ClimateWise

Better business planning for a changing climate.

Climate
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Aotearoa

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Sustainable Business Network

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Ranginui – Papatūānuku	*From the Sky Father and Earth Mother*
Tāne Mahuta, Tangaroa, Hine Kirikiri, Ruaumoko, Rongomatāne, Tūmatauenga.	*Come the gods of the domains*
Te whai ao, te ao mārama	*Who usher forth all life*
Tuia ki te rangi, tuia ki te whenua, tuia ki te moana, tuia te here tangata. E rongo te pō, e rongo te ao.	*Bind the tapestry of life which affirms humanity's connection to the natural world. To the celestial realm, to the earthly realm, to water – the sustenance for all life forms, and, to remember to keep everything in 'balance'.*

What's inside

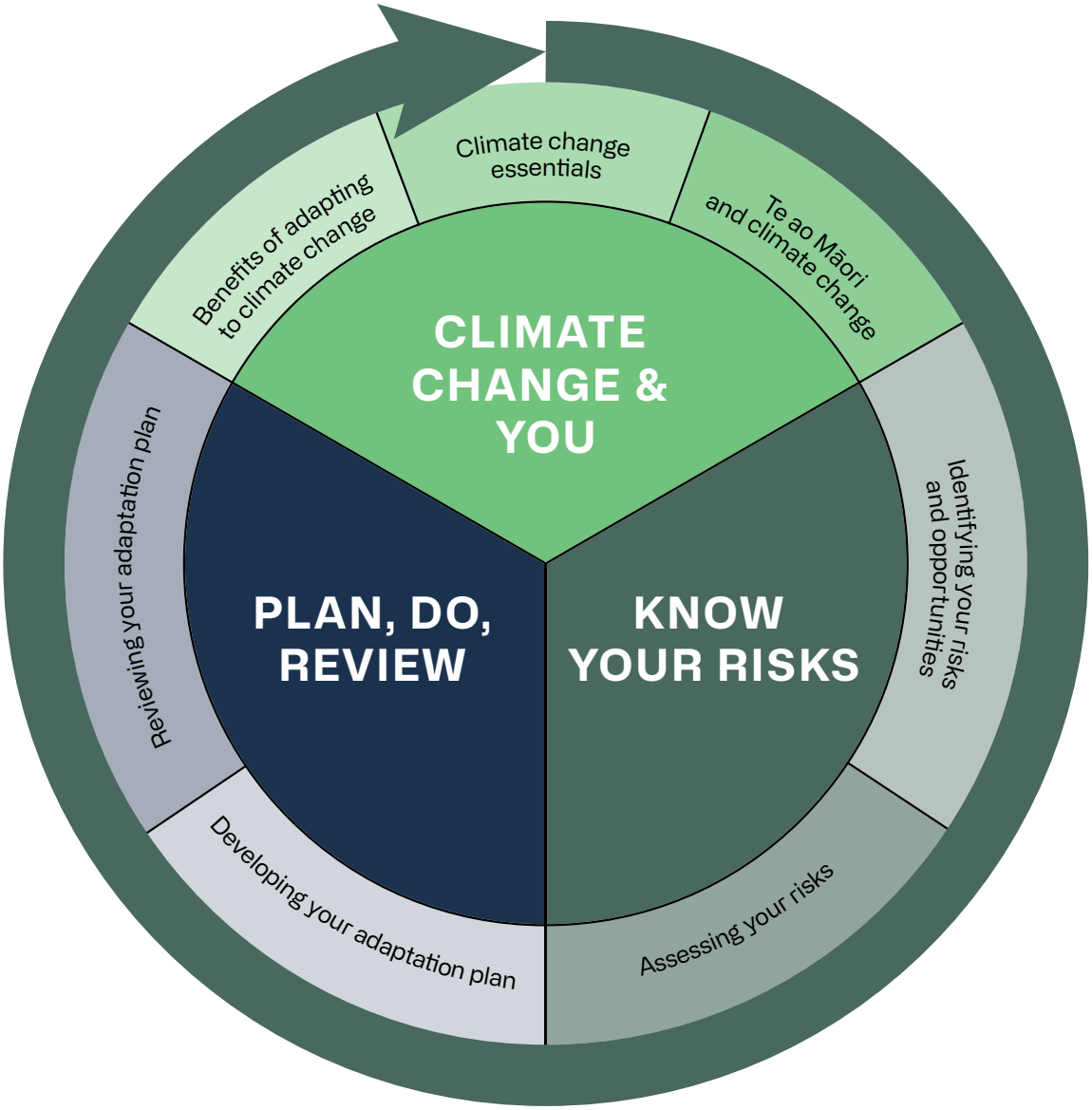
Introduction

Climate change is having a material impact on businesses and communities across Aotearoa New Zealand. As the planet warms, we are experiencing more frequent and intense weather events, such as storms, floods and droughts. When your business is affected by these changes, it also affects your communities, whānau and networks – and vice versa. We are all in this together.

Climate adaptation means preparing for and responding to the current and projected physical impacts of climate change. Taking proactive steps can help your business manage risks, reduce costs, attract customers and investors and strengthen your supply chain and reputation.

Getting the most from ClimateWise

ClimateWise provides practical guidance to help small to medium-sized enterprises adapt effectively to climate change. It integrates traditional Māori knowledge and values, providing unique insights that support conventional approaches.



As you work through ClimateWise, you will identify and assess the climate-related risks and opportunities most relevant to your business and develop a practical plan to manage them. The process is designed to fit your unique business context - no one knows your business better than you!

Adaptation planning is an ongoing process as both the climate and your business will continue to evolve. ClimateWise breaks this into a series of steps as you work through the cycle, with each designed to strengthen your business's resilience.

Reading this guide from start to finish will take most people less than two hours. But take as long as you need to complete the various tools in the later modules. You want to make time for strategic thinking.

You can **download the tools in module 4-6** as editable files.

Climate change and you

MODULE 1
BENEFITS OF ADAPTING TO CLIMATE CHANGE

As a busy SME owner, you might be wondering, "What's in it for me?" The benefits of adapting to climate change go far beyond mitigating risks — they can positively impact your bottom line, operational efficiency and reputation. Let's explore how climate change adaptation can help your business in practical ways.

1. Cost savings and improved competitiveness

Adapting to climate change can lead to significant cost savings by reducing operational expenses and lowering insurance premiums. By proactively managing climate-related risks, you can avoid costly surprises such as water-damaged stock or the time-consuming process of filing insurance claims. Many financial institutions offer discounts to companies that effectively manage their climate-related risks, providing further financial incentives for adaptation.

2. Enhanced business continuity

By managing your exposure to climate-related risks and developing robust adaptation plans, you can improve your business's continuity and resilience. This means you're better equipped to continue operating and meet customer demands even in the face of extreme weather events or other climate-related disruptions, safeguarding your revenue streams and maintaining customer satisfaction.

3. Competitive advantage

Adaptation can confer a competitive advantage by making your business more resilient and agile compared to competitors who neglect to understand and address their climate-related risks. By identifying opportunities for innovation and market differentiation, such as developing new products or services that enhance water efficiency during droughts, you can gain a 'first mover advantage' and capture new market segments.

4. Reputational benefits

Proactively managing climate-related risks signals to stakeholders (including shareholders, customers, prospective employees and investors) that your business is forward-thinking and responsible. Participating in climate conversations and taking climate action within your local community can enhance your business's reputation as an environmentally conscious and socially responsible entity, strengthening stakeholder trust and loyalty.

5. Improved cash flow management

Climate adaptation costs can be planned over time often allowing you to increase the resilience of your business incrementally. In contrast, costs associated with flood damage or a cancelled event can be large and immediate, creating cashflow problems which can make it difficult to complete key transactions such as paying staff or buying new stock.

6. Te ao Māori and social resilience

For Māori-owned businesses, adaptation that aligns with effective environmental stewardship is consistent with te ao Māori values. Upholding cultural values around tupuna decision-making and protecting future generations benefits not only your business but also your community and environment.

7. Adaptation and mitigation

Adapting to climate change also presents opportunities to mitigate your business's impact on the environment (e.g., reduce carbon emissions). For example, installing solar panels to ensure your business can operate when energy supplies are disrupted can also reduce your business's overall carbon footprint and reduce costs.

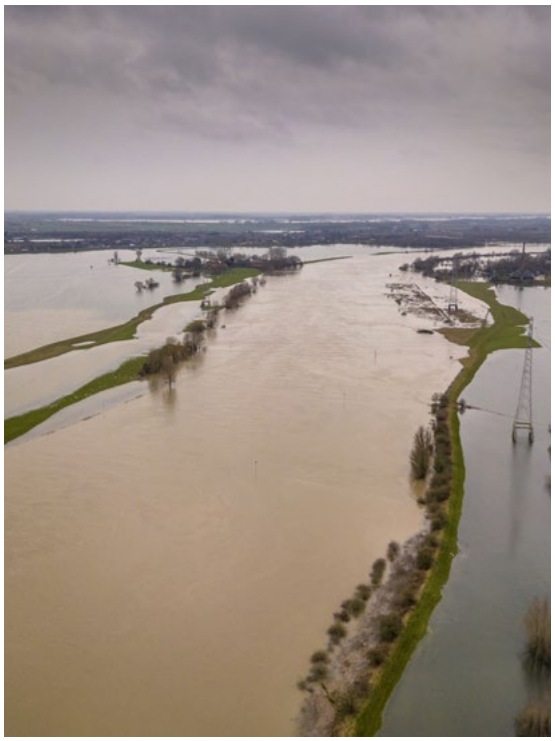
MODULE 2
CLIMATE CHANGE ESSENTIALS

Understanding climate change is crucial to effectively prepare for the future. This module provides an overview of how the climate is changing in Aotearoa New Zealand, with a focus on regional impacts that will help you understand the scale and significance of these changes.

What is climate change?

Climate change refers to long-term shifts in temperatures and weather patterns. Human activities, such as burning fossil fuels (i.e., coal, oil, gas) and deforestation, are the primary drivers of these changes. These activities increase the levels of greenhouse gases in the atmosphere, such as carbon dioxide and methane, which trap heat from the sun. This creates a 'greenhouse effect' that warms the Earth.

As the planet warms, we are witnessing fundamental changes to Earth's systems. For instance, glaciers and ice caps are melting at an accelerated rate, contributing to rising sea levels. The warming atmosphere is leading to more frequent and intense extreme weather events, such as floods and droughts. These changes also affect seasonal patterns, altering the timing of natural events like flowering and migration.



Climate hazards

Understanding how the climate has changed to date, and will continue to change, is a critical aspect of your adaptation planning. Projections are available globally and locally that project the changes in our climate.

Climate hazards are a core part of projections and describe the change in either a size, persistence and frequency of an acute event (such as a storm or flood) or a slow onset event (such as sea level rise or increasing temperatures).

Throughout the assessment of climate-related risks and opportunities for your business, you should consider both acute and slow onset climate hazards including heatwaves, wildfires, flooding, coastal inundation, storms and landslides (acute) and sea level rise (slow onset).

The Ministry for Environment has worked with National Institute of Water and Atmospheric Research (NIWA) to provide localised projections for across the motu. For the latest information, visit the Ministry for Environment.

Climate change in Tāmaki Makaurau Auckland

Over the last century, Tāmaki Makaurau Auckland has experienced significant changes in the climate. If greenhouse gas emissions continue at their current rate, these changes will become even more pronounced.

Within Tāmaki Makaurau, recent discussions about climate change have focused on the impacts of extreme weather events such as the Auckland Anniversary Weekend floods in January 2023 and Cyclone Gabrielle in February 2023. According to NIWA, this period was the wettest since records began with Central Auckland rainfall series recording a total of 539 mm of rain in Albert Park, smashing the earlier record of 420mm from February 1869.[1]

Looking ahead, Tāmaki Makaurau Auckland could experience:

- **Increased number of hot days:** Currently, we experience around 20 days each year with temperatures above 25°C. By the end of the century, this could increase to over 70 days if emissions stay at current levels, and over 100 days under a high emissions scenario.

- **Increased extreme rainfall:** A warmer atmosphere holds more moisture, which can lead to heavier, short-duration rainfall events. These rare, intense storms are projected to increase by 14 per cent for every degree of warming.

Understanding these projections helps you anticipate the challenges and opportunities your business might face, allowing you to plan accordingly. However, it is not critical to understand these projections in detail to begin your adaptation planning. If you are based outside of Tāmaki Makaurau Auckland, the Ministry for the Environment's climate projections are a great place to start.

[1] NIWA (2023). Auckland suffers wettest month in history: https://niwa.co.nz/news/auckland-suffers-wettest-month-history

Climate projections for Tāmaki Makaurau Auckland (under high emissions scenarios)

Climate hazard	Baseline period[2]	2040[3]	2090
Heatwaves (hot days)	19.7 hot days.[4]	47 hot days (>25°C)	100 hot days (>25°C)
Wildfires[5]	N/A	• 10-30% increase in Seasonal Severity Rating (SSR)[6] • Very high and extreme forest fire danger increases by 40-50%	• 10-30% increase in SSR • Very high and extreme forest fire danger increases by 50-100% for the Auckland region north of the isthmus and by 40-50% south of the isthmus
Flooding and extreme rainfall	100-year ARI, 24-hour storm depth, 176mm	100-year ARI, 24-hour storm depth, 189mm	100-year ARI, 24-hour storm depth, 215mm
Sea level rise (worsening coastal inundation)	N/A	Increase by 0.3 metres	Increase by 1.2 metres
Storms	9 cyclones every 10 years	Increased intensity and reduced frequency of ex-tropical cyclones.	Increased intensity and reduced frequency of ex-tropical cyclones
Drought	• Potential evaporation transportation (PED) is 225 mm-375 mm per year • 237[7] dry days per year	• 60-100 mm increase in PED • 3-9 more dry days per year • Annual relative humidity increases by 1%	• 100-140 mm increase in PED • 12-21 dry days per year • Annual relative humidity decreases by up to 2% for most of the region
Landslides	N/A	Increased intensity of heavy rainfall events will increase the frequency and severity of landslides	Increased intensity of heavy rainfall events will increase the frequency and severity of landslides

Note: Projection data retrieved from the Tāmaki Makaurau Economic Climate Change Risk Assessment[8] and SeaRise[9]

[2] The baseline period is an average, depending on the climate variable, based on past data usually from 1995
[3] Projections are the average of the 20-year period 2031-2050
[4] Days where the temperature exceeds 25°C
[5] Projections for wildfire are in relation to a 1980-1999 baseline and are for the 20-year periods centred on 2050 and 2080
[6] Seasonal Severity Rating (SSR) is a seasonal average of the Daily Severity Rating (DSR), which captures the effects of both wind and fuel dryness on potential fire intensity, and therefore control difficulty and the amount of work required to suppress a fire
[7] Days of less than 1mm of rainfall
[8] The Economic Climate Change Risk Assessment (ECCRA) for Auckland builds upon the preliminary CCRA undertaken in 2020. This CCRA adds to the knowledge of climate change risks already identified by Auckland Council. It considers both risks and opportunities arising from physical climate change hazards as well as those arising from the transition to a low carbon economy. Key physical risks across the food and beverage, construction, screen and visitor economy sector have been included
[9] SeaRise (n.d.). Sea level rise projection maps: searise.nz/maps-2

Why climate change is important to you

Understanding why climate change is important to you, your whānau and your business is crucial for effective planning and adaptation.

Climate change impacts various aspects of our lives, from an individual and community level to the environment we live in and the businesses we run.

Choosing which climate-related risks to address depends on what you value and prioritise as a business. Reviewing your business strategy or values statement can be a starting point in helping understand what is driving you to adapt to climate change, and where your ways of working may already support your resilience.

Health and wellbeing

Climate change affects individuals and their whānau by impacting their living conditions, mobility, sense of safety, health and wellbeing, and experience with the natural environment. Extreme weather events, such as floods and cyclones, can damage homes and infrastructure, displacing families and compromising their safety.

A changing climate also impacts individual and whānau health. Health issues related to heat-related illnesses and vector-borne diseases are becoming more prevalent due to climate change. Individual and whānau health will also be indirectly affected by drought and heavy rainfall events affecting water availability and quality.

Aside from physical health, the psychological toll of experiencing climate-related disasters and being displaced from familiar environments can have long-lasting effects on the mental health and resilience of whānau. Moreover, the loss of biodiversity and natural habitats affects recreational activities and cultural practices that are integral to people's identities.[10]

[10] Ministry for Environment (2021). National Climate Change Risk Assessment environment.govt.nz/publications/national-climate-change-risk-assessment-for-new-zealand-main-report

Business implications of climate change

For businesses, climate change presents both challenges and opportunities across various sectors. Changes in weather patterns and natural disasters can disrupt supply chains, increase operational costs and affect customer demand. An increasing incidence of extreme weather will affect all SMEs. These impacts range from damage to key infrastructure through to an increase in insurance premiums.[11]

Businesses that rely on natural resources, such as agriculture, forestry and tourism are particularly vulnerable to climate-related risks. For example, changes in weather patterns can disrupt agricultural production, leading to food insecurity and economic instability for SMEs that operate in the primary production sphere.[12]

However, a changing climate can also create new market opportunities and enhance competitiveness. Developing sustainable business practices, such as strengthening assets, developing off grid energy storage and adopting climate-resilient technologies can reduce climate risks and have the added benefit of attracting environmentally conscious consumers.

Collaboration and community resilience

Addressing the challenges of climate change requires collaboration and collective action at local, national and global levels.

Community-based initiatives, such as disaster preparedness programmes and climate education campaigns can empower individuals, whānau and businesses to build resilience and adapt to changing conditions.

What's more, industry collaboration is crucial when considering adaptation actions to address large-scale risks such as risks to supply chains.

At the community level, businesses can play a broader role in driving climate action by engaging with stakeholders and advocating for policy changes that support climate resilience. Businesses can also play a critical role in driving climate action by integrating sustainability into their operations, engaging with stakeholders, and advocating for policy changes that support climate resilience.

By working together, individuals, whānau and businesses can create a more sustainable and resilient future for themselves and future generations.

[11, 12] Tataki Auckland Unlimited (2021). Tāmaki Makaurau Economic Climate Change Risk Assessment knowledgeauckland.org.nz/publications/tamaki-makaurau-economic-climate-change-risk-assessment

Take a moment

Considering these points will help you better understand the content in this module.

- How have you been impacted by climate-related events?

- How has your business and whānau been affected?

- Can you think of some examples where your community has collaborated to overcome a challenge? This could either be a disaster event or related to COVID-19. How did you work together to overcome this challenge? How could some of these learnings be applied when thinking about developing community resilience to climate events?

It might be useful to talk these points through with your management team or teammates. That's because you'll likely have experienced past impacts differently, given your different roles within your business. (Use your answers here to help complete the climate-related risk and opportunity identification tool in Module 5.)

Find out more

I want more information on ...	Resource	Pages
How the climate is changing across New Zealand	National Climate Change Risk Assessment[13]	37
	Projected regional climate change hazards	N/A
How the climate is changing in Auckland	Tāmaki Makaurau Economic Climate Change Risk Assessment	8
	Auckland region climate change projections and impacts[14]	All
How climate change is impacting Māori	He huringa ā huarangi he huringa ao: a changing climate, a changing world	All
New Zealand's 10 most significant climate change risks	National climate change risk assessment	9
Auckland's economic climate change risks	Tāmaki Makaurau Economic Climate Change Risk Assessment	Executive summary

[13] This report presents the findings of New Zealand's first National Climate Change Risk Assessment (NCCRA). The risk assessment gives a national picture of how New Zealand may be affected by climate-related hazards

[14] Auckland Council and Council-controlled organisations commissioned NIWA to analyse projected climate changes for the Auckland region and potential impacts of climate change on some of Auckland's environments and sectors. This report addresses expected changes for 21 different climate variables out to 2120 and draws heavily on climate model simulations from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. Potential climate change impacts on important environments and sectors in the Auckland region are discussed

MODULE 3
TE AO MĀORI AND CLIMATE CHANGE

For SMEs looking to achieve long-term sustainability through climate adaptation planning, it's important to understand how climate change is perceived by te ao Māori (the Māori worldview). This module introduces key principles and values that are held by many Māori, including those in business or self-employment.

Te Tironga Māori – a cultural vantage point

Māori, like other indigenous cultures, have a rich history of adapting to environmental changes. Recognising these traditions is essential in the context of climate adaptation planning.

There are also some aspects of climate change that could affect Māori differently, whether through connections to land and taiao or the types of work in which Māori lead or are employed within, such as primary industries or construction. Some of these risks are explored more fully in He huringa ā huarangi he huringa ao: a changing climate, a changing world.

Mātauranga Māori – traditional Māori knowledge

Mātauranga Māori offers valuable insights into understanding and responding to climate change. This knowledge has been passed down through generations and includes observations of environmental changes and patterns.

Historically, Māori have observed and recorded natural signs that indicate changes in the environment. These signs are seen in the behaviours of plants, animals and weather patterns. For example, the timing of certain bird migrations or the flowering of specific plants has long been used to predict seasonal changes. These observations align with contemporary scientific findings, providing a holistic understanding of climate change.

Mātauranga often emphasises the interconnectedness of all living things and the importance of caring for all that occupy the environment. For example, sustainability of resources is central to Māori values and principles and will likely guide Māori-owned businesses. When it comes to business longevity, the protection and preservation of te taiao (the natural environment) is prioritised over short-term gain.

What we could learn from te ao Māori

Ko te amorangi ki mua, ko te hāpai ō ki mua

The leader at the front and the workers behind the scenes

This whakataukī recognises the importance of planning and preparation. Specific reference is made to the need to have the 'behind the scenes' in order, for the front to go well. Business values often reflect your own personal and cultural values. The business values that your SME adopts will help determine the direction that is taken, how decisions are prioritised and what may be considered appropriate and important.

Mātāpono (Principles)

Principle	Consideration
Taurite (balance)	Maintaining balance in all our transactions as SME owners is important. Ensuring that our business practices are taking into account how we may impact the environment is a key consideration. Balance can also refer to ensuring that your business plans and the associated decisions that you make are in balance with regard to achieving a sustainable supply of services, product and/or clientele.
Utu (reciprocity, payment and repayment)	The extent to which your business 'gives back' to the environment and the communities you serve through your business endeavours are key considerations. Reciprocity as a value acknowledges that we have a responsibility to ensure that our environment is kept healthy.
Whanaungatanga (relationships and the act of establishing relationships)	This principle acknowledges that the relationships we as a business owners form with whānau, family, community members and customers is critical to business success. In terms of adaptation, the capacity of your own business network to access support, information, skills, future networks and capability is pivotal to business success measures.
Manaakitanga (the act of generosity, care, support or hospitality)	In line with international trends, the capacity for your business to build forms of care for others (including the environment) into your practises is often considered by the marketplace. For example, the use of environmentally friendly products, opting for packaging that is biodegradable, adopting energy saving mechanisms, sponsoring and supporting environmental activities, shifting goods in ways that reduces your businesses carbon footprint, reducing the amount of flying that you do, and promoting options that support carbon reduction all demonstrate an attempt to reduce environmental impact.
Whakapapa (genealogy, connections)	This concept refers to genealogical connections. For Māori, these un-broken genealogical links with te taiao begin with origin stories of Ranginui (Sky Father) and Papatūānuku (Mother Earth). For business owners, your business will also have a genealogy that is interconnected to the market and to the network of customers and business support you have secured. Ensuring that your whakapapa connections are strengthened and always kept 'warm' is central to your success as a SME.
Mauri (essence of life, the essential quality and vitality of a being or entity)	Mauri is the impression we leave behind as a result of our interactions and intentions. Mauri (our life essence) influences all of those we make contact with, giving others an impression of us as owners, our staff and more generally our business. Consider how you would like your mauri described by others so that you are able to be its best representative.
Mana (authority, prestige, influence, status)	The health of our respective and collective mana is cumulative in nature. Through the business timeline we are either enhancing and/or detracting both our personal and business mana. When our personal and business mana is intact and in a healthy state this tends to be reflected in our business transactions. Equally, when one's mana is in a healthy state, this too is reflected outwardly. Climate adaptation planning alongside other business plans assists us in ensuring that our personal and business mana is reflected positively in all our dealings.

Te ao Māori and climate change

These Māori principles illustrate the importance of the environment as related to business practises. They can be used as a template to reflect on climate adaptation planning, and the role your own SME plays more broadly.

This approach is aligned with a global trend whereby sustainable environmental and socially responsible business practises are not only more intentionally adopted and applied, but also used to attract customers. When you create a climate adaptation plan, you have the opportunity to reassess how your business values align with sustainable business practices and mātāpono.

Find out more

I want more information on ...	Resource	Pages
How Māori (nationwide) will be affected by a changing climate	He huringa ā huarangi he huringa ao: a changing climate, a changing world	All
How Māori businesses in Tāmaki Makaurau will be affected by a changing climate	Tāmaki Makaurau Economic Climate Change Risk Assessment	All
How New Zealand's first national adaptation plan will help Māori adapt to the effects of climate change	Climate action for Māori: The national adaptation plan	All

Know your risks

MODULE 4
IDENTIFYING YOUR RISKS AND OPPORTUNITIES

Understanding the climate-related risks and opportunities facing your business is essential for effective adaptation planning. This section guides you through the process of identifying both the potential adverse impacts and beneficial outcomes associated with climate hazards.

Climate hazards, risks and opportunities

Climate hazards (or *physical* climate hazards) include extreme events like floods, storms and heatwaves, as well as gradual changes such as sea level rise. These hazards can pose risks to your business operations, staff, customers and assets, while also presenting opportunities for innovation and growth.

For example, while a garden centre may face risks from drought affecting its plant stock, it may also benefit from a longer growing season and increased demand for drought-tolerant plants.

If you run a business in Auckland, you can easily discover if your business will be affected by flooding, the causes of flooding, and ways to prepare your property. Go to the Auckland Flood Viewer.

Transition risks and opportunities

Transition risks and opportunities arise as society transitions to a low-carbon economy. They can be driven by policy and regulatory drivers, technology and market changes, or changes in consumer behaviour and preferences.

For example, a transition risk common to all SMEs is the increasing cost of transporting input materials across all sectors due to rising fuel costs. A transition opportunity could be an increase in consumer demand for low emissions products.

Although not addressed in this guidance, which focuses on the physical risks from a changing climate, you may want to consider transition risks as part of your wider planning for the future.

Identifying your risks and opportunities

Know your risks

Identifying direct risks

To identify climate-related risks and opportunities, consider how climate hazards could directly impact two key areas within your value chain:

1. Staff and customers

Identify risks to the health, safety and well-being of your staff and customers following climate hazards such as extreme heat and flooding. These could include illnesses such as heat stress or injuries to key stakeholders.

2. Assets and infrastructure

Identify risks to the assets and infrastructure essential for your business operations, including physical facilities, equipment and inventory. Assess the vulnerability of these assets to climate hazards such as flooding and sea level rise.

Identifying indirect risks (inputs/suppliers)

Indirect risks are risks beyond your business's direct control or ownership. For example, imagine a supplier your business relies on for a key resource experiences operational damage due to a storm.

The inability to source this key resource will directly impact your business if you can't secure another supplier in time. Other examples of indirect risk include outages of key utilities such as internet and power, as well as increases in insurance premiums.

Identifying opportunities

In addition to identifying risks, be proactive in identifying potential opportunities for your business to thrive in a changing climate. Here are two examples:

Anticipating industry trends

Stay ahead of industry changes by anticipating how climate changes create new market demands or change consumer preferences. For example, increasing awareness of environmental sustainability may drive demand for eco-friendly products and services.

Efficient resource use

Explore opportunities to reduce costs and enhance efficiency through sustainable practices, such as energy and water conservation, waste reduction and recycling. Embracing renewable energy sources and eco-friendly technologies can also yield long-term benefits for your business.

Identifying your risks and opportunities

Know your risks

Māori perspectives on risk and opportunity

For Māori-owned businesses and communities, perspectives on risk and opportunity are influenced by cultural values as well as connections to whenua (land) and whakapapa (ancestral lineage). What Māori SMEs identify as 'at-risk' may extend beyond immediate operational concerns, to encompass broader cultural considerations.

Acknowledging the interconnectedness of elements at risk within mātauranga Māori can help strengthen your adaptation planning by taking a more holistic view.

By integrating these perspectives into your adaptation planning, you can make sure your strategies are inclusive, resilient and aligned with the values of all stakeholders.

Consider how climate change may impact cultural values relevant to your organisation. These may relate to the values listed in Module 3.

Ngā tohu taiao (environmental signs)

There are many sources of information that can be drawn on to help inform your business practices and direction.

The maramataka (Māori lunar calendar) is a lived form of practised science — based on the observation of the stars, moon and lunar phases — that you can also use to determine business risks and opportunities.

For climate adaptation there is opportunity to consider an approach that considers the various traditional environmental indicators that are drawn from this body of knowledge. For example, in some iwi regions the onset of severe weather is indicated by the kārearea screaming on a fine day. Other iwi note that when pūkeko move to higher ground stormy weather is approaching.

When it comes to food crops and the levels of productivity and the harvest timings, some iwi understand that when certain trees flower, certain seafood is ready for harvesting. Other iwi tend to take note of which part of the tree flowers first to indicate how plentiful a crop is likely to be.

Identifying your risks and opportunities

Know your risks

TOOL: Climate risk and opportunity identification

Use our climate-related risk and opportunity identification tool to identify your climate-related risks and opportunities. We've pre-populated this tool with key climate hazards to help you get started.

Climate hazard	Have you experienced impacts from this hazard in the past?	If yes, what were the impacts on your business?	Climate hazard trajectory in the future	Do you expect your business to be affected by these hazards in the future? If so, capture the impacts across your business' value chain			What potential opportunities are caused by this hazard?
				Staff and customers	Assets and infrastructure	Inputs and suppliers	
Heatwaves 	Yes, in the context of a small-scale horticultural business in south Auckland	Staff experienced extreme heat stress when working outside over the summer months in 2024	Increase in the frequency, duration and, magnitude of heatwaves	Yes, as heatwaves become more frequent and intense, staff are likely to experience more extreme impacts from heat stress, such as heatstroke	Certain infrastructure may need more maintenance as may deteriorate faster due to heat stress	Yes, as certain crops may suffer from heat stress and may not survive warmer conditions. May face an increased costs of pest management inputs due to an increased number of pests and diseases due to warmer temperatures. Increased water requirements	Warmer conditions and lengthened growing seasons may allow for additional crops to be produced
Wildfires 			Increase in the frequency of wildfires				
Flooding 			Increase in the frequency and extent of flooding				
Coastal inundation and sea level rise 			Increase in coastal inundation and sea level				
Storms 			Less frequent but more intense storms				
Drought 			More frequent and intense drought				
Landslides 			Increase in the frequency of landslides				

Drafting risk statements

Risk statements provide a clear, concise way of describing identified risks and impacts. Use our risk statement tool to turn your identified risks into risk statements:

- Assign each risk a number for ease of identification.
- Copy the hazard, hazard trajectory, value chain element and risk impact from our climate-related risk and opportunity identification tool.
- Frame the risk statement by starting with the hazard and associated trajectory, followed by the immediate impact on your value chain, and long-term impact on your business.

TOOL: Climate risk statement

Risk ID #	Climate hazard + trajectory	Value chain element	Impact	Risk statement
1	Increase in heatwaves	Staff	Staff experience heat stress	Increase in heatwaves causing heat stress for staff, resulting in a reduction in staff productivity during daylight hours
2				
3				
4				
5				

Identifying your risks and opportunities

Know your risks

Take a moment

Considering these points will help you better understand the content in this module.

- Have you identified current or recent impacts to your business from climate change?
- Do you understand how each climate hazard is projected to change at a high-level?
- Have you identified climate-related risks and opportunities for your staff and customers?
- Have you identified climate-related risks and opportunities for your inputs and outputs?
- Have you identified climate-related risks and opportunities for your assets and infrastructure?

Find out more

I want more information on ...	Resource	Pages
How the climate is changing across New Zealand	National Climate Change Risk Assessment [15]	37
How the climate is changing in Auckland	Tāmaki Makaurau Economic Climate Change Risk Assessment	8
Whether my business and associated infrastructure is at risk of flooding	Auckland Council Flood Viewer	All

[15] This report presents the findings of New Zealand's first National Climate Change Risk Assessment (NCCRA). The risk assessment gives a national picture of how New Zealand may be affected by climate change-related hazards

MODULE 5
ASSESSING YOUR RISKS

You've identified the climate-related risks your business faces. Now it's time to assess and prioritise these risks, to understand their significance and focus your adaptation efforts.

Understanding risk levels

Rating your climate-related risks allows you to gauge their impact on your business and prioritise them. Revisit the risks you identified in Module 4 and assign a rating to each one. If you already have a risk register, that can serve as a valuable starting point.

Do you already have an enterprise risk management framework or a consequence framework? You can align the risk rating scale with these. Otherwise, we recommend using a qualitative three-point scale:

MINOR RISK

Limited consequences for your business operations, finances or reputation that need attention but are unlikely to significantly disrupt your business.

MODERATE RISK

Moderate consequences to your business operations, finance or reputation that need careful consideration and proactive management.

SIGNIFICANT RISK

Significant consequences to your business operations, finance or reputation that need immediate attention and robust mitigation strategies.

Prioritising risks for management

Rating your risks helps you identify the most significant threats to your business, so that you can prioritise your efforts and resources.

With limited time and resources, you probably won't be able to respond to all the risks and opportunities. In prioritising climate-related risks for management:

- **Review recent incidents:** Reflect on recent climate-related incidents or experiences your business has encountered. These can offer valuable insights into the potential severity and frequency of future and the recovery process following an event (i.e., timelines, contacts).
- **Assess risk attitudes:** Recognise that each person or SME has a different attitude towards risk, influenced by factors such as outlook and personal circumstances. Consider your own risk appetite and how it may impact your approach to managing climate-related risks.
- **Evaluate consequences:** Consider the consequences of your risk attitude on your business, colleagues and whānau. Assess how your risk tolerance may influence decision-making and resource allocation within your organisation.

TOOL: Climate risk rating

Risk statements	Risk rating			Justification for rating
	Low	Moderate	Significant	
E.g., Increase in heatwaves causing heat stress for staff, resulting in a reduction in staff productivity during daylight hours				E.g., Impacts experienced to date

Take a moment

Considering these points will help you better understand the content in this module.

- Do you understand your attitude to risk?
- Have you identified which climate hazards have the greatest impact to your business?
- Have you reviewed your risks and given each one a clear rating with justification?
- Have you started to identify ways that you can adapt your business to climate change?

Find out more

I want more information on ...	Resource	Pages
How the climate is changing across New Zealand	National Climate Change Risk Assessment [16]	37
How the climate is changing in Auckland	Tāmaki Makaurau Economic Climate Change Risk Assessment	8
Whether my business and associated infrastructure is at risk of flooding	Auckland Council Flood Viewer	All

[16] This report presents the findings of New Zealand's first National Climate Change Risk Assessment (NCCRA). The risk assessment gives a national picture of how New Zealand may be affected by climate change-related hazards

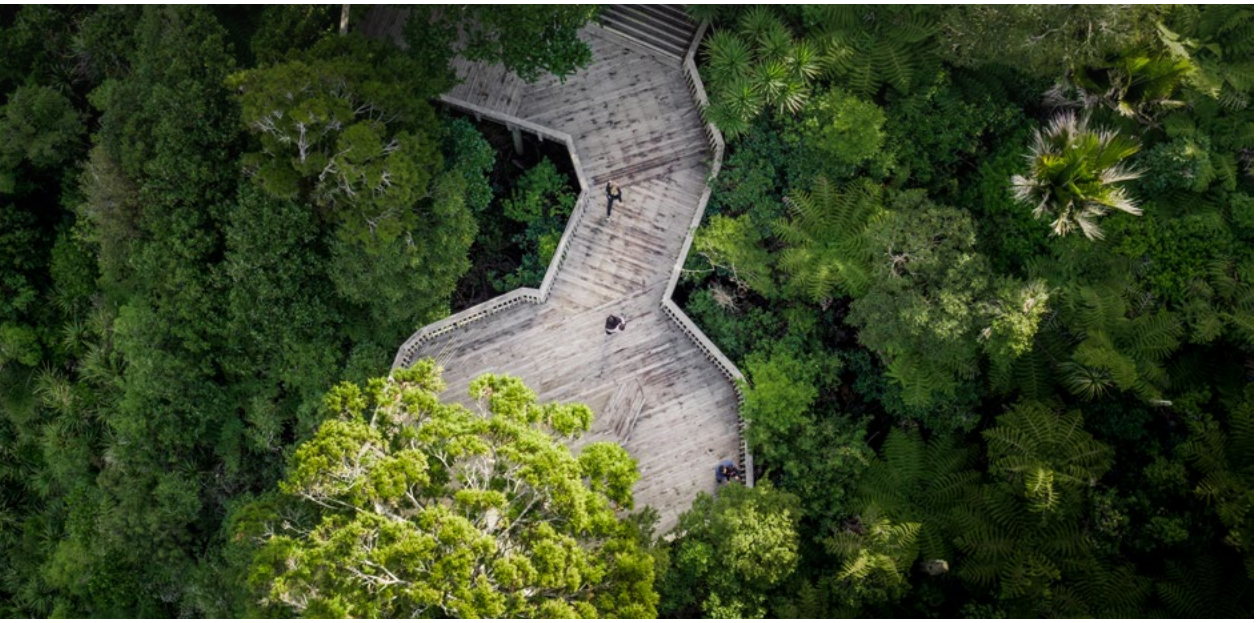
Plan, do, review

MODULE 6
DEVELOPING YOUR ADAPTATION PLAN

Planning for climate change is essential to ensure the resilience and continuity of your business. This module provides a straightforward introduction to business continuity and adaptation planning, equipping you with the knowledge to develop robust strategies that address climate-related risks and enhance your business's sustainability.

The timescale and complexity of planning for adaptation depends on:

- The nature of the risks you face
- Your business characteristics
- Your planning cycles
- The resources you have available.



Your planning can be as simple as a short conversation with team members or as complex as a strategic report. The important thing is to get started.

Business continuity plans and adaptation plans

A business continuity plan (BCP) is a proactive approach to preparing for unexpected disruptions, focusing on the short-term recovery and maintenance of critical business functions during crises. BCPs evaluate potential risks to essential components of your business and outline strategies to recover swiftly and efficiently, so that your operations remain effective despite disruptions.

In contrast, an adaptation plan is a strategic, long-term approach that addresses both current and future climate-related risks. It aims to enhance the resilience of your business by considering broader, systemic changes and implementing actions to mitigate long-term climate impacts.

While a BCP deals with immediate threats, an adaptation plan ensures your business evolves and thrives in the face of ongoing climate change.

These plans are essential parts of your adaptation planning and can be integrated to provide comprehensive risk management and resilience-building strategies. Both are valuable planning tools that can be used together. The risks you have identified in Modules 4 and 5 will support you in both types of planning.

Developing your adaptation plan

Plan, do, review

Creating an effective business continuity plan

Here's how you can create an effective BCP:

IDENTIFY CRITICAL BUSINESS FUNCTIONS

Begin by pinpointing the core functions that are vital to your business operations. This could include production processes, supply chain logistics, customer service and IT systems.

↓

ASSESS POTENTIAL RISKS

Evaluate the risks that could impact these critical functions. Consider both immediate threats, such as extreme weather events and long-term risks, like gradual climate changes.

↓

DEVELOP RESPONSE STRATEGIES

Outline steps and strategies to respond to identified risks. This could involve creating backup systems, diversifying suppliers or implementing flexible work arrangements.

↓

CREATE RECOVERY PLANS

Develop details plans for returning your business to normal operations following a disruption. This should include timelines, resource allocation and communication strategies.

↓

REGULARLY REVIEW AND UPDATE

A BCP is not a one-time document. Review and update your plan at least once a year to ensure it remains relevant and effective, as your business and the external environment evolve.

An effective BCP acknowledges the threats climate-related risks pose to your business operations and provides a structured approach to mitigate these risks, ensuring your business can withstand, recover from, and even avoid certain climate-related shocks.

For further support, try services such as Auckland Emergency Management and WorkSafe. Both have a range of tools that can help your business become more resilient to disasters.

Developing your adaptation plan

Plan, do, review

Creating an effective adaptation plan

An adaptation plan outlines the actions you plan to take in response to the climate-related risks and opportunities that you've identified and assessed. It looks at current and future risks and often considers a longer period than a business continuity plan.

Our adaptation tool will provide a starting point to help you think about how to develop a basic adaptation plan. To address the risks you identified in Modules 5 and 6:

EXPLORE ADAPTATION OPTIONS

Research and evaluate different adaptation options. Consider a variety of approaches, such as infrastructure upgrades, process improvements, or new technologies.

ASSESS OPTIONS

Assess the pros and cons of each option using criteria such as:

- Costs (initial and maintenance)
- Effectiveness over time
- Lifespan of technology
- Acceptability to staff, customers, and the community
- Necessary permissions or regulatory compliance.

PRIORITISE ACTIONS

Based on your appraisal, prioritise the actions that offer the greatest benefits. Focus on addressing the highest risks for the most vulnerable sites or assets.

DEVELOP A PLAN

Using the adaptation tool as a basis, develop a plan that sets out the preferred options and steps to implement them. Your plan could be integrated into your standard business planning processes and should include:

- A budget and financial plan
- A work plan with timelines and milestones
- Clearly articulated roles and responsibilities.

IMPLEMENT AND MONITOR

Begin implementing the actions outlined in your plan. Regularly monitor progress and adjust as needed to ensure your adaptation efforts are still effective.

Plan, do, review

Adaptation planning and business continuity planning checklist

Our adaptation planning and business continuity planning checklist is a useful starting point before you start populating the adaptation planning tool. This checklist has been developed as prompts to help your business identify the key actions required. There will likely be others depending on your business. Where appropriate, consider delegating these actions to other people in your team, to ensure shared responsibilities for adapting your business.

STAFF AND CUSTOMERS

- ☐ Have you checked with your employees if their homes or travel routes are likely to be impacted by climate hazards?
- ☐ Have you considered the wellbeing and mental health of your employees and suppliers?
- ☐ Have you provided support or training to your employees on climate change and the impacts of climate hazards (i.e., extreme temperatures, precipitation)?
- ☐ Have you considered health and safety procedures for your employees who are at risk from climate hazards (i.e., extreme temperatures)?
- ☐ Have you got updated contact details for your staff, customers, and suppliers? Are you reviewing these every three to six months?
- ☐ Have you considered your legal obligations for the health and safety and working conditions within your workplace?

INPUTS AND OUTPUTS

- ☐ Have you considered how climate change will impact your product or service?
- ☐ Have you considered the impacts of climate hazards to your supply chain, including your logistics between suppliers and customers?
- ☐ Have you reviewed your business plans to align your future with the projected changes in climate? Do you have scope to innovate products and services to enter new markets or gain a competitive advantage?
- ☐ Have you considered how you can integrate climate change action within existing processes (e.g., business continuity plan, risk registers, maintenance regimes) to reduce workload?

ASSETS AND INFRASTRUCTURE

- ☐ Have you identified the specific climate hazards that your assets and infrastructure are exposed to?
- ☐ Have you considered if your business is at risk of flooding e.g., by reviewing the Auckland Council Flood Viewer[17] maps?
- ☐ Have you decided how your business can continue to run when an event occurs?
- ☐ Have you identified ways of making your assets and infrastructure more resilient to climate hazards (e.g., regularly cleaning gutters and drains)?
- ☐ Do you monitor how well your buildings and building services manage in extreme temperatures?
- ☐ Have you considered the financial implications of increased maintenance costs?
- ☐ Have you reviewed your insurance contracts to confirm the coverage of your assets and infrastructure to climate hazard?

[17] Auckland Council has prepared GIS maps that visualise the predicted change in flooding for Auckland

TOOL: Climate adaptation planning

Use our adaptation planning tool to get started on your adaptation plan. It's important to bear in mind that how you evaluate adaptation options (as per the options assessment below) depends on your values as an SME (as per Module 4) and how your values affect your appetite for risk.

Key risks	Risk rating	Potential adaptation action	Options assessment			Prioritised actions based on the options assessment	Person responsible for the action	Start-by date and deadline date
			Qualitative factors	Approximate finance needed ($, $$, $$$, $$$$)	Approximate cost to business if this could not be done			
From the Climate Risk ID Tool – suggest putting the highest rated risks first	From the Climate Risk Rating Tool	Research and evaluate different adaptation options. Consider a variety of approaches, such as infrastructure upgrades, process improvements, or new technologies	Assess the pros and cons of each option using criteria such as effectiveness over time, lifespan of technology and necessary permissions or regulatory compliance	Insert one of the $ estimates	E.g., replacement costs of infrastructure, reductions in sales etc.			

Developing your adaptation plan

Plan, do, review

Integrating te ao Māori perspectives

For Māori-owned businesses, integrating te ao Māori perspectives into your BCP and adaptation plans is crucial. Māori cultural values play a significant role in shaping how climate-related risks and opportunities are perceived and addressed. It is useful to re-visit the principles highlighted in Module 3, including:

Manaakitanga (hospitality and care)

Focus on the wellbeing of your community. Ensure your plans consider the broader social impacts of climate change and aim to enhance the resilience of not just your business, and your whānau and local community.

Whakapapa (genealogy)

Recognise the interconnectedness of all things. View your business's climate-related risks and opportunities as part of a larger, holistic system that includes environmental, social and cultural dimensions.

By aligning your adaptation efforts with te ao Māori values, you can create plans that are culturally relevant, community-focused and environmentally sustainable.

Find out more

I want more information on ...	Resource	Page(s)
Business continuity planning	Business.govt.nz continuity and contingency planning video	All
Business continuity planning templates	Auckland Emergency Management BCP templates	All

MODULE 7
REVIEWING YOUR ADAPTATION PLAN

Adapting to climate change is an ongoing journey, not a one-time task. It involves continuously assessing, learning and improving your strategies to ensure your business remains resilient in the face of an uncertain future.

This module will guide you through the process of reflecting on your adaptation efforts, learning from your experiences, and making improvements to your plans. By integrating these practices into your routine business activities, you can enhance the effectiveness of your adaptation strategies and maintain a proactive approach to climate-related risks and opportunities.

Reflecting on your adaptation efforts

Reflection is a crucial part of the adaptation process. It involves looking back at your actions, assessing their outcomes, and understanding what worked and what didn't. Here's how you can incorporate reflection into your adaptation planning:

SET REGULAR REVIEW PERIODS

Establish specific times to review and update your adaptation plans. This could be quarterly, biannually or annually, depending on the nature of your business and the climate-related risks and opportunities you face.

GATHER FEEDBACK FROM YOUR TEAM

Engage your employees in the reflection process. Their on-the-ground insights can provide valuable information about the effectiveness of your adaptation measures.

DOCUMENT YOUR EXPERIENCES

Keep a record of what you've done, the challenges you met, and the successes you achieved. This documentation will be useful for future reference and for making improvements.

ANALYSE OUTCOMES

Compare your adaptation actions against your SMART objectives. Did you achieve what you set out to do? If not, what were the obstacles? Understanding these factors will help you refine your strategies.

Reviewing your adaptation plan

Plan, do, review

Learning from your experiences

Learning is about turning your reflections into actionable insights. It involves understanding why certain actions were successful or unsuccessful and using this knowledge to inform future decisions. Here's how you can enhance learning in your adaptation planning:

IDENTIFY KEY LEARNINGS

From your reflections, pinpoint the key learnings that can help improve your adaptation strategies. This could be specific tactics that worked well or areas where you need more resources or different approaches.

ENGAGE IN CONTINUOUS LEARNING

Stay informed about the latest climate science, adaptation strategies and industry best practices. Attend workshops, webinars and conferences to expand your knowledge and skills. This could be as simple as signing up to relevant newsletters or following key organisations on social media or attending conferences. Do what makes sense to your business and the resources you have available.

LEARN FROM OTHERS

Connect with other SMEs, both within and outside your industry. Sharing experiences and insights can provide new perspectives and innovative ideas for your adaptation planning.

FOSTER A LEARNING CULTURE

Encourage a culture of continuous improvement within your business. Promote open communication, where employees feel comfortable sharing their experiences and suggestions for adaptation.

Reviewing your adaptation plan

Plan, do, review

Improving your adaptation plans

Improvement involves using what you've learned to enhance your adaptation plans. It's about making iterative changes that incrementally increase the resilience of your business. Here's how you can effectively improve your adaptation strategies:

UPDATE YOUR RISK ASSESSMENTS

As you learn more about your climate-related risks and how they impact your business, update your risk assessments. This ensures that your adaptation plans remain relevant and effective.

REFINE YOUR STRATEGIES

Use your learnings to refine your adaptation strategies. This might involve adopting new technologies, changing operational procedures, or enhancing infrastructure.

SET NEW OBJECTIVES

Based on your reflections and learnings, set new, achievable objectives for your adaptation planning. These SMART objectives should align with your overall business goals.

MONITOR AND EVALUATE PROGRESS

Continuously monitor the implementation of your adaptation plans. Evaluate the effectiveness of your actions and adjust as needed.

Reviewing your adaptation plan

Plan, do, review

Monitoring and evaluation

To ensure that reflection, learning and improvement become part of your business-as-usual activities, embed monitoring and evaluation within your existing processes. Here are some practical options to achieve this:

- **Incorporate adaptation into meetings:** Include a regular update on adaptation progress in your management or board meetings. This could be a brief 10-minute segment where you discuss what has been done and what needs attention.
- **Annual reporting:** Add a section on climate resilience and adaptation efforts to your annual report. Highlight the actions you've taken, the results achieved, and the plans for the coming year.
- **Assign responsibilities:** Clearly define roles and responsibilities for adaptation within your team. Include these responsibilities in job descriptions and individual development plans to ensure accountability.
- **Use technology:** Leverage technology to track and analyse your adaptation efforts. Use project management tools, data analytics software and other digital resources to streamline the monitoring process.

Sharing your adaptation journey

Sharing your adaptation journey can provide added benefits, such as enhanced business reputation and learning from the experiences of others. These conversations can be held with any of your networks or associations; they do not have to have a sustainability or adaptation focus. Here's how you can share your progress:

- **Communicate with stakeholders:** Keep your stakeholders informed about your adaptation efforts. This includes employees, customers, investors and the local community. Transparency builds trust and shows your commitment to resilience.
- **Join networks and associations:** Become part of networks and associations that focus on climate adaptation and resilience. These provide opportunities to share your experiences and learn from others.
- **Publish case studies:** Create case studies detailing your adaptation actions, successes and lessons learned. These can be shared on our website, in industry publications or at conferences. If you want us to publish your case study, please email us.

  hello@climateconnectnz.com

- **Participate in community initiatives:** Engage in community initiatives related to climate adaptation. This not only helps build local resilience but also positions your business as a leader in sustainability.

Reviewing your adaptation plan

Find out more

I want more information on ...	Resource	
How to develop a comprehensive monitoring and evaluation framework	AdaptME toolkit	All

Checklist

Section	Module	Considerations / Questions
Climate change and you	Climate change essentials	☐ How have you been impacted by climate change? ☐ How has your business and whānau been affected? ☐ Can you think of some examples where your community has collaborated to overcome a challenge? This could either be a disaster event or related to COVID-19. How did you work together to overcome this challenge? How could some of these learnings be applied when thinking about developing community resilience to climate events?
	Te ao Māori and climate change	☐ Have you considered some ways that te ao Māori can support your adaptation planning? ☐ Have you identified values that you want to include within your adaptation planning? ☐ Have you considered how you can engage with iwi/hapū through your adaptation planning?
Know your risks	Identifying your risks and opportunities	☐ Have you identified current or recent impacts to your business from climate change? ☐ Do you understand how each climate hazard is projected to change at a high-level? ☐ Have you identified climate-related risks and opportunities for your staff and customers? ☐ Have you identified climate-related risks and opportunities for your inputs and outputs? ☐ Have you identified climate-related risks and opportunities for your assets and infrastructure?
	Assessing your risks and opportunities	☐ Do you understand your attitude to risk? ☐ Have you identified your which climate hazards have the greatest impact to your business? ☐ Have you reviewed your risks and given each one a clear rating with justification? ☐ Have you started to identify ways that you can adapt your business to climate change?

Checklist

Plan, do, review	Developing your adaptation plan	**Staff and customers** ☐ Have you checked with your employees if their homes or travel routes are likely to be impacted by climate hazards? ☐ Have you considered the wellbeing and mental health of your employees and suppliers? ☐ Have you provided support or training to your employees on climate change and the impacts of climate hazards (i.e., extreme temperatures, precipitation)? ☐ Have you considered health and safety procedures for your employees who are at risk from climate hazards (i.e., extreme temperatures)? ☐ Have you got updated contact details for your staff, customers, and suppliers? Are you reviewing these every three to six months? ☐ Have you considered your legal obligations for the health and safety and working conditions within your workplace? **Inputs and outputs** ☐ Have you considered how climate change will impact your product or service? ☐ Have you considered the impacts of climate hazards to your supply chain, including your logistics between suppliers and customers? ☐ Have you reviewed your business plans to align your future with the projected changes in climate? Do you have scope to innovate products and services to enter new markets or gain a competitive advantage? ☐ Have you considered how you can integrate climate change action within existing processes (e.g., business continuity plan, risk registers, maintenance regimes) to reduce workload? **Assets and infrastructure** ☐ Have you identified the specific climate hazards that your assets and infrastructure are exposed to? ☐ Have you considered if your business is at risk of flooding by reviewing the Auckland Council Flood Viewer Maps? ☐ Have you planned for how your business can continue to run when an event occurs? ☐ Have you identified ways of making your assets and infrastructure more resilient to climate hazards (e.g., regularly cleaning gutters and drains)? ☐ Do you monitor how well your buildings and building services manage in extreme temperatures? ☐ Have you considered the financial implications of increased maintenance costs? ☐ Have you reviewed your insurance contracts to confirm the coverage of your assets and infrastructure to climate hazards? ☐ Have you considered the financial implications of increased maintenance costs? ☐ Have you reviewed your insurance contracts to confirm the coverage of your assets and infrastructure to climate hazards?

Glossary

Term	Definition
Adaptation	The process of adapting to the physical impacts of climate change on the environment, the economy, infrastructure and society. Examples are raising river or coastal stop banks and planting drought-resistant crops.[18]
Adaptation plan	Adaptation planning for climate change is transitioning from a phase of awareness to the construction of actual strategies and plans (robust evidence, high agreement).[19]
Business Continuity Plan (BCP)	A business continuity plan (BCP) pinpoints the most important parts of your business, identifies potential risks to these critical pieces and prepares you to recover as quick and easy as possible.[20]
Climate	Climate refers to the average weather experienced in a region over a lengthy period, typically at least 30 years. This includes temperature, wind and rainfall patterns.
Climate change	The United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability seen over comparable time periods".
Climate hazards	The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.
Coastal inundation / sea level rise	New Zealand has low-lying coastal areas that are vulnerable to inundation (flooding) by the sea, especially during storms. Coastal inundation is particularly likely when high tides, storm surge and/or large waves occur at the same time. At these times, areas where rivers or creeks meet the sea are more vulnerable because high seas can cause the rivers to back up inland. Sea level is also rising, and future storms may be more intense, so areas that are inundated only occasionally now are likely to be inundated much more often in future.[21]
Drought	A drought is defined as a rainfall deficit which restricts or prevents a human activity – for example, farming or power generation. Extended dry periods are experienced in New Zealand most years, but whether they are classed as drought depends on a range of factors. They are usually defined by when potential evapotranspiration deficit (PED) exceeds 300mm.[22]
Extreme weather event	An event that is rare at a particular place. Definitions of 'rare' vary, but an extreme weather event would normally be an event that occurred less than once every 10 years. The characteristics of what is called extreme weather may vary from place to place.[23]
Flooding	A flood is when water covers land that is normally dry. Floods are usually caused by heavy or prolonged rainfall but can also occur due to landslides triggered by heavy rainfall or earthquakes, failure of dams, high sea levels at river mouths, coastal storm inundation and tsunami.[24]
Fossil fuels	Non-renewable fuels including coal, oil and natural gas.[25]

[18] NIWA (n.d.) Glossary of terms: niwa.co.nz/helping-your-business-or-organisation-plan-climate-change-adaptation/climate-change-adaptation-toolbox/glossary
[19] IPCC (n.d.). IPCC glossary: apps.ipcc.ch/glossary
[20] BusinessNZ (n.d.) Continuity and contingency planning: business.govt.nz/risks-and-operations/planning-for-the-unexpected-bcp/continuity-and-contingency-planning
[21] NIWA (n.d.). Coastal storm inundation: niwa.co.nz/hazards/coastal-storm-inundation
[22] NIWA (n.d.). Droughts: niwa.co.nz/hazards/droughts
[23] NIWA (n.d.) Glossary of terms: niwa.co.nz/helping-your-business-or-organisation-plan-climate-change-adaptation/climate-change-adaptation-toolbox/glossary
[24] Civil Defence NZ (n.d.). Floods: civildefence.govt.nz/cdem-sector/consistent-messages/flood
[25] Sustainable Business Network (n.d.). Glossary of sustainability: sustainable.org.nz/learn/tools-resources/glossary-of-sustainability

Glossary

Greenhouse gases	A greenhouse gas is a gas in the atmosphere that absorbs heat energy (known as infrared radiation). Greenhouse gases are important for the Earth's climate because they allow incoming energy from the sun through. However, human activities have increased the concentration of certain greenhouse gases, such as carbon dioxide and methane, in the atmosphere, creating a 'blanket' effect, increasing global temperatures.[23]
Heatwaves	Heatwaves are an unusual hot weather (max, min and daily average) over a region persisting at least two consecutive days during the hot period of the year based on local climatological conditions, with thermal conditions recorded above given thresholds.
Hot day	An extreme sweltering day in New Zealand is often defined as a day when the maximum temperature exceeds 25°C.
Intense rainfall events	An intense rainfall amount is the value reached that provides the uppermost 10% (or 90th quantile) of the total seasonal precipitation.[23]
Intergovernmental Panel on Climate Change (IPCC)	Established in 1988 by the World Meteorological Organisation and the UN Environment Programme (UNEP), the IPCC surveys worldwide scientific and technical literature and publishes assessment reports that are widely recognised as the most credible existing sources of information on climate change.[23]
Landslides	Landslides, sometimes called landslips or simply slips, are the downhill movement of soil and rock driven by gravity. These are exacerbated by events such as flooding.[26]
Mātauranga Māori	Literally translated means 'Māori knowledge'. A modern term that broadly includes traditions, values, concepts, philosophies, world views and understandings derived from uniquely Māori cultural points of view.[23]
Mitigation	Any action that results, by design, in the reduction of greenhouse gas emissions by source or enhances removals by sinks. Examples include switching to solar energy or wind power, improving the insulation of buildings to reduce energy consumption and expanding forests to remove greater amounts of carbon dioxide from the atmosphere.
Paris Agreement	In 2015, all parties to the UNFCCC came together for the UN Climate Change Conference in Paris and adopted by consensus the Paris Agreement, aimed at limiting global warming to less than two degrees Celsius, and to pursue efforts to limit the rise to 1.5 degrees Celsius. The Paris Agreement also brings together member nations to undertake ambitious efforts to adapt to its effects.[23]
Percentile	The value below which falls a specified percentage (e.g., 90% of a set of values. The 10th and 90th percentile values are commonly used to define the thresholds for extreme events. For example, the 90th percentile daily average temperature is that which is exceeded on only one day in 10.[23]
Physical risks and opportunities	Physical risks and opportunities are those associated with the impacts from climate change. These risks and opportunities can be event driven (acute) or associated with longer-term shifts in climate patterns (slow onset).

[26] Landslides NZ (n.d.). Science: landslides.nz/science

Glossary

Potential Evapotranspiration Deficient (PED)	Evapotranspiration is the process where water held in the soil is gradually released to the atmosphere through a combination of direct evaporation and transpiration from plants. As the growing season advances, the amount a water lost from the soil through evapotranspiration typically exceeds rainfall, giving rise to an increase in soil moisture deficit. The difference between this demand (potential evapotranspiration), and the actual evapotranspiration is defined as the potential evapotranspiration deficit. In practice, PED is the amount of water required by irrigation, or that needs to be replenished by rainfall, to maintain plant growth at levels unconstrained by soil water shortage.[27]
Resilience	The ability of a social or natural system to absorb disturbances while keeping the same basic structure and ways of functioning and the capacity to adapt to stress and change.[23]
Scenario	A plausible and often simplified representation of the future climate, based on an internally consistent set of climatological relationships that has been constructed for explicit use in investigating the potential consequences of anthropogenic climate change, often serving as input to impact models.[28]
Supply chain	A network between a company and its suppliers to produce and distribute a specific product to the final buyer. [29]
Transition risks and opportunities	Transition risks or opportunities arise from the shift of global systems towards a decarbonised future.
Taonga Māori	Taonga Māori refers to tangible and intangible items that are highly valued in Māori culture.
Wildfire	In New Zealand, 'wildfires' includes forest, grassland and scrub fires that can threaten lives and property. 'Bushfire', however, often has a more specific meaning, referring to fires in native bush areas, though it is also used colloquially by the media and public in both New Zealand and Australia.

[27] NIWA (n.d.). Drought indicator charts: niwa.co.nz/climate-and-weather/nz-drought-indicator-products-and-information/drought-indicator-charts

[28] Flato G, Marotzke J, Abiodun B, et al. Evaluation of Climate Models. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press: ipcc.ch/report/ar5/wg1/

[29] NIWA (n.d.). Glossary of terms: niwa.co.nz/helping-your-business-or-organisation-plan-climate-change-adaptation/climate-change-adaptation-toolbox/glossary

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