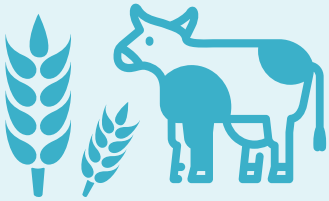
Increases in temperature may alter the tourist season in some regions. Increased bushfire and flooding risk may threaten tourism infrastructure and damage popular tourist sites.



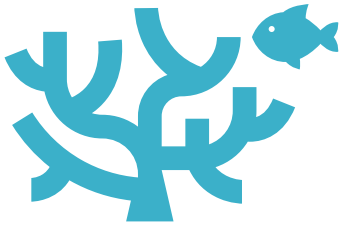
Extreme events may damage workplaces, equipment and facilities. Increased frequency of flooding and inundation, bushfires and heatwaves may disrupt supply chains, presenting difficulties for businesses, staff and customers.

Projected increases in tropical cyclone and storm intensity and sea-level rise will see a higher risk of flooding and inundation, particularly for coastal communities. Higher temperatures and longer dry seasons will increase bushfire risk in some regions.

Higher temperatures and more hot days could result in heat exhaustion and increased heat-related mortality, particularly among outdoor workers and vulnerable people, including the very young and old. The current ranges of vector-borne diseases such as malaria and dengue fever may change in response to changing temperatures, humidity and rainfall. Similarly, some dangerous animal species may expand their ranges as air and sea temperatures rise. Rural, regional and remote communities are particularly sensitive to a changing climate.



More climate extremes and changes in rainfall variability in some regions could lead to decreased crop production, forage production, surface cover, livestock carrying capacity and animal production. Livestock may be exposed to a greater risk of heat stress in some regions. Plant diseases, weeds and pests may spread as conditions change.



Even a small rise in temperature can have serious implications for biodiversity and natural systems. Increased sea surface temperatures are likely to cause more regular coral bleaching in the Great Barrier Reef. Warming seas and increased storm tide inundation may harm coastal ecosystems.

For more detailed regionally-specific information on climate impacts and potential adaptation measures, view the Regional Climate Change Impact Summaries or the Climate Change in Queensland map application available at www.qld.gov.au/climate/climate-change

The journey so far

Over the past 10 years, successive Queensland Governments have partnered with businesses and communities to prepare for climate impacts and reduce exposure to climate risks through adaptation work and activities.

2007

- Future climate impacts start being actively considered in policy work and actions with the release of ClimateSmart Adaptation 2007-12

2009

- Additional resourcing provided by the Queensland Government to support climate-related programs through the ClimateQ strategy

2011

- Climate Change: Adaptation for Queensland issues paper released for public consultation to identify major issues and knowledge gaps

2014

- Q-CAS Partners group established to co-create a contemporary adaptation strategy and showcase adaptation leadership across multiple sectors

2015

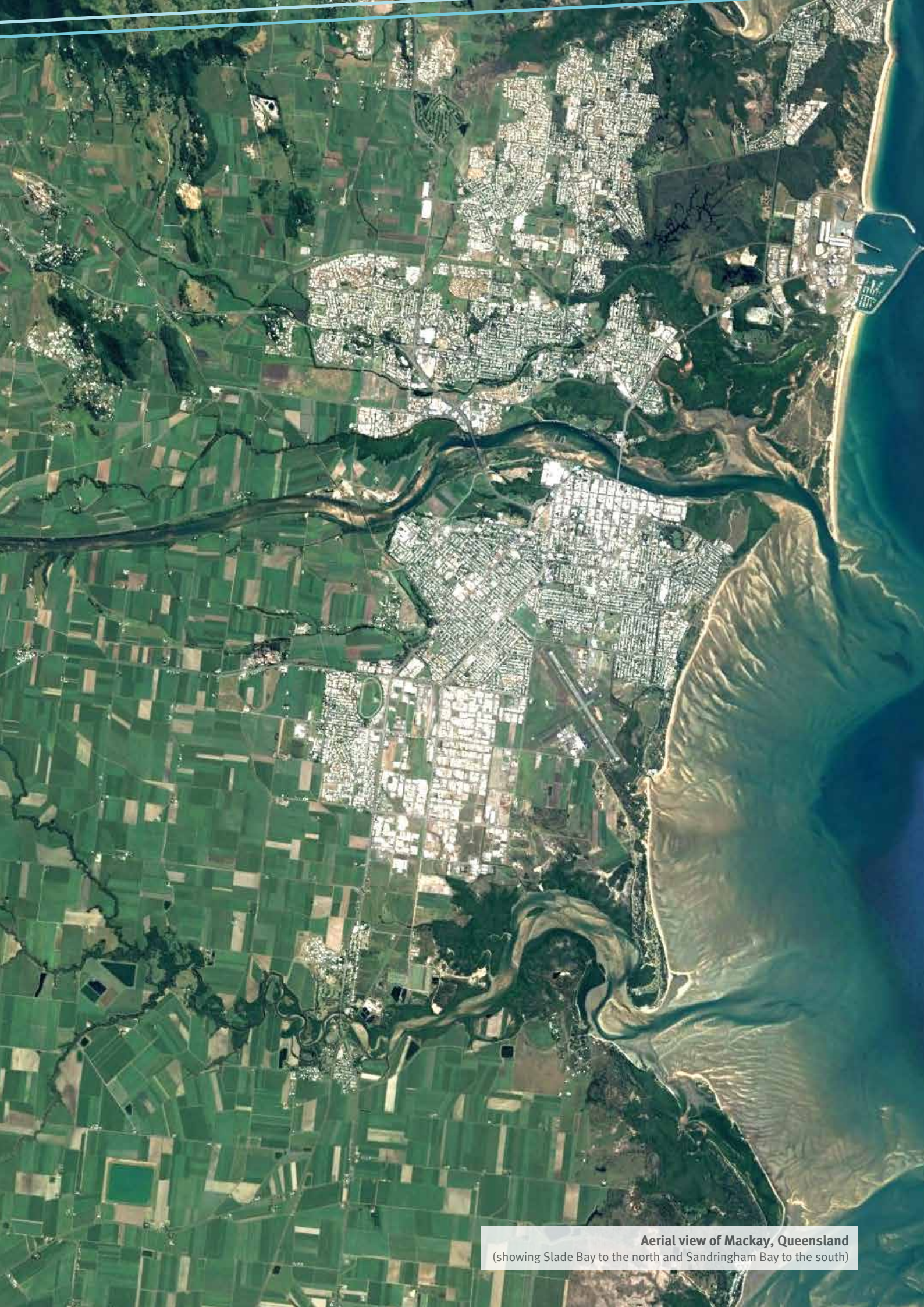
- Funded commitment to deliver a collaborative adaptation strategy together with the Q-CAS Partners
- QCoast2100 program established with $12 million funding over three years
- $3 million over three years to develop a collaborative climate adaptation strategy

2016

- Queensland Climate Adaptation Directions Statement released for public consultation
- Public consultation workshops held in locations across the state
- Regional Climate Change Impact Summaries released
- Climate Change in Queensland map application released
- Drought and Climate Adaptation Program established ($17.5 million to 2021)

2017

- Queensland Climate Resilient Councils program commenced ($903,000)
- Sector Adaptation Plans developed for Agriculture, and Built Environment and Infrastructure
- Queensland Strategy for Disaster Resilience update



Aerial view of Mackay, Queensland
(showing Slade Bay to the north and Sandringham Bay to the south)

Drivers

Global drivers

At the 21st United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties (COP21) held in December 2015, the international community unanimously adopted the 'Paris Agreement' to reduce carbon emissions and decarbonise the global economy. In addition to the mitigation of carbon emissions, the Paris Agreement also addresses adaptation issues such as enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, as well as loss and damage associated with the adverse effects of climate change and extreme weather events. The Australian Government ratified the Paris Agreement in November 2016.

Shifting global market drivers and preferences for low carbon products have the potential to influence Australia's economy, including through changing demand and prices for resources, manufactured items and agricultural products.

National drivers

The Commonwealth Government has played an important role in climate change adaptation primarily through the funding of the *National Climate Change Adaptation Research Facility* (NCCARF) and other research and development programs. These programs have delivered some of the science needed to understand adaptation across Australia. However, a commitment to these or similar programs has been less than certain in recent years and some programs, such as the CSIRO's former Climate Adaptation Flagship, have been decommissioned.

The *National Review of Climate Change Policies* does not include adaptation in its terms of reference; however, the Queensland Government will continue to advocate for the Commonwealth Government to play a robust and ongoing role in climate change policy, including providing continuing funding for NCCARF.

Other states and territories are active in developing assertive climate change policies and actions, with a number also having developed adaptation strategies. Queensland will continue to seek opportunities to collaborate and align these strategies across state boundaries.

Queensland drivers

Queensland already experiences climate extremes such as floods, droughts, heatwaves and bushfires. Climate change is likely to exacerbate the frequency and/or severity of these events, and can be an amplifier of these and other hazards. In this context, it is important to plan and take appropriate action to better manage our climate risks. Well-considered and effective adaptation measures can help manage the adverse impacts of climate change on communities, the economy and natural systems.

Many businesses, communities and local governments are already working to incorporate climate change into their planning and risk assessment processes and continue to seek increased action from the State Government. This Strategy builds on this growing momentum and the valuable collaborative approaches that have been formed by working together to plan for current and future climate impacts across different sectors and regions.


RESCUE

Our vision

An innovative and resilient Queensland that manages the risks and harnesses the opportunities of a changing climate.

Objectives—where are we headed?

This Strategy is based around four clear objectives:

RECOGNISE

Queenslanders understand the risks a changing climate presents to communities, businesses and the natural environment, and the economic opportunities for new sustainable industries.

EQUIP

Queenslanders have access to the best available science and risk-analysis tools to support adaptation decisions.

INTEGRATE

Queenslanders integrate climate adaptation considerations into policies and processes.

COLLABORATE

Queenslanders collaborate to achieve effective climate adaptation through partnerships across communities, educational institutions, governments and industries.

What do we mean by adaptation?

Climate adaptation refers to actions taken to reduce the negative impacts of climate change, or to take advantage of emerging opportunities. Adaptation involves going above and beyond traditional preparedness for climate variation, natural hazards and disaster events. It requires developing a comprehensive understanding of how a changing climate will affect Queensland, our regions and our communities, and actively working to reduce our exposure to climate risks and to capture any new opportunities. Successful adaptation to climate change is a proactive and long-term process.

Adaptation can take many forms, including changing the way we do business, constructing better infrastructure, building resilient communities, and eliminating stressors on our biodiversity and critical ecosystem services. Successful adaptation also requires that we monitor and evaluate progress so we can learn from experience and adopt actions that provide the most benefit.

Getting it right for Queensland

A coordinated approach

Queensland needs a coordinated approach to climate adaptation that recognises the state's exposure to a range of climate hazards and the great diversity of our communities, regions, natural environments and industries.

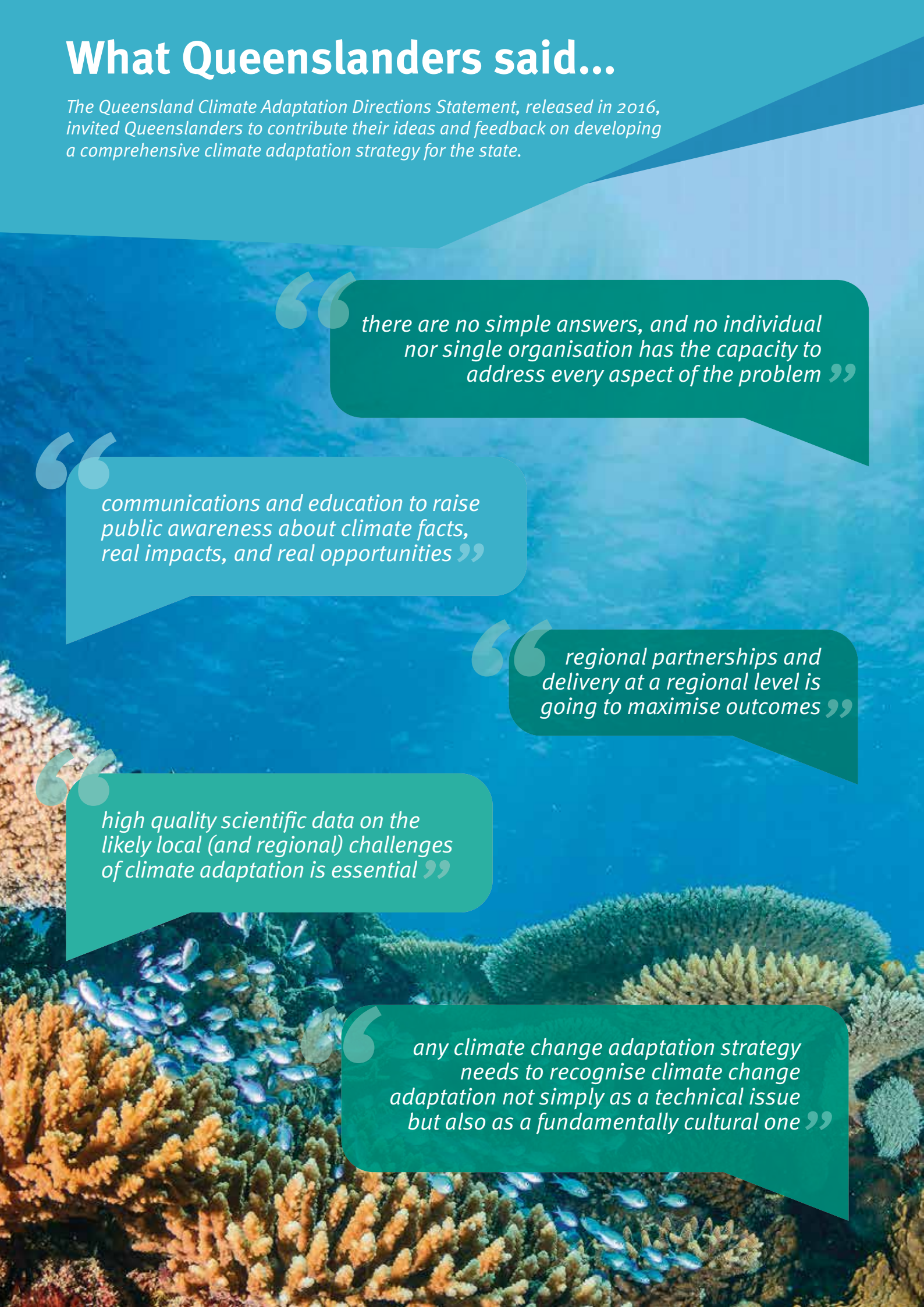
This Strategy delivers that coordinated approach by:

- putting partnerships and collaboration at the centre of adaptation planning
- ensuring adaptation policies and actions are evidence-based, led by the best available science
- demonstrating leadership through government action and planning to protect critical public assets and services
- delivering consistency in policies and programs through a whole-of-government approach
- providing an enduring commitment and the policy certainty required to inspire confidence and investment
- enabling effective climate adaptation and planning by communities, local governments and businesses.

This Strategy engages a wide range of stakeholders to deliver a truly collaborative approach delivered through partnerships and genuine engagement.

What Queenslanders said...

The Queensland Climate Adaptation Directions Statement, released in 2016, invited Queenslanders to contribute their ideas and feedback on developing a comprehensive climate adaptation strategy for the state.



> *there are no simple answers, and no individual nor single organisation has the capacity to address every aspect of the problem*

> *communications and education to raise public awareness about climate facts, real impacts, and real opportunities*

> *regional partnerships and delivery at a regional level is going to maximise outcomes*

> *high quality scientific data on the likely local (and regional) challenges of climate adaptation is essential*

> *any climate change adaptation strategy needs to recognise climate change adaptation not simply as a technical issue but also as a fundamentally cultural one*

meeting the challenges posed by climate change requires community resilience, social justice, and our stewardship of the environment to become the core yardstick of social, political, and economic decision making

Queensland Government may need to facilitate cross-sectoral, intra-sectoral and cross-departmental discussions to identify perceived vulnerabilities within the region

a 'whole-of-community' approach for the most effective outcome

the human element is integral to any discussion on climate change adaptation

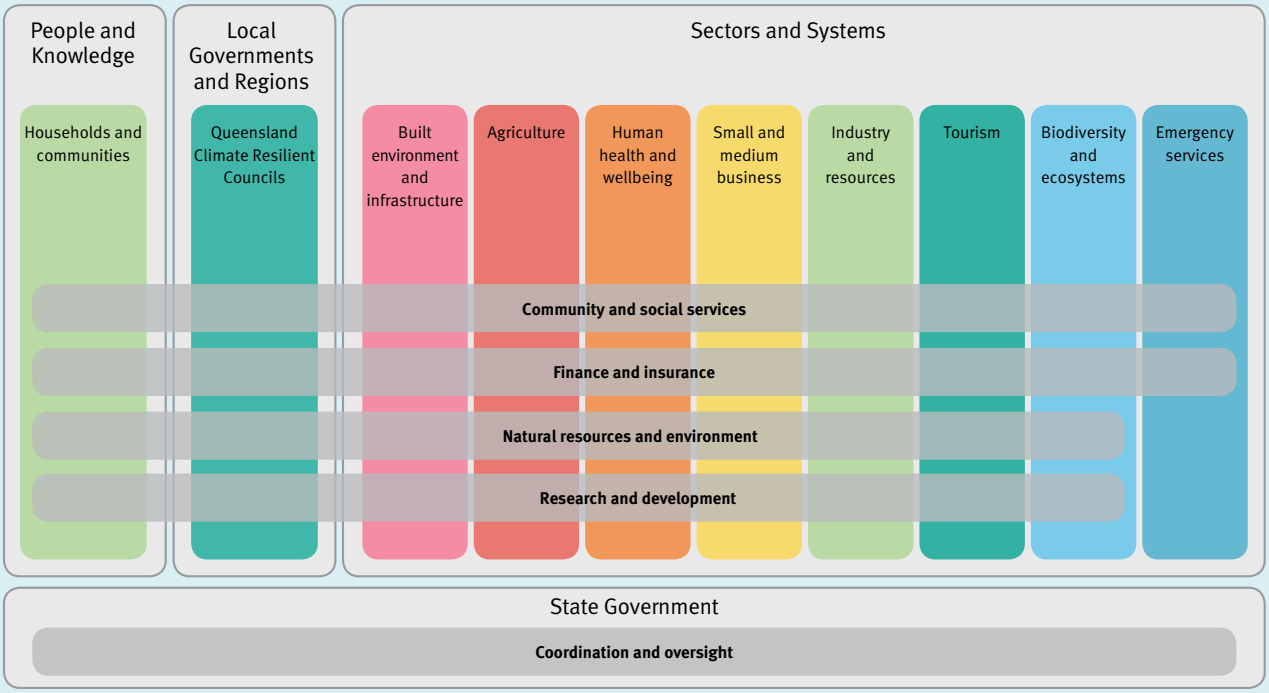
government should mobilise action for climate adaptation and lead from the front

climate policy and action require a range of methods to suit the diversity of problems

a focus should be on ecosystems, which provide both the services and resources that we all use, and helps to build community resilience

Addressing complex and cross-sectoral issues

Queensland's social, economic and environmental landscape is complex, with relationships and interdependencies across pathways, sectors and systems. These include issues relating to community and social services, natural resource management, research and development, and finance and insurance, among others. Under this Strategy, adaptation plans will be developed in partnership with key stakeholders to facilitate sectoral collaboration and identify and address common issues. Local governments will also play a key role in addressing cross-sectoral issues at the regional level.



Core principles

The following principles were developed in response to what Queenslanders told us, and will guide ongoing climate adaptation policy development and implementation.

- Adaptation programs should be risk-based and people-focused.
- A healthy natural environment is fundamental to successful adaptation, providing critical ecosystem services and support for community wellbeing.
- Adaptation involves continuous improvement.
- Adaptation responses should be evidence-based, effective, flexible, equitable, inclusive and able to respond to new information.
- Adaptation is best achieved through collaboration, with responsibility shared across all levels of government, industries and communities.
- Adaptation, resilience and risk management should be integrated into all levels of policy, planning and implementation.
- Adaptation must be sustainable and avoid perverse outcomes, including detrimental impacts on communities, other sectors, the economy or the natural environment.
- Adaptation action is complementary to mitigation action.

Setting Queensland on the adaptation path

This Strategy will deliver on the objectives through four clearly defined but complementary pathways. These pathways recognise that appropriate adaptation actions will vary across Queensland's regions, communities and economy.

People and Knowledge

Empower best-practice climate science, education and engagement to support climate risk management within Queensland's communities

State Government

Embed the consideration of climate adaptation into policies, regulations and procedures, and address risks to assets and services

Local Governments and Regions

Partner with local governments and other regional organisations to develop regional adaptation solutions, including embedding climate risk in planning and development decisions

Sectors and Systems

Assist sector leaders to collaborate with government agencies, local governments and other stakeholders to identify adaptation needs and to prioritise adaptation activities

People and Knowledge Pathway

The People and Knowledge Pathway will build upon the Queensland Government's ongoing investment in climate science to increase understanding and adaptive capacity across our communities. For example, through community engagement, supporting climate adaptation leadership and partnerships, this pathway will develop and communicate knowledge of climate change risks and responses.

This pathway will also provide tools, guidelines and climate change information to support individuals, social groups, communities, government, regions and businesses in understanding climate change, its risks and its opportunities, while acknowledging differing sources of knowledge and information requirements.

The People and Knowledge Pathway recognises that climate change risks are not spread evenly, and that Queensland's elderly, young, Aboriginal and Torres Strait Islander, homeless or otherwise marginalised community members are likely to be especially impacted.

Action

1.1	**Build adaptive capacity and resilience in communities through best-practice community engagement** • Implement a best-practice Community Engagement Plan to ensure Queenslanders are equipped with the best available information, recognise climate risks and opportunities, and integrate climate considerations into decisions. • Partner with community organisations to build resilience of individuals and communities. • Build adaptive capacity in vulnerable communities, including Aboriginal and Torres Strait Islander communities. • Work with the creative community to develop innovative programs to engage our diverse communities.
1.2	**Advance climate science** • Continue to support quality scientific research to improve knowledge of projected climate change and risks. • Work with industry, universities and research organisations to expand climate science research and expertise.
1.3	**Educate using the best climate science** • Provide the best climate science in a consistent and relatable way. • Provide relevant climate data in formats that facilitate risk-based decision making.
1.4	**Develop a climate risk toolkit** • Provide risk assessment and adaptation decision support tools to suit Queensland households and businesses. • Continue to develop resources that allow communities to recognise, equip and integrate climate change impacts and risks on a regional basis.

Improving climate information

The Queensland Government's ongoing investment in climate science has delivered important information products to support climate adaptation decisions, including:

- Regional Climate Change Impact Summaries (one statewide and 13 regional summaries)
- The Climate Change in Queensland map application
- Application-ready climate datasets.

without trust, mutual understanding and a shared vision, it is difficult to bring about change needed to enhance adaptive capacity of institutions and communities in Queensland

invest in research to provide the better information for decision making

Drought and Climate Adaptation Program

The Drought and Climate Adaptation Program (DCAP) is an initiative of the Department of Agriculture and Fisheries that improves the capacity of farmers and regional communities to become more resilient to the impacts of climate variability and drought. The Queensland Government has committed $17.5 million in funding for the program to 2021.

The program aims to:

- improve the capacity of farmers and regional communities to effectively manage climate variability and climate extremes, including drought
- help landholders adapt to a changing climate.

It includes a number of activities designed to improve the drought and climate resilience of landholders, including science information products, decision support tools, advice and workshops.

State Government Pathway

The State Government Pathway will provide a mechanism to address climate risks to a diverse array of public assets, services and functions, such as hospitals, schools, national parks, major roads, and public transport networks, among many others. The Queensland Government is committed to working closely with Queenslanders to continue to deliver quality frontline services, create jobs and build a strong economy, while protecting the environment and building safer, more resilient communities.

The Queensland Government will demonstrate leadership in climate adaptation through the Government Adaptation Action Plan (GAAP) that will provide a coordinated whole-of-government response to climate risks and opportunities.

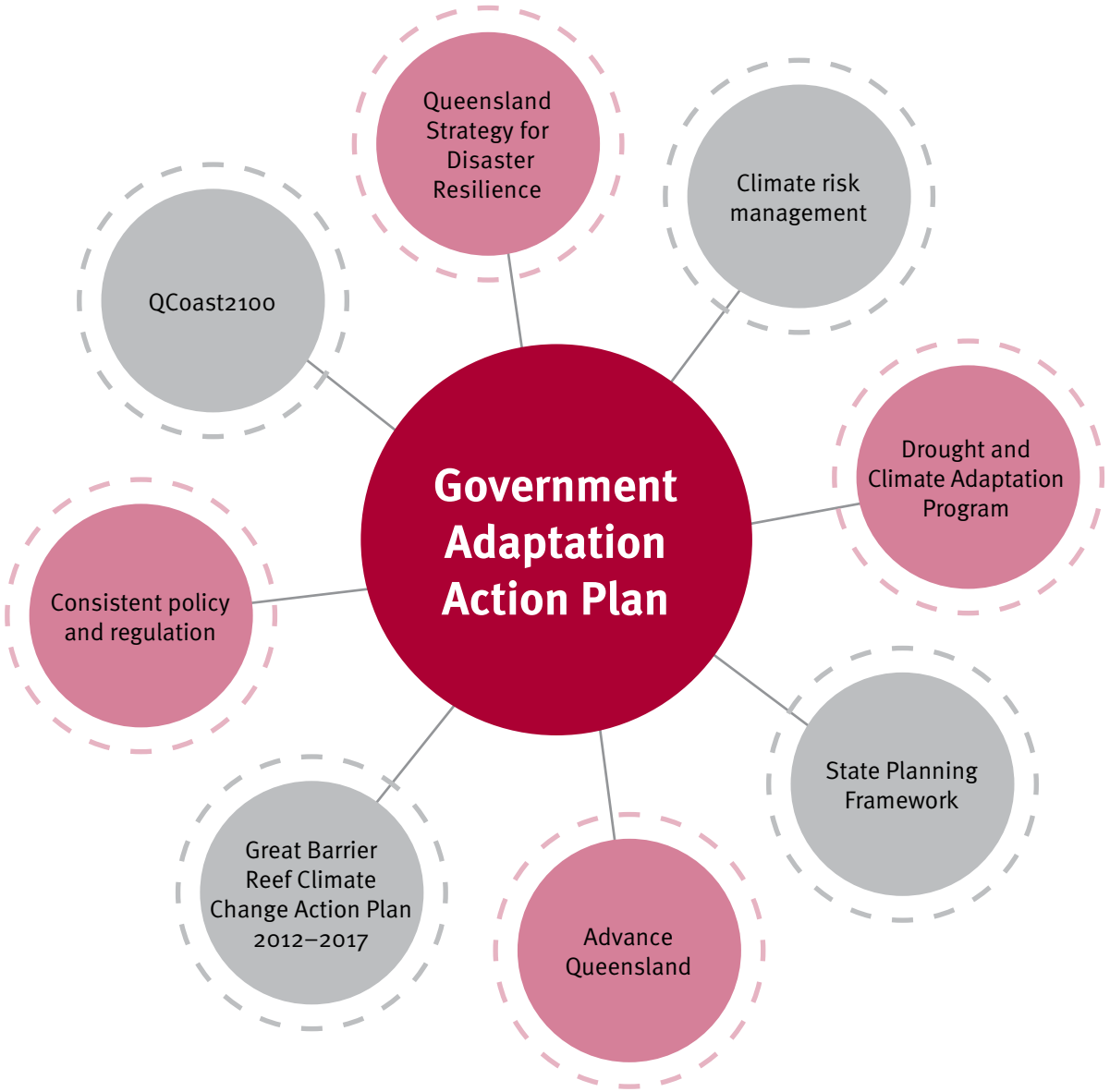
Each Queensland Government agency will undertake a detailed climate risk assessment and either develop a specific adaptation action plan to address priority climate risks, or incorporate climate adaptation actions into existing plans and risk frameworks. These plans will reduce the potential for maladaptation and increase opportunities for outcomes that align with the Q-CAS Core Principles. In addition, these plans will describe how agencies will consider climate risks and adaptation planning when assessing proposals for new infrastructure and assets.

The GAAP will be completed in 2017–18 and will be formally reviewed every three years.

Action

2.1	**Develop a Government Adaptation Action Plan** • Define agency roles and responsibilities in climate adaptation. • Provide a consistent approach to climate adaptation in policies and processes. • Incorporate climate risk into existing risk management processes.
2.2	**Manage risks to property, assets, infrastructure and services** • Apply a robust risk management framework to protect critical assets and services owned or managed by the State Government. • Ensure climate change is considered in state and regional planning instruments.
2.3	**Advocate for strong and consistent national climate policies** • Maintain important cross-jurisdictional partnerships (e.g. Adaptation Working Group, Climate Action Roundtable). • Advocate for a nationally coherent adaptation response to climate change, including coordinated standards and approaches.
2.4	**Incorporate sustainability objectives into infrastructure projects** • The Queensland Government has invested in version 2 of the Infrastructure Sustainability Council of Australia (ISCA) sustainability rating tool that includes specific climate change credit ratings. • Work with ISCA to mainstream sustainability principles into government policies and processes.
2.5	**Monitor, evaluate and review** • Establish a monitoring, evaluation and review framework for climate adaptation based on world's best practice. • Review the effectiveness of the Strategy every 3–5 years and implement recommended changes.

The State Government Pathway provides a whole-of-government framework for climate adaptation actions



Case study: Embedding climate adaptation into state land use planning

Land use planning is widely recognised as one of the most cost-effective ways to reduce the exposure of people and the built environment to climate exacerbated risks both now and in the future. From July 2017, the *Queensland Planning Act 2016* will be supported by a range of new state planning instruments, development assessment requirements and guidelines which work together to facilitate the achievement of ecological sustainability—including addressing the impacts of climate change.

For example, the State Planning Policy has been amended to specifically require that the projected impacts of climate change be avoided and mitigated in strategic land use planning and development assessment. In addition, statewide coastal hazards mapping has been updated to include the internationally accepted climate change projection of 0.8 metre sea level rise to 2100, so these projections can be used in the land use planning and development assessment process.

Queensland Betterment Fund

The Queensland Betterment Fund was first released in 2013 following Tropical Cyclone Oswald, and again in 2015 following Tropical Cyclone Marcia. The Fund is a joint initiative of the Australian and Queensland governments under the Natural Disaster Relief and Recovery Arrangements. The Betterment Fund allows Queensland local governments to restore or replace essential public assets damaged by natural disasters to a more disaster-resilient standard, reducing future expenditure on asset restoration, reducing incidents, injuries and fatalities resulting from natural disasters, and improving asset utility during and after natural disasters.

Following damage from Tropical Cyclone Oswald in 2013 and Tropical Cyclone Marcia in 2015, 295 projects worth almost $100 million were approved under the Betterment Fund.

Of the Betterment projects completed and impacted by subsequent natural disaster events in 2015 and early 2016, 95% remained undamaged or sustained only superficial damage. The $27 million investment in these projects has already avoided reconstruction costs of $42 million.

Case study: Gayndah Mundubbera Road

Gayndah Mundubbera Road is an essential freight and transport link for the North Burnett region, connecting the highly productive agricultural towns of Gayndah and Mundubbera. The road was damaged by flooding in 2011 and rebuilt at a cost of $800,000, only to suffer $6.8 million in damage again in 2013.

Through the Queensland Betterment Fund, the road was moved up hill by up to 11 metres during reconstruction. Concrete lined channels, culverts and scour protection were also installed to increase the resilience of the road to flooding.

Following Tropical Cyclone Marcia in early 2015, the Gayndah Mundubbera Road was re-opened within three hours of the flood waters receding with only minor expenditure required to clean up and remove debris. The local council advised at the time that the cost to re-open the road in 2015 was about $1,500. This compares with the road's closure for more than three months in 2013 and a repair cost of almost $6.8 million.

> *government should mobilise action for climate adaptation and lead from the front*

Queensland Strategy for Disaster Resilience 2017

The Queensland Reconstruction Authority (QRA) is the lead agency for disaster resilience and recovery in Queensland.

The updated Queensland Strategy for Disaster Resilience (QSDR) will ensure the state's disaster resilience activities are aligned with government priorities, such as the State Infrastructure Plan and State Disaster Management Plan. The QSDR will be updated in 2017 and align with Q-CAS. The QSDR accounts for the projected impacts of climate change on the frequency and intensity of natural disasters and extreme events.

The QSDR reflects the latest international research on trends in resilience policy, has been developed in accordance with international best practice, and builds on existing knowledge and experience across government and non-government organisations.

Both the QSDR and Q-CAS recognise that building resilience across all sectors of the community is an important component of adapting to climate change.

Local Governments and Regions Pathway

Local governments are at the forefront of climate adaptation, with close connections to communities, businesses and industries, as well as a central role in planning and development. Queensland's 14 Natural Resource Management (NRM) groups also have a vital role in regional adaptation activities by taking a whole-of-landscape approach to addressing climate issues in regional NRM plans, and by providing tailored information and services to landholders.

The Queensland Climate Resilient Councils (Q-CRC) program is a partnership between the Local Government Association of Queensland (LGAQ) and the Queensland Government to support local governments to plan for and respond to climate change. The Q-CRC is a three year program that will strengthen internal council decision-making processes and provide essential resources to support regional adaptation.

Action

3.1	**Support local government climate adaptation planning** • Fund 32 councils to develop local government climate adaptation plans through the Queensland Climate Resilient Councils program. • Support the development of Local Government Climate Change Strategies to address cross-sectoral adaptation issues at a regional level.
3.2	**Facilitate coastal hazard adaptation planning** • The QCoast2100 program will support enhanced coastal hazard adaptation planning in up to 45 councils.
3.3	**Partner with Indigenous local councils** • Support Indigenous local councils to complete climate adaptation planning as part of a wider climate change program for remote communities.
3.4	**Partner with Natural Resource Management groups** • Partner with Natural Resource Management groups to deliver on-the-ground adaptation projects relating to the management of natural resources. • Support Natural Resource Management groups in improving and incorporating climate adaptation and resilience responses in regional NRM plans.
3.5	**Provide regionally-specific information and tools** • Support regional groups and local governments with information products and tools for climate adaptation and resilience tailored for each region's climate, as well as social and economic factors.

QCoast2100 and Whitsunday Regional Council

The $12 million QCoast2100 program is a partnership between the Queensland Government and the LGAQ. It provides funding, tools and technical support to enable all Queensland coastal local governments to progress the preparation of plans and strategies to address climate change related coastal hazards in the long term.

Whitsunday Regional Council was the first local government to apply for the QCoast2100 program and is actively working to respond to coastal hazards and climate change. In 2016, it released its Climate Change Adaptation Strategy and Climate Change Adaptation Policy and intends to use the QCoast2100 funding to develop a Coastal Hazard Adaptation Strategy.

> *The Queensland Government needs to work in a genuine partnership with the local governments and the local agencies that will ultimately have the responsibility of delivering the adaptation plan on the ground.*

Councils sign Memorandum of Understanding for Climate Change Innovation

On 17 February 2017, the Whitsunday Regional Council and Kingborough Council in Tasmania signed a Memorandum of Understanding that will see them work together on climate change research.

It demonstrates their commitment to facilitating and showcasing real-world, community-focused and innovative approaches to the challenges and opportunities presented by climate change.

Whitsunday Regional Council Mayor Andrew Willcox said the new partnership is one of learning and collaboration and will guide the council to improve upon existing practices and prepare communities for the developing impacts of climate change.

Kingborough Council Mayor Steve Wass identified that climate change is not just an environmental issue for local government—it is a whole-of-business, whole-of-community issue that should be addressed in a structured and strategic manner.

Sectors and Systems Pathway

The Sectors and Systems Pathway will address the specific adaptation needs of Queensland's major economic sectors, as well as the critical systems on which we depend for essential services, such as our biodiversity and ecosystems. For example, the Great Barrier Reef not only has enormous intrinsic value, but also makes a substantial contribution to Queensland's economy by supporting major fishing and tourism industries.

Through this pathway, the Queensland Government will work alongside industry, business and non-government organisations to develop Sector Adaptation Plans (SAPs) that will provide a mechanism for these stakeholders to:

- collaborate with relevant government agencies, local governments, research institutions and other interest groups
- prioritise adaptation activities
- address complex and cross-cutting issues
- identify emerging opportunities
- identify potential financing mechanisms for adaptation projects, such as green bonds
- ensure adaptation measures are complementary and avoid perverse outcomes.

The development of SAPs will be led by key representatives from within each sector, ensuring each SAP is developed and owned by participants who understand the specific needs of their community, businesses and environment.

The Sectors and Systems Pathway recognises that significant progress on climate adaptation planning has already occurred, with many industries and organisations adopting a proactive approach to climate risk management. By involving sector leaders in their development, SAPs will avoid duplication and capitalise on existing activities, knowledge and resources.

This collaborative approach has been used to develop two pilot SAPs for the Agriculture sector and the Built Environment and Infrastructure sector. The remaining SAPs will be developed during 2017–18.

Action

4.1	**Support industry-led development of Sector Adaptation Plans** • SAPs will be developed for each of the eight identified sectors and systems.
4.2	**Facilitate private sector adaptation actions** • Facilitate the implementation of priority adaptation actions across industry and community sectors.
4.3	**Investigate finance and insurance options** • Improve access to information on insurance options as a method to manage climate risk. • Investigate options for improving access to finance for priority adaptation actions.
4.4	**Address complex and cross-sectoral issues** • Establish a mechanism to identify and manage issues that cut across multiple sectors or systems.

> *climate impacts will severely compromise the ability of the ecosystem services sector to provide services to humans including water, health, adaptation, food, resilient ecosystems*

Sector Adaptation Plans will be developed for:

Human health and wellbeing—health facilities such as hospitals and clinics, critical primary and preventative services for both physical and emotional health, and social organisations representing vulnerable or marginalised community members.

Biodiversity and ecosystems—terrestrial, marine and freshwater ecosystems, including critical ecosystem services.

Tourism—accommodation, tours, transport, events and experiences.

Small and medium business—small and medium sized businesses (i.e. fewer than 200 employees) in a range of industries, including retail, hospitality, technology and services.

Industry and resources—manufacturing, mining, energy and supporting services.

Agriculture—food and fibre production, including livestock, grains, sugar, cotton, horticulture, aquaculture and forestry.

Built environment and infrastructure—builders, developers, planners, infrastructure and core networks (e.g. road, rail, energy, water and telecommunications).

Emergency services—emergency management and disaster response organisations including the Queensland Ambulance Service, the Queensland Police Service and the Queensland Fire and Emergency Services.

Climate risk

There's more to climate risk than the physical effects of climate hazards like higher temperatures and rising sea levels.

Other indirect risks stem from the actions taken, or not taken, in response to these hazards and include risks associated with legal liability, new regulatory environments, financial risks resulting from changing asset values, changing market dynamics and reputational effects as consumers share information and exercise choice.

The Sector Adaptation Plans provide a mechanism to identify and address these multiple sources of risk in a coordinated way.

Case Study: Agriculture Sector Adaptation Plan (SAP)

The Agriculture SAP was developed by a partnership of leading industry organisations in consultation with a broad range of industry stakeholders. The Agriculture SAP identifies priority activities required to help agriculture industry members identify and adapt to climate hazards that present a risk to their productivity and sustainable profitability.

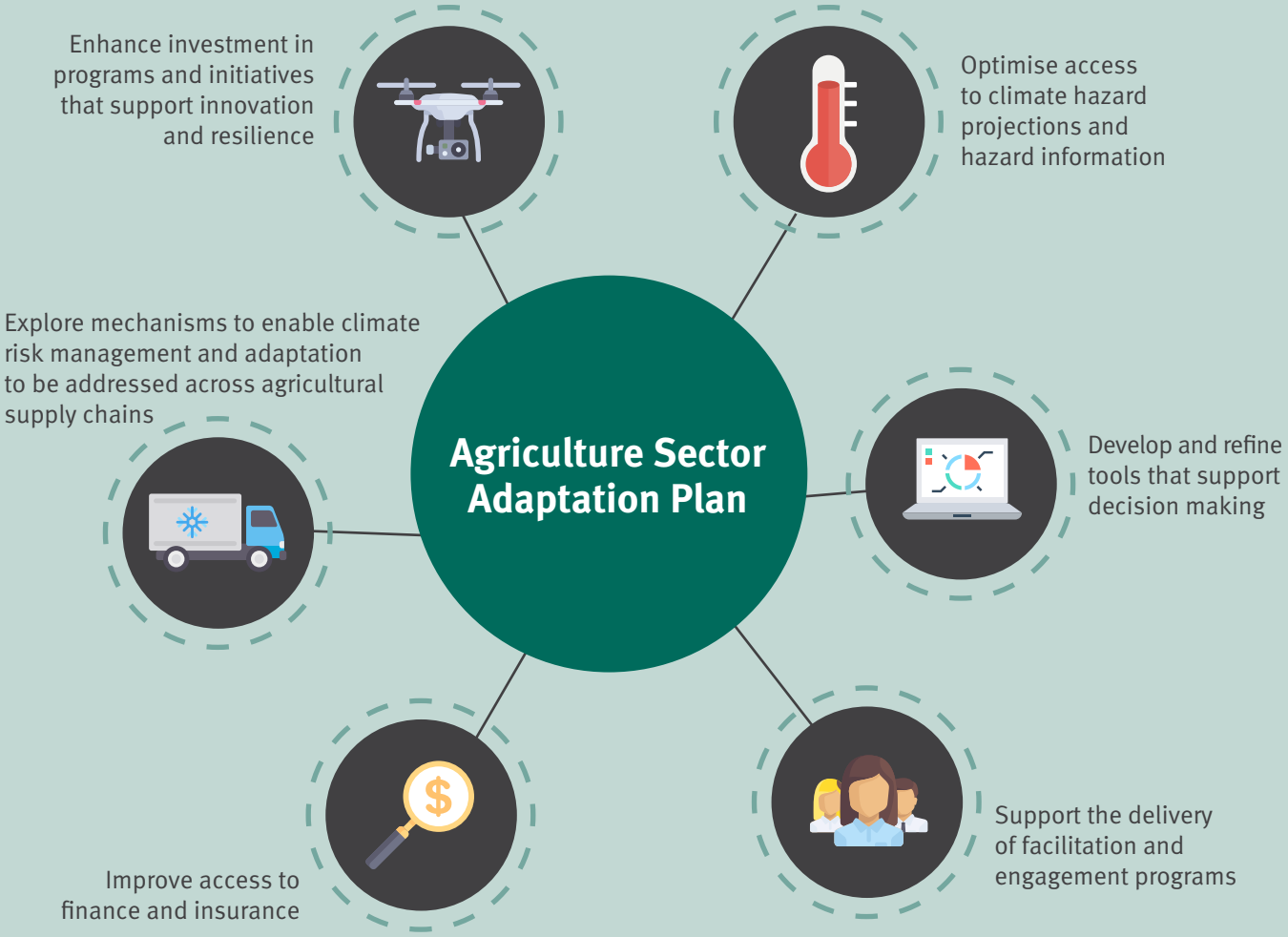


Photo: Seqwater

Case study: Seqwater

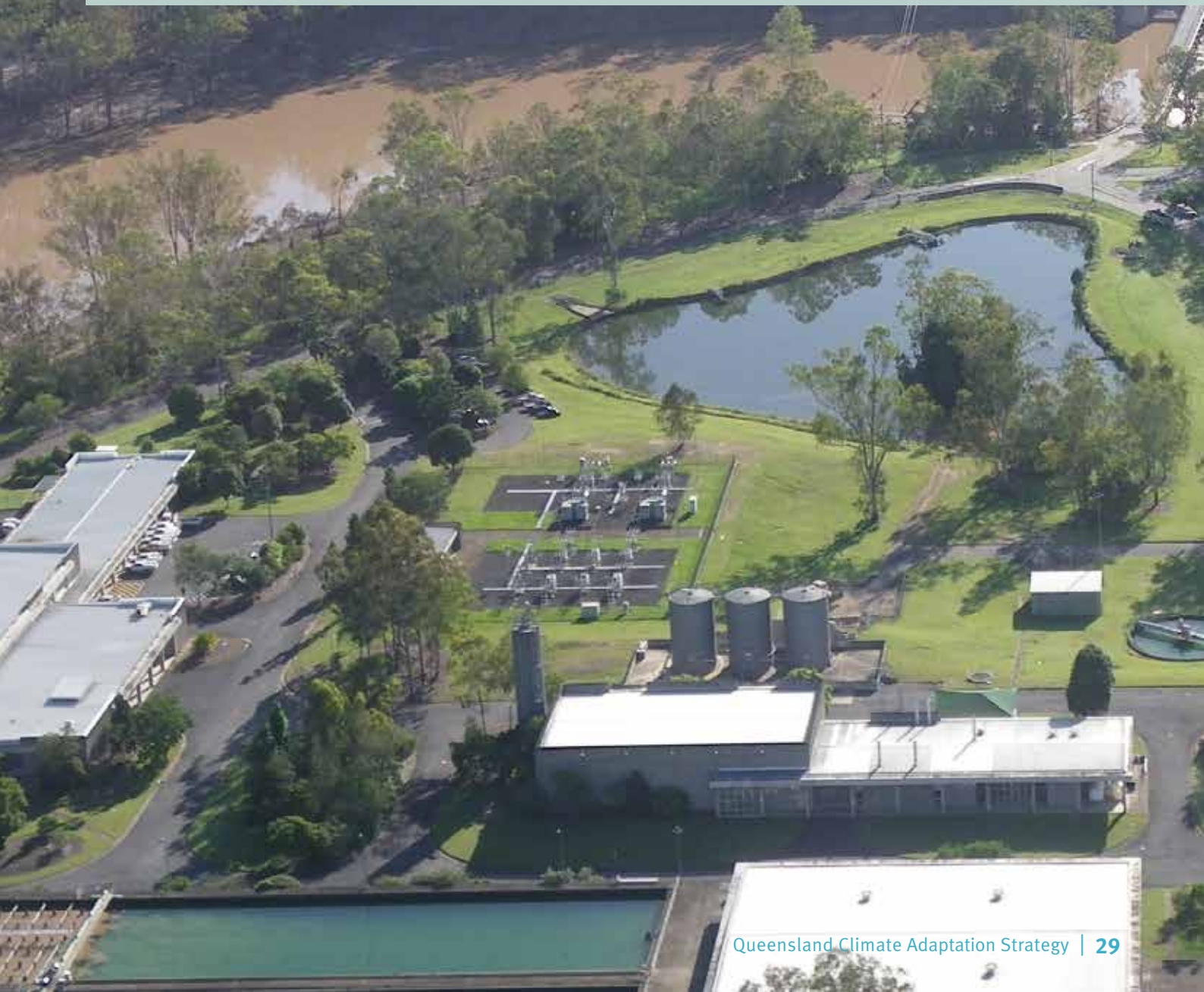
Seqwater is one of Australia's largest water businesses, with the most geographically spread and diverse asset base of any capital city water authority.

The Mt Crosby water treatment plants are significant assets for the South East Queensland drinking water supply system, supplying approximately 40 per cent of the water to the region. These plants are part of a complex system with dependencies on external networks and service providers. For example, the power supply on which the plants are dependent is also vulnerable to a range of off-site hazards, including flooding, storm damage, bushfires or extreme heat.

Extreme rainfall events in 2011 and 2013 exposed some risks, including to the central Brisbane water supply. It is expected that these kinds of events will increase in frequency under a changing climate.

Seqwater has developed a Climate Resilience Strategy to ensure climate risks are adequately understood and managed through business-as-usual asset planning, management and operations. More than 300 unique risks have been identified that may have pervasive impacts on the cost:income ratio, service reliability and stability, water quality, ecological properties of the catchment, and reputational damage to the organisation. Priority actions include quantifying the changing level of risk to assets, considering future climate in catchment planning, and addressing the critical cross-dependencies with external assets and services.

This Climate Resilience Strategy has enabled Seqwater to take a structured approach to assessing risks and priority actions to ensure a climate resilient bulk water supply for South East Queensland.



Next steps

This Strategy provides the overarching framework for climate adaptation planning and action in Queensland. The next steps involve the development of specific adaptation action plans or implementation plans for Queensland Government agencies, communities, local governments, regions, sectors and essential systems, as described under the four Pathways.

How will we know we are making progress?

The Queensland Government is developing a comprehensive monitoring, evaluation and review framework that will enable all Queenslanders to have confidence that climate risks are being addressed.

This framework will be based on a detailed world-wide review of best practice for climate policy monitoring and evaluation. Through this process, we will be able to learn from experience and refine this Strategy to ensure we continue to support actions that are effective, efficient and equitable. The framework will be informed by the Strategy's objectives and progress will be measured against a range of outcomes.

1–2 years

- Government Adaptation Action Plan and Sector Adaptation Plans completed.
- Relevant information on climate hazards is available to help all stakeholders assess their risks and opportunities.
- The strategic approach to climate adaptation is enhancing Queenslanders' capacity to understand, measure and respond to climate change.
- Resources and tools are available to support adaptation actions.

3–5 years

- The Queensland Climate Resilient Councils (Q-CRC) program is completed.
- Government agencies employ a consistent approach to climate risk management and consider climate risks in policy development.
- State and local government policies facilitate adaptation action, with few barriers to implementation.
- Local governments have incorporated climate risks into planning and decision-making processes.
- Adaptation activities are being implemented by industries and communities.

5+ years

- The Queensland community has the knowledge and tools for increased resilience under a changing climate.
- Climate risk management is an integral component of planning and decision making by governments and industry.

Roles and responsibilities

All Queenslanders have a role to play in climate change adaptation. The following table summarises the main roles and responsibilities for governments, business, industry and the broader community.

Queensland Government	• Support vibrant and prosperous communities through meaningful engagement. • Ensure a consistent, whole-of-government approach to climate risk management and adaptation. • Minimise climate risks to public assets and services owned or managed by the Queensland Government. • Manage climate risks to natural assets that provide critical ecosystem services, recreation opportunities, and that support business. • Ensure consideration of climate change adaptation and disaster resilience is embedded into state and regional planning instruments. • Create the conditions that support adaptation actions by business, communities and individuals (i.e. seek to remove barriers and impediments). • Facilitate adaptation activities across regions and sectors. • Collaborate with other jurisdictions to develop coordinated national standards and approaches. • Partner with local governments, communities and the private sector. • Support climate change adaptation research and development. • Engage in science communications to provide information to support adaptation decisions. • Ensure emergency management strategies, arrangements and responses consider future climate risks. • Where required, take actions not initiated by the private sector because of market failures.
Local governments	• Manage climate risks to public assets owned or managed by local governments. • Ensure local government services can be delivered effectively and efficiently under changed climate conditions. • Ensure climate hazards are considered in planning schemes, development assessment, legislation and decision-making processes. • Publish all natural hazard reports and information on council websites and provide related data files to Queensland Fire and Emergency Services. • Work with communities and regional organisations to build resilience and adaptive capacity. • Contribute appropriate resources to prepare, prevent, respond and recover from climate impacts. • Contribute to projects under the Q-CAS Regional Program, including the Queensland Climate Resilient Councils Program. • Implement cross-sectoral adaptation initiatives at a regional level.

Commonwealth Government	• Lead Australia's participation in, and achievement of, international programs and agreements. • Fund national climate research and development programs. • Manage national climate policy reform.
Q-CAS Partners	• Work with the Queensland Government to develop and review climate adaptation strategies and policies. • Identify pathways to build the resilience and adaptive capacity of Queenslanders. • Act as leaders on climate action within their sector, industry and community. • Contribute to the development of multiple SAPs and address cross-sectoral links.
Business and Industry	• Consider climate impacts in long-term strategic planning and investment decisions. • Lead the development of SAPs. • Assess climate risks to assets and activities. • Invest in management strategies to reduce risks. • Invest in research and development to support both adaptation and mitigation activities. • Identify and invest in emerging opportunities for new products or services.
Natural Resource Management groups	• Contribute to the development of SAPs and projects under the Regions and Local Government pathway. • Collaborate with local governments, industry sectors and landholders to support regional adaptation activities through catchment-scale planning. • Communicate relevant scientific, land management practice and policy information to industry and the community.
Community members	• Assess climate risks to assets and activities. • Build preparedness for climate risks and extreme events. • Consider climate risks in investment decisions.
Research and development organisations	• Undertake research and development to inform strategic policy development and long-term planning. • Partner with industry to conduct research and development into sector-specific impacts to inform adaptation strategies. • Communicate scientific information to industry and the community.
Government-owned corporations (GOCs)	• Manage climate risks to critical assets and services. • Share information on climate risks with other government-owned corporations (GOCs) and customers to facilitate better risk management across interdependent networks.

Strategy summary

Our vision

An innovative and resilient Queensland that addresses the risks and harnesses the opportunities of a changing climate

Our objectives

Recognise

Queenslanders understand the risks a changing climate presents to communities, businesses and the natural environment, and the economic opportunities for new sustainable industries

Equip

Queenslanders have access to the best available science and risk-analysis tools to support adaptation decisions

Integrate

Queenslanders integrate climate adaptation considerations into policies and processes

Collaborate

Queenslanders collaborate to achieve effective climate adaptation through partnerships across communities, educational institutions, governments and industries.

Our pathways

1. People and Knowledge

Empower best-practice climate science, education and engagement to support climate risk management within Queensland's communities

2. State Government

Embed the consideration of climate change into policies, regulations and procedures, and to address risks to assets and services

3. Local Governments and Regions

Partner with local governments and other regional organisations to develop regional adaptation solutions, including embedding climate risk in planning and development decisions

4. Sectors and Systems

Assist industry and other sectors to collaborate with government agencies, local governments and other stakeholders, identify adaptation needs and to prioritise adaptation activities

Implementation plans

Community Engagement Plan and Science Program	Government Adaptation Action Plan	Queensland Climate Resilient Councils	Sector Adaptation Plans

Monitoring and Evaluation Program

Action summary

			1-2 years	3-5 years	5+ years
People and Knowledge	1.1	Build adaptive capacity and resilience in communities through best-practice community engagement	●	●	●
	1.2	Advance climate science	●	●	
	1.3	Educate using the best climate science	●	●	
	1.4	Develop a climate risk toolkit	●		
State Government	2.1	Develop a Government Adaptation Action Plan	●		
	2.2	Manage risks to property, assets, infrastructure and services	●	●	●
	2.3	Advocate for strong and consistent national climate policies	●	●	●
	2.4	Incorporate sustainability objectives into infrastructure projects	●	●	●
	2.5	Monitor, evaluate and review		●	●
Local Governments and Regions	3.1	Support local government climate adaptation planning	●	●	
	3.2	Facilitate coastal hazard adaptation planning	●		
	3.3	Partner with Indigenous local councils	●	●	
	3.4	Partner with Natural Resource Management groups	●		
	3.5	Provide regionally-specific information and tools	●		
Sectors and Systems	4.1	Support industry-led development of Sector Adaptation Plans	●		
	4.2	Facilitate private sector adaptation actions	●	●	
	4.3	Investigate finance and insurance options	●		
	4.4	Address complex and cross-sectoral issues	●	●	

Climate Change

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