



ADAPTING TO

Thrive

IN A CHANGING CLIMATE

**CLIMATE CHANGE
ADAPTATION PLAN**

FOR ZESPRI AND THE KIWIFRUIT INDUSTRY

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Setting the
SCENE

OVERVIEW OF ZESPRI AND THE NEW ZEALAND KIWIFRUIT INDUSTRY

Based in Mount Maunganui, New Zealand, Zespri is 100 percent owned by current or past kiwifruit growers. Zespri exports and markets the world's leading portfolio of branded kiwifruit 12 months of the year, as well as implementing a world-leading kiwifruit research and development programme. Orchards and post-harvest facilities are independently owned and managed.

Zespri Kiwifruit is grown in New Zealand, Italy, France, Japan and Korea and exported to more than 50 countries around the world.

There are nearly 15,000 hectares in production in New Zealand and 3,500 hectares offshore, with 1,300 growers offshore and 2,800 growers in New Zealand.

Zespri's major markets are Europe, Greater China and Japan. Zespri is on track to grow global sales to \$4.5 billion by 2025 from \$3.9 billion in operating revenue in the 2020/21 season. More than \$2.2 billion was returned as direct grower payments to communities around regional New Zealand in the 2021/22 season.

BACKGROUND

In 2020, Zespri outlined a number of sustainability commitments on behalf of the kiwifruit industry, including setting four key targets to address climate change.

The industry's Climate Change Strategy¹ outlines in more detail how we are looking to achieve these targets, goals and milestones.

WE WILL WORK WITH OUR PARTNERS TO BE CARBON POSITIVE BY 2035, ACHIEVING TWO KEY TARGETS ALONG THE WAY:

ZESPRI CORPORATE

WILL BE CARBON NEUTRAL BY

BY 2025

WE WILL SUPPORT OUR GLOBAL SUPPLY CHAIN TO BECOME

CARBON POSITIVE TO RETAILERS

BY 2030

We will strengthen our preparedness for climate change by:

REPORTING ON

OUR CLIMATE RISKS AND OPPORTUNITIES

BY AUGUST 2021

BUILDING AN

INDUSTRY-WIDE ADAPTATION PLAN

BY DECEMBER 2022

Climate Change Risks and Opportunities Report

In 2021, we achieved a key milestone – publishing an industry-wide Climate Change Risk and Opportunities Report.² This was prepared in accordance with the Task Force on Climate-Related Financial Disclosures (TCFD), and was audited by KPMG.



Our approach to adapting to climate change is structured around three goals:



GOAL 1:

**TO PROVIDE THE WORLD
WITH CARBON POSITIVE
KIWIFRUIT**



GOAL 2:

**TO ENABLE THE
KIWIFRUIT INDUSTRY
TO THRIVE IN A RAPIDLY
CHANGING CLIMATE**



GOAL 3:

**TO GROW OUR CAPABILITY
AS A CLIMATE LEADER**

¹ Zespri Climate Change Strategy: www.zespri.com/content/dam/zespri/nz/sustainability/Zespri_Climate_Strategy_Document.pdf

² Zespri Climate Change Risks and Opportunities Report: [www.zespri.com/content/dam/zespri/nz/sustainability/Zespri-Climate-Risk-Opportunities-\(TCFD\)-Report.pdf](http://www.zespri.com/content/dam/zespri/nz/sustainability/Zespri-Climate-Risk-Opportunities-(TCFD)-Report.pdf)

WHAT IS THE PURPOSE OF THIS CLIMATE CHANGE ADAPTATION PLAN?

This Climate Change Adaptation Plan is our response to the risks and opportunities identified in the Climate Change Risks and Opportunities Report. The plan helps us focus our efforts on the most important actions we need to take and the timeframes to achieve these.

By coordinating our efforts as an industry, we can be more effective and efficient - allowing us to thrive as the climate continues to change.

WHAT IS ADAPTATION³?

Adaptation refers to the response to the physical and transitional risks that climate change may cause.

- **Physical climate risks** reflect long-term climatic changes such as shifting seasons or impacts resulting from severe events, e.g., increasingly frequent and intense storms.
- **Transitional climate risks** arise from policy, regulatory, legal, technological, market and other societal responses to the challenges posed by climate change and the transition to a low-carbon economy. Examples could include increasing carbon prices or restricted access to irrigation as demand for water increases over time.

Adaptation is about understanding these risks and taking actions to address them. We can do this in different ways:

- **Reduce vulnerability:** reduce the sensitivity and susceptibility of people and systems to climate impacts
- **Enhance adaptive capacity:** build capacity to respond and develop climate expertise across the industry
- **Strengthen resilience:** strengthen systems and prepare people to lessen the impact of climate risks.

WHAT ACTION IS THE KIWIFRUIT INDUSTRY ALREADY TAKING?

We are already experiencing and responding to the physical, market and regulatory impacts of climate change. This plan will build on the responses and work already underway across the industry:

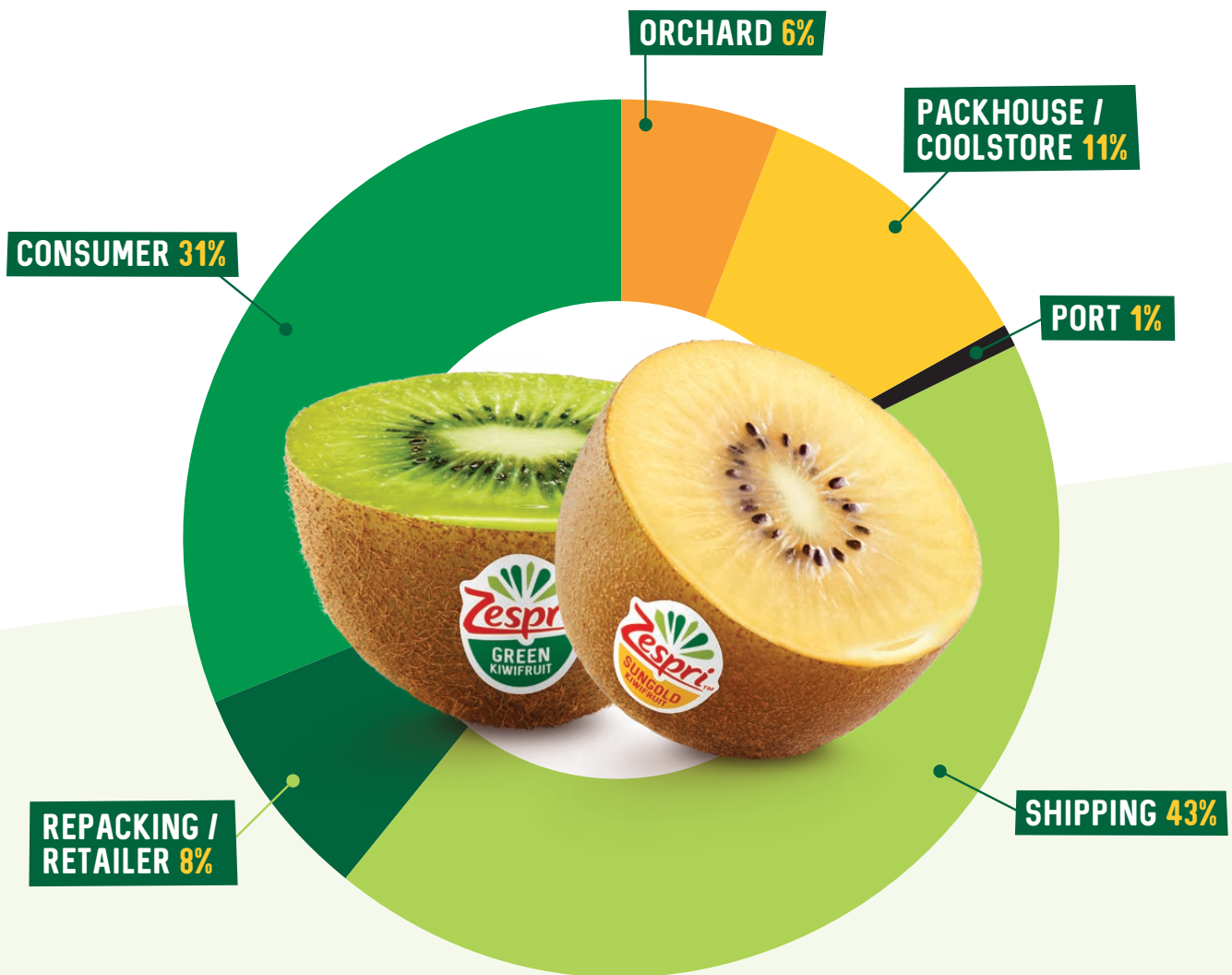
- **Growers** are already adjusting their growing practices as the climate changes, e.g., developing and maintaining shelterbelts to help protect orchards from severe wind events.
- **Packhouses** are also responding to changes as they emerge, such as pre-cooling fruit for longer before packing due to fruit arriving from the orchards warmer than it used to be. These packhouses also provide support services for their growers, with dedicated orchard management teams continuing to be critical in supporting growers to respond to climate change in the coming years.
- **Our industry:**
 - is investing significantly in research, innovation and new cultivars, which will help our growers adapt and our industry to remain profitable
 - is investing more than \$1 million per year in research to understand more about mitigating and managing the impacts of climate change
 - has a governance framework to manage climate and other sustainability risks (see page 3 of our Climate Change Risks and Opportunities Report for more information)
 - works to ensure local and national policies are fair and equitable, and reflect the interests of our growers
 - understands the contribution we make to climate change and has set ambitious targets to reduce our emissions.

Further detail is provided within the actions we are taking, from page 16 onwards.

³Definitions in this section are based on the New Zealand Ministry for the Environment's 2022 National Adaptation Plan.

OUR INDUSTRY CARBON FOOTPRINT

INDICATIVE CONTRIBUTION OF EACH STAGE IN THE SUPPLY CHAIN OF THE CARBON FOOTPRINT OF ZESPRI KIWIFRUIT PRODUCED IN NEW ZEALAND AND CONSUMED GLOBALLY⁴



⁴ For the 2017 crop, calculated in accordance with the PAS2050:2011 specification for the assessment of the life cycle greenhouse gas emissions of goods and services standard. The full supply chain footprint will be updated in 2023.

WHAT IS THE SCOPE OF THE CLIMATE CHANGE ADAPTATION PLAN?

This plan covers physical risks encountered throughout the kiwifruit industry's supply chain, from orchard, packing, transport and distribution through to (but excluding) the retailer. It also covers transitional risks, including market and regulatory risks such as emissions pricing, environmental labelling and changing consumer preferences. It targets all Zespri Kiwifruit grown and processed in New Zealand but also extends to Zespri's Global Supply regions.

WHAT TIMEFRAME DOES IT COVER?

This plan outlines a framework for the long-term approach to climate change adaptation for the kiwifruit industry. It comprises a detailed three-year work programme from 2023, marking a step change for the business in approaching the challenges arising from future and current climate change scenarios.

We will review this plan by 2025, following an update of the Climate Change Risks and Opportunities Report. The next phase of the adaptation response would then run from 2026-2030.

WHO IS THIS CLIMATE CHANGE ADAPTATION PLAN FOR?

This plan is intended for our partners across the kiwifruit supply chain in New Zealand and Zespri's Global Supply regions. The plan sets out actions the industry will take to respond to climate change, and in doing so, should provide confidence that the industry continues to grow in a way that's good for our growers, communities and the environment. By sharing the work we are doing, we hope this plan paves the way for collaboration with those who have similar interests, such as our supply chain partners, other horticultural organisations or government entities.

WHAT IS ZESPRI'S ROLE?

Zespri sees its role as a catalyst for change: providing evidence-based insights and data, advocacy, and helping inform policy development, so that industry players can take the appropriate actions for their businesses. We are a grower-owned business, with responsibility for marketing and exporting kiwifruit, along with innovation and setting quality standards. We do not have direct control over the supply chain – we don't own orchards, packhouses or coolstores. This means we rely on our supply chain partners to manage and adjust to emerging challenges, including responding to climate risks and opportunities.

WHERE CAN WE FIND MORE INFORMATION ABOUT THE KIWIFRUIT INDUSTRY AND CLIMATE CHANGE?

The following resources provide more information on how the kiwifruit industry is responding to climate change:

- Zespri Climate Change Strategy on the Zespri website
- Zespri Climate Change Risks and Opportunities Report on the Zespri website
- Zespri Annual Reports on the Zespri website
- NZKGI Environmental Policy webpage
- NIWA climate change webpage.

Growers can also access specific information and guidance through Canopy, Zespri's grower portal, which includes regional summaries showing the impacts of climate change in New Zealand growing regions.







Climate change

**EFFECTS WE'RE
EXPERIENCING**



Physical Risks

GLOBAL OUTLOOK

As global emissions continue to rise, more heat energy from the sun is trapped in the Earth's atmosphere. This is changing global weather patterns and conditions. Globally, we are experiencing increasing severity and frequency of severe weather events such as floods, droughts, tropical storms and extreme heat events. Incremental changes to weather patterns, such as extended dry periods and disruption to typical seasonal patterns, are also emerging.

Global food systems have been hit hard by these changes in recent years. Productivity has been affected, including from extended and more extreme seasonal droughts, and loss of topsoil due to more frequent intense rainfall events. In addition, weather-related impacts on supply chains, such as the effect on roading infrastructure, have added to the disruptions experienced as a result of the global COVID-19 pandemic.

Our northern hemisphere partners grow kiwifruit in conditions very different from those in New Zealand. They are already experiencing challenging growing conditions, which look set to continue due to climate change. For example, the high temperatures experienced during the 2022 European summer likely impacted fruit size in French and Italian growing regions. Growers in other regions have developed different growing strategies too in response to the conditions, such as growing inside 'tunnel houses' in South Korea. These adaptive techniques could provide valuable lessons for other growers in the years to come.

THE NEW ZEALAND EXPERIENCE

New Zealand's weather patterns are changing.

Changes to rainfall patterns in the Bay of Plenty mean growers are experiencing longer periods without rain, which can later be followed by significant rainfall events.

Growers are also adjusting to having warmer autumn and winter conditions. Over the past five years, 10 out of 11 sites across the Bay of Plenty and Gisborne regions showed reduction in winter chilling hours between May and June. For example, Te Teko had 410 winter chill hours in 2017. This has steadily reduced over time, with 230 hours recorded in 2022.⁵

Cool temperatures in these months help to stimulate budbreak and flower production. In areas with warmer winters, hydrogen cyanamide can be applied after harvest, mimicking the effect of cooler temperatures, encouraging flower production and leading to greater yields of quality kiwifruit. As New Zealand's winters gradually warm, hydrogen cyanamide (or any future alternatives) will be an important tool for growers to adapt to climate change.

In addition, the kiwifruit industry has experienced severe weather events in recent years. In 2020, a hail event in the Tasman region cost the industry \$45 million, once losses to Orchard Gate Returns, sales and insurance costs were factored in. In 2021, a severe wind event caused some growers in Ōpōtiki to lose up to 50 percent of their crops. The 2022 North Island flooding event that cost the New Zealand economy \$80 million caused significant flooding, damage and delay to harvest in kiwifruit orchards in Tairāwhiti, Gisborne.

The social cost of these events can be significant for growers and their wider communities, and the effects are often felt long after the initial weather event.

⁵ Data sourced from Kiwifruit Vine Health's winter chill unit calculator.



ZESPRI PHYSICAL CLIMATE RISK SCENARIO ANALYSIS AND RISK RATINGS FOR NEW ZEALAND GROWING REGIONS

Climate Variable	Potential Impact	Projected Change In NZ 2050		Risk Rating
		2°C Moderate Scenario	4°C High Scenario	
Average temperatures	Rising average temperatures may increase the risk of pests and pathogens becoming established in primary growing regions.	~0.9°C	~1.1°C	High
Minimum temperatures	A rise in minimum spring temperature may prevent consistent budbreak and king flower production in primary growing regions.	~1°C	~1.25°C	High
Maximum temperatures	A rise in summer maximum temperatures may increase energy costs in post-harvest sorting and distribution centres.	~1°C		Moderate
Number of hot days (>25°C)	An increase in the number of hot days in primary growing regions may increase the risk of heat stress among orchard workers.	~75% increase	~95% increase	Moderate
Average rainfall	Kiwifruit vine water demand may increase with rising temperatures, impeding fruit development in water-deprived areas.	Substantial regional and seasonal variation.		Moderate
Drought	An increase in the severity and frequency of droughts, especially in already dry areas, may impede fruit development.	100mm increase in Potential Evapotranspiration Deficit		Moderate
Number of dry days (<1mm / day rainfall)	An increase in the number of dry days may marginally alter the risk of drought and water stress in primary growing areas.	0—5% Increase in dry days		Low
Extreme rainfall events	An increase in extreme rainfall events may marginally alter the risk of harvest losses, soil erosion, flood damage and diminish soil productivity.	0—5% increase in the magnitude of a 99th percentile rainfall event		Low
Extreme wind speeds	An increase in extreme wind speeds may see more wind damaged fruit on the vine.	0—2.5% increase in the magnitude of a 99th percentile daily mean wind speed		Low

The two climate scenarios applied were a 'Moderate' emission scenario in which aggressive action keeps global warming to within 2°C and a 'High' 4°C emissions scenario in which global warming continues unchecked. For more information, refer to Zespri Climate Change Risks and Opportunities Report at [https://www.zespri.com/content/dam/zespri/nz/sustainability/Zespri-Climate-Risk-Opportunities-\(TCFD\)-Report.pdf](https://www.zespri.com/content/dam/zespri/nz/sustainability/Zespri-Climate-Risk-Opportunities-(TCFD)-Report.pdf)



WHAT WILL THIS MEAN FOR KIWIFRUIT GROWING?

Zespri partnered with Plant & Food Research in a New Zealand Ministry for Primary Industries Research Study⁶ to assess the suitability of different New Zealand growing regions for kiwifruit (and other crops) under different climate change scenarios. Suitability assessments considered various climate and land factors in 2075.

In a future with strong global action to minimise the increase in average temperatures, it is expected that:

- Many parts of the upper North Island and the East Cape could experience a reduction in suitability
- Northland is the most affected, with a small reduction in suitability in the Bay of Plenty
- The central and lower North Island, and the South Island could see improvements in suitability.

In a future with only limited global action to curb temperature increase, then by the end of 2075, the following is expected to occur:

- More places around the North Island (upper and coastal areas) see reduced suitability
- The South Island and central North Island see increases in suitability that are substantial in many locations.

The main climate factors affecting change were found to be:

- Decreased winter chill hours, which will likely reduce suitability in areas such as Northland and Bay of Plenty. Mitigation strategies could assist with ongoing successful kiwifruit production in these areas, e.g. more suitable cultivars and/or effective budbreak enhancers. The industry is investing significantly in both of these.
- In other areas, lower frost risk and higher growing degree days will more than offset the effect of decreased chill, leading to an overall improvement in suitable growing conditions.

The study highlights the value in continued innovation to support growers to adapt in the areas that may be affected. The findings also indicate the potential for growth in areas that are currently less suitable for kiwifruit growing. These results may be useful in guiding future investment decisions for growers and post-harvest operators.

A subsequent study will assess climate-related risks to kiwifruit production under climate change, particularly the amount of value at risk. The project will also identify options to mitigate climate change effects and model the effectiveness of these on reducing risk. This study is due to be completed in mid-2023.

⁶ <https://www.plantandfood.com/en-nz/article/climate-change-impacts-on-kiwifruit>



Market and regulatory risks

Governments, customers and consumers are increasingly discerning about environmental performance. They're seeing the physical impacts relating to climate change and are aware and concerned. More and more, customer and consumer purchasing decisions reflect this increased sense of responsibility towards the environment.

Our Climate Change Risks and Opportunities Report describes the key transitional risks as being:

- environmental regulation
- social licence to operate
- shifting consumer preferences.

ENVIRONMENTAL REGULATIONS AND SOCIAL LICENCE TO OPERATE

Strengthened environmental regulations may result in cost increases over the short and medium terms. Such regulations are already emerging in many of Zespri's markets. Examples include emissions pricing and environmental labelling requirements.

In New Zealand, accessing water for irrigation is expected to become more challenging as prolonged dry periods combine with increased demand from communities, businesses and agriculture. The Kiwifruit Industry's Water Strategy⁷ provides a clear vision and governance with a focus on sustainable management of water resources.

The subsequent five year water roadmap⁸ provides a cross-disciplinary approach to put the vision into action, helping the industry to manage this emerging risk.

PROTECTING OUR VALUE IN THE MARKET

Zespri's growth strategy is founded on building brand identity and brand value, broadening our market base and looking at the long-term opportunities for the industry.

Market access can change, and regulatory and compliance requirements are expanding. Zespri and the industry must keep pace with these to make sure we meet market access requirements, stay relevant for our customers and hold value.

Acting on climate change isn't just about managing risk – it's also an opportunity. Research conducted by Kantar for Zespri in 2021 estimated a market opportunity of ~US\$1.9 billion if we are able to respond to the consumers that care about climate performance.

To help us understand this opportunity, and the consumer response to environmental claims, we are conducting a sales trial of a carbon neutral product. Working with a cohort of growers and selected supply chain partners, this work will enable us to develop and test our systems for emissions reporting and investigate innovative ways to reduce emissions.

⁷The Kiwifruit Industry Water Strategy: https://www.nzkgi.org.nz/wp-content/uploads/2020/09/1002013_Water_Strategy_Document_Update_R2_Final_WEB_Small.pdf

⁸A five-year plan to reach our Kiwifruit Industry's water goals: https://www.nzkgi.org.nz/wp-content/uploads/2021/06/Water-roadmap-Achieving-the-kiwifruit-industry-water-goals_Full-version.pdf



The actions
WE'LL TAKE





GOALS AND OBJECTIVES



GOAL 1: FUTURE-PROOF GROWING & BREEDING

1. Support growers to adopt climate-resilient practices
2. Continue to invest in climate-resilient cultivars
3. Develop a future-focused climate research programme



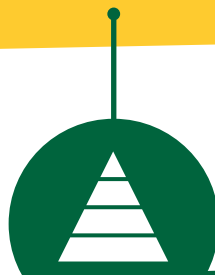
GOAL 2: MAINTAIN FRUIT QUALITY & MANAGE SUPPLY

1. Respond to fruit quality challenges
2. Adapt to changes to the season
3. Include climate impacts in industry planning



GOAL 3: PROTECT INDUSTRY PROFITABILITY

1. Assess likely effects on productivity and profitability
2. Lessen exposure to carbon costs by reducing emissions
3. Take action to address consumer and customer response



STRONG FOUNDATIONS

1. Improve data quality
2. Advocate effectively
3. Govern effectively



GOAL 1: FUTURE-PROOF GROWING AND BREEDING

Our growers work with the natural environment to produce nutritious kiwifruit – they naturally adapt to changing conditions and have been doing so for years. With climate change, growers will need to adapt further, and faster.

This goal is about making sure the way we grow, and types of kiwifruit we grow, will be productive in future growing climates. Much of this work is already being done across the industry, but we want to be deliberate about preparing for future climates.

1. Support growers to adopt climate-resilient practices

The industry provides resources and on-orchard support for growers. Many of the areas this guidance relates to will be affected by climate change, such as efficient water use or pest control. Including information about climate change in the advice we give to growers will enable them to set their orchards up to be less vulnerable and more resilient to the changing climate.

To help share these messages, organisations from across the industry will continue to offer support and guidance to growers, including one-on-one support and on-orchard workshops.

Zespri is in the process of developing a New Zealand grower network, which will serve to connect growers and decision-makers in the kiwifruit industry to each other and provide a platform where ideas and information can be shared and discussed. The topics addressed by this network will relate predominantly to sustainability, resilience and ecosystem services.

Growing conditions of our northern hemisphere partners are similar to the conditions New Zealand may experience in the future, due to projected temperature increases. Understanding the impact of key climate characteristics on overseas orchards and learning how growers manage these conditions could provide learning opportunities for New Zealand growers.

We will make the most of the industry's investment in research conducted in New Zealand and offshore by sharing orchard research and grower experiences between growing regions.

Develop Mātauranga Māori (a Māori knowledge base) for kiwifruit growing

Māori are an important partner in the kiwifruit industry, representing around 10 percent of New Zealand production. Māori growers have expressed an interest in having traditional knowledge and approaches to growing reflected in the guidance and discussions on responding to climate change.

We will identify what Māori growers want to know and develop projects to support learning in these areas.

2. Continue to invest in climate-resilient cultivars

Developing new kiwifruit varieties has been central to the success of the New Zealand kiwifruit industry and the Zespri brand. This includes our great-tasting and hugely popular Zespri SunGold™ Kiwifruit and Zespri RubyRed™ Kiwifruit varieties. The breeding programme in the New Zealand kiwifruit industry also focuses on the development of cultivars and rootstock that will meet other performance requirements, such as environmental, productivity and storage criteria.

We currently select traits that will perform well in a changing climate. These include increased nutrient and water efficiency, as well as tolerance to drought, waterlogging, low winter chill and pests and diseases. We will review the environmental screening criteria for new cultivars to ensure they reflect the matters identified in our Climate Change Risks and Opportunities Report.

3. Develop a future-focused climate research programme

Zespri’s research programme has played a critical role in shaping and strengthening the kiwifruit industry over the past 20 years. Developing a Future-Led Innovation Programme is one of Zespri’s key strategic priorities and a strong driver of future value for Zespri growers and shareholders.

We will develop a dedicated climate change research programme to understand the implications of climate change on kiwifruit and the wider ecosystem. This will include topics such as orchard resilience to severe weather events, heat tolerance, water security, biosecurity, biodiversity and pollination. We will seek out research partners to collaborate with so we can deliver high-quality, relevant research in a cost effective way.

This programme will include New Zealand and Zespri’s Global Supply regions, as well as adaptation that can be adopted across the supply chain.

We will also invest in exploring future production systems in combination with improved plant genetics. A key target will be increased scion resilience through improved rootstock cultivars specifically developed for growers in challenging climates.



FUTURE-PROOF GROWING AND BREEDING

Objectives	Actions	Timeframe
Support growers to adopt climate-resilient practices	1. Review grower resources through a climate change lens.	2023
	2. Summarise relevant research on Mātauranga Māori (traditional knowledge).	2023
	3. Support Māori growers to learn from each other in a te ao Māori context.	Ongoing
	4. In the context of Mātauranga Māori, identify what Māori growers want to know, and develop projects to support learning in these areas.	Ongoing
	5. Continue to invest in extension services to support growers to adapt to the changing climate.	Ongoing
	6. Continue to invest in systems and technologies to help growers manage risks of new pests and diseases.	Ongoing
	7. Share learnings between New Zealand and offshore growing regions.	Ongoing
Continue to invest in climate-resilient cultivars	8. Review the criteria for new fruiting and rootstock cultivars to reflect updated climate risks (every three years).	2023 onwards
	9. Ensure innovations in growing systems enable mitigation of climate change risks.	Ongoing
Develop a future-focused climate research programme	10. Develop three-year climate change research and innovation plan.	2023
	11. Assess climate change risks and validate solutions to increase industry resilience.	Ongoing
	12. Invest in understanding the climate-related benefits of future production systems.	Ongoing



GOAL 2: MAINTAIN FRUIT QUALITY AND MANAGE SUPPLY

Kiwifruit crops develop and mature in response to distinct climatic conditions that happen throughout a season. Over time, some of these conditions might change due to climate change. Some industry insights suggest current conditions have already started to change, and this may be affecting the timing of fruit maturity, fruit quality and how well the fruit stores once harvested. This goal is about investing in research, technology and systems to better understand the impact of the changing climate on production and supply and translating that so the industry can prepare and respond.

1. Respond to fruit quality challenges

Launched in 2001, the Taste Zespri programme aims to produce the best-tasting kiwifruit and this superior taste experience to deliver to the consumer. This programme has helped build increased value and returns to growers.

Due to climate change, some of the climatic factors our growers rely on to develop great-tasting, higher quality kiwifruit may change over time. Therefore, as the industry continues to monitor trends in taste and fruit quality, we will also consider the contribution climate change may have made. This will allow us to predict what may happen as the climate continues to change and adjust our practices accordingly.

2. Adapt to changes to the season

Each season has key characteristics that contribute to the growth of quality kiwifruit in New Zealand and overseas. As the climate changes, some elements of the seasons may also change.

We will investigate how climate change is expected to affect the length and timing of growing seasons in New Zealand and offshore.

For example, we expect opportunities to extend kiwifruit growing into new regions around New Zealand, such as further south and to higher elevations. The timing of harvest may differ in these new regions.

We will assess how changes to key climate variables in new and emerging growing regions could impact the supply of kiwifruit in New Zealand. This will enable the industry to be prepared, including making the most of the opportunities.

3. Include climate impacts in industry planning

Understanding how climate change could affect supply within a season and over time provides important information that will help the industry plan for the season ahead. We will invest in technology and systems to provide more accurate estimations of orchard production and maturity timing, which will assist with supply chain forecasting and planning for the season.

These climate insights can also be useful in longer-term forecasting. Our *Five-Year Outlook* document explains to growers, industry representatives and shareholders how Zespri's medium-term strategy will be implemented. The *Five-Year Outlook* is updated and reviewed annually by the Board of Directors and sets out some of the key challenges and opportunities ahead. In doing so, it helps inform business decisions and investments across the industry. As our understanding of climate implications improves over time, we will reflect these findings in the *Five-Year Outlook*.



MAINTAIN FRUIT QUALITY AND MANAGE SUPPLY

Objectives	Actions	Timeframe
Respond to fruit quality challenges	13. Consider the contribution of climate variables in fruit quality issues as part of the industry's Quality Review.	2023
	14. Consider the contribution of climate variables to fruit quality as part of annual season reviews.	2023 onwards
Adapt to changes to the season	15. Investigate how changes to key climate variables could impact the timing of the season.	2024
Include climate impacts in industry planning	16. Review the climate-related assessment criteria for offshore partner/grower selection process.	2023
	17. Review the climate-related site selection criteria for the assessment of new offshore growing regions.	2023
	18. Include climate considerations as part of Zespri's five year planning process.	2023 onwards



GOAL 3: PROTECT INDUSTRY PROFITABILITY

Over time, we may see more challenging growing conditions and increased market and regulatory costs, which could affect the industry's overall productivity and profitability. Our goal is to better understand what these changes might look like, which is the first step in being able to prepare and respond to them.

1. Assess likely effects on to productivity and profitability

There are many ways that the physical and transitional impacts of climate change could affect orchard and industry profitability.

Changes to weather patterns could increase or decrease productivity in different regions. Zespri has partnered with Plant & Food Research in a New Zealand Ministry for Primary Industries project to assess the impact of climate change on kiwifruit productivity in different New Zealand growing regions. We will undertake a similar assessment for our overseas growing regions.

Severe weather events like storms are becoming more frequent. While these events can be devastating to productivity and can have high clean-up costs, there are actions growers can take to reduce their impact. For example, natural or artificial shelters can be used to help protect flowers and fruit from severe wind events, which can reduce crop yields and damage fruit.

Disruptions to the supply chain could affect the ability to get fruit into market, relationships with customers and returns for all involved in the industry. Zespri has initiated discussions with key shipping stakeholders, including the Port of Tauranga and New Zealand government agencies, about the risks and resiliency options for international shipping.

The **cost of meeting regulatory and market expectations**, such as emissions pricing and environmental labelling, could increase costs across the supply chain. For example, an increase in the emissions price in New Zealand would increase growers' costs for fertiliser, electricity (and thus irrigation) and fuel. Their Orchard Gate Returns would also factor in the higher emissions costs that their post-harvest operators and others in the supply chain are facing.

Research findings relating to these climate impacts will be communicated to the industry and potential investors.

2. Lessen exposure to carbon cost by reducing emissions

Exposure to the rising cost of carbon is inevitable as the world grapples with the challenge of how to address climate change and regulators seek to constrain emissions. By reducing emissions, we can play our part in avoiding catastrophic climate change and reduce our exposure to these increasing costs.

NATURAL HAZARDS PROTECTION

The industry has already invested in actions that reduce the financial impacts on kiwifruit returns from hail events through its hail damage policy. This established process positions the kiwifruit industry well to consider expansion to cover other impacts of acute weather events in coming years as climate-related events increase in severity and frequency.

Amending the policy to provide additional support for climate-related events serves as a mechanism for providing financial protection to

growers that isn't available through conventional insurance channels. In June 2022, growers were asked if they wanted to extend cover to other natural disasters for which risks cannot be mitigated, such as earthquakes, volcanic eruptions and flooding events. At this stage, growers voted not to extend the policy.

We will continue to revisit the issue, including seeking input from growers, at least every five years.



We will **develop a pathway to net zero** that will assess emissions trajectories and identify priority actions across the supply chain to reduce emissions.

Developing **levers for change** will be a key element of this pathway. This may include introducing a price to incentivise emissions reductions actions across the supply chain. The form of any pricing mechanism would depend on the barriers to action we identify as part of our pathway to net zero.

We will continue to **focus on shipping**, which accounts for 43 percent of our emissions. Research commissioned by Zespri has given our shipping experts key insights into future fuels and technologies. These will provide opportunities for conversations and partnerships with shipping providers, as well as advocacy with governments about measures that may support decarbonisation.

Offsetting in the meantime: we have demonstrated our commitment to protecting the environment through our climate targets to being carbon positive to retailers by 2030 and carbon positive in total by 2035. However, reducing our emissions will take time. Growers want to understand the contribution they make by removing carbon dioxide from the atmosphere through their vines, additional planting efforts and soil sequestration.

We will continue our work to understand these contributions as well as the role that purchasing carbon credits will play.

3. Take action to address consumer and customer response

Zespri has a number of initiatives underway and planned to help understand the role of climate action in protecting and driving value in the market. To do this, we will undertake research on the value that environmental sustainability and actions on emissions can contribute to Zespri's brand. We will also conduct regular market scans to gain insights about environmental sustainability trends.

Zespri is collaborating with supply chain partners to deliver a carbon neutral product trial. The trial will develop our expertise in environmental certification, measuring and reducing supply chain emissions and the value proposition it may offer. Our collaborative approach will also provide valuable insights and lessons for reducing emissions and reaching our industry goal of being carbon positive by 2035.



PROTECT INDUSTRY PROFITABILITY

Objectives	Actions	Timeframe
Assess likely effects on productivity and profitability	19. Model climate impacts and adaptation in New Zealand and overseas growing regions.	2023 onwards
	20. Update new cultivar investment guides and grower guidance for New Zealand licence releases.	2023 onwards
	21. At least every five years, ask growers whether there is interest in arranging insurance for natural disaster risks to risks other than hail.	2025
Lessen exposure to carbon cost by reducing emissions	22. Develop options for industry pathways to net-zero emissions.	April 2023
	23. Agree industry pathway to net-zero and actions to achieve this.	March 2024
	24. Update emissions footprint for the full supply chain.	2024
	25. Desktop analysis of potential for on-orchard carbon sequestration.	2023
Take action to address consumer and customer response	26. Incorporate carbon costs into Zespri financial planning.	2023 onwards
	27. Assess the value environmental sustainability contributes to the Zespri brand.	2023 onwards
	28. Undertake market insights about environmental sustainability trends.	2023 onwards
	29. Deliver a certified carbon neutral product.	2024



STRONG FOUNDATIONS

Underpinning all our work on sustainability is a commitment to reliable, high-quality data and evidence that the industry can rely on to make informed decisions. These are also critical in contributing to local and national policy discussions and shaping international rules and standards. Our strong governance arrangements will ensure we keep on track and identify and respond appropriately to risks and opportunities as they arise.

1. Improve data quality

Zespri has defined the performance indicators for its climate change targets and commitments in line with internationally recognised standards.⁹ Independent assurance over all climate-related disclosures included in Zespri's annual reporting helps to increase the credibility and reliability of information being disclosed.

However, challenges still exist in obtaining timely and accurate environmental data from certain parts of the supply chain. We will invest in systems to deliver data-driven insights, which will enable timely business planning and decision-making.

2. Advocate effectively

The kiwifruit industry takes a collaborative approach to environmental policy and advocacy in New Zealand, particularly on water and climate issues, which are closely related. New Zealand Kiwifruit Growers Incorporated (NZKGI) works closely with Māori Kiwifruit Growers Incorporated (MKGI) and Zespri to develop policies on environmental issues that affect growers, leveraging the expertise and insights from other organisations, sectors and government.

The industry will continue to invest in these relationships, contributing to water and climate policies at local and national levels. Zespri will continue to contribute to collaboration platforms – such as the Sustainable Business Council, Climate Leaders Coalition and Aotearoa Circle – to represent the industry's interests and contribute to national strategies. We will advocate for evidence-based recognition of New Zealand and industry-specific practices in global reporting standards.

3. Govern effectively

As presented in our Climate Change Risks and Opportunities Report, the industry already has governance arrangements in place to manage sustainability risks, including climate change. These risks are reported on annually to the Audit and Risk Management Committee, a sub-committee of Zespri's Board of Directors.

To successfully adapt to climate change, we need a step change in our efforts to identify and evaluate potential risks and opportunities. We need all our supply chain partners to contribute to this. To help promote these insights, an environmental engagement group for New Zealand-based post-harvest operators will be established. This group will also inform the development of industry environmental policies, practices and targets.

Together, we can decide what action is needed. This could range from monitoring changes over time, undertaking further research or taking steps to manage the risk or explore an opportunity.

⁹Zespri has used the following standards to estimate emissions: PAS 2050-1:2012 for the assessment of life cycle greenhouse gas emissions for horticulture products; and ISO14064-1 for the quantification and reporting of Zespri's organisational (or 'corporate') emissions.



STRONG FOUNDATIONS

Improve data quality	Actions	Timeframe
Improve data systems and insights	30. Improve climate reporting process and models to enable timely data insights.	Ongoing
	31. Develop weather risk monitoring platforms and climate change impact models.	2023 onwards
Advocate effectively	Actions	Timeframe
Support supply chain partners	32. Encourage supply chain partners to assess, monitor and respond to climate risks.	Ongoing
	33. Fund research on climate risks to the supply chain where there is an industry-wide benefit.	Ongoing
Influence regulation	34. Continue to invest in advocacy on water issues and climate policies at national and regional levels.	Ongoing
	35. Engage with New Zealand regional and district councils in relation to effective consenting processes.	Ongoing
Strengthen buy-in from stakeholders	36. Establish an environmental engagement group for New Zealand post-harvest operators.	April 2023
Influence global standards	37. Advocate for recognition of New Zealand and industry-specific practices in global reporting standards.	Ongoing
	38. Leverage collaboration platforms to represent the industry's interests and contribute to national strategies.	Ongoing
Govern effectively	Actions	Timeframe
Support implementation and risk management	39. Report annually to the industry on progress implementing the Climate Change Adaptation Plan.	Annual
	40. Report annually to the Zespri Audit & Risk Management Committee on emerging climate risks and opportunities, and industry responses.	Annual
	41. Review Zespri's Climate Change Risks and Opportunities Report every three years.	2024 onwards



Measuring
OUR PROGRESS





Our measure of success will be based on the progress in delivery against the three-year work programme.

Progress in implementing the milestones set out in the work programme will be reported annually to Zespri's Audit and Risk Management Committee and the New Zealand Kiwifruit Industry Advisory Council.

We will review this plan by 2025, following an update of the Climate Change Risks and Opportunities Report (due in 2024).

This will allow the planning for the second stage of our Climate Change Adaptation Plan to be developed and implemented from 2026-2030.



Summary OF ACTIONS



FUTURE-PROOF GROWING AND BREEDING

Objectives	Actions	Timeframe
Support growers to adopt climate-resilient practices	1. Review grower resources through a climate change lens.	2023
	2. Summarise relevant research on Mātauranga Māori (traditional knowledge).	2023
	3. Support Māori growers to learn from each other in a te ao Māori context.	Ongoing
	4. In the context of Mātauranga Māori, identify what Māori growers want to know, and develop projects to support learning in these areas.	Ongoing
	5. Continue to invest in extension services to support growers to adapt to the changing climate.	Ongoing
	6. Continue to invest in systems and technologies to help growers manage risks of new pests and diseases.	Ongoing
	7. Share learnings between New Zealand and offshore growing regions.	Ongoing
Continue to invest in climate-resilient cultivars	8. Review the criteria for new fruiting and rootstock cultivars to reflect updated climate risks (every three years).	2023 onwards
	9. Ensure innovations in growing systems enable mitigation of climate change risks.	Ongoing
Develop a future-focused climate research programme	10. Develop a three-year climate change research and innovation plan.	2023
	11. Assess climate change risks and validate solutions to increase industry resilience.	Ongoing
	12. Invest in understanding the climate-related benefits of future production systems.	Ongoing



MAINTAIN FRUIT QUALITY AND MANAGE SUPPLY

Objectives	Actions	Timeframe
Respond to fruit quality challenges	13. Consider the contribution of climate variables in fruit quality issues as part of the industry's Quality Review.	2023
	14. Consider the contribution of climate variables to fruit quality as part of annual season reviews.	2023 onwards
Adapt to changes to the season	15. Investigate how changes to key climate variables could impact the timing of the season.	2024
Include climate impacts in industry planning	16. Review the climate-related assessment criteria for offshore partner/grower selection process.	2023
	17. Review the climate-related site selection criteria for the assessment of new offshore growing regions.	2023
	18. Include climate considerations as part of Zespri's five year planning process.	2023 onwards



PROTECT INDUSTRY PROFITABILITY

Objectives	Actions	Timeframe
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	23. Agree industry pathway to net-zero and actions to achieve this.	March 2024
	24. Update emissions footprint for the full supply chain.	2024
	25. Undertake desktop analysis of potential for on-orchard carbon sequestration.	2023
	26. Incorporate carbon costs into Zespri financial planning.	2023 onwards
Take action to address consumer and customer response	27. Assess the value environmental sustainability contributes to the Zespri brand.	2023 onwards
	28. Develop market insights about environmental sustainability trends.	2023 onwards
	29. Deliver a certified carbon neutral product.	2024



STRONG FOUNDATIONS

Objectives	Actions	Timeframe
Improve data quality		
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Advocate effectively		
Support supply chain partners	32. Encourage supply chain partners to assess, monitor and respond to climate risks.	Ongoing
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Influence regulation	34. Continue to invest in advocacy on water issues and climate policies at national and regional levels.	Ongoing
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Strengthen buy-in from stakeholders	36. Establish an environmental engagement group for New Zealand post-harvest operators.	April 2023
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	38. Leverage collaboration platforms to represent the industry's interests and contribute to national strategies.	Ongoing
Govern effectively		
Support implementation and risk management	39. Report annually to the industry on progress implementing the Climate Change Adaptation Plan.	Annual
	40. Report annually to the Zespri Audit & Risk Management Committee on emerging climate risks and opportunities, and industry responses.	Annual
	41. Review Zespri's Climate Change Risks and Opportunities Report every three years.	2024 onwards





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