

SUBMISSION

SUBMISSION ON
**Climate Change Adaptation
Plan**

7 June 2022

To: Ministry for the Environment

Name of Submitter: Horticulture New Zealand

Supported by: New Zealand Kiwifruit Growers Inc, Tomatoes
NZ and Asparagus Council, Citrus NZ, Teviot Fruit Growers
Association, Persimmon Industry Council, NZ Feijoa Growers

Contact for Service:

Michelle Sands
Policy and Strategy Manager
Horticulture New Zealand
PO Box 10-232 WELLINGTON
Ph: 021 610 653
Email: michelle@horticulture.co.nz



OVERVIEW

Submission structure

- 1 Part 1: HortNZ's Role
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Our submission

Horticulture New Zealand (HortNZ) thanks the Ministry for the Environment (MfE) for the opportunity to submit on the Climate Change Adaptation Plan and welcomes any opportunity to continue to work with MfE and to discuss our submission.

HortNZ wishes to be heard in support of our submission and would be prepared to consider presenting our submission in a joint case with others making a similar submission at any hearing.

The details of HortNZ's submission and decisions we are seeking are set out in our submission below.

HortNZ's Role

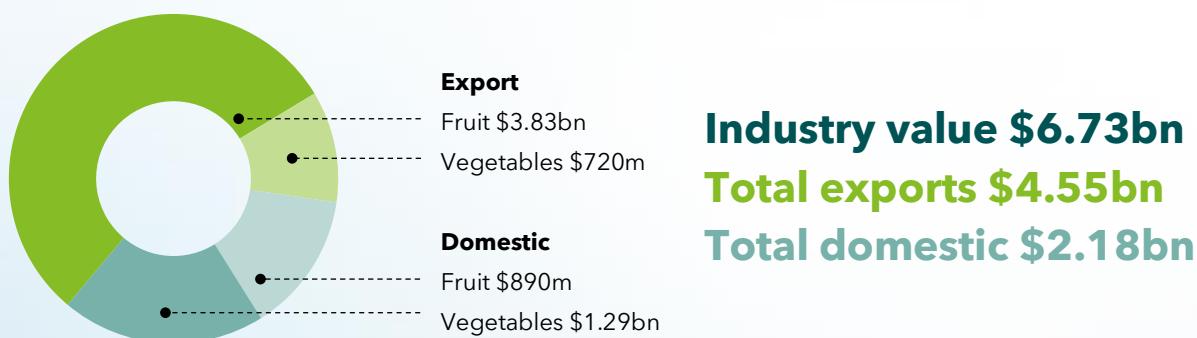
Background to HortNZ

HortNZ represents the interests of 6000 commercial fruit and vegetable growers in New Zealand, who grow around 100 different crop types and employ over 60,000 workers.

There is approximately 120,000 hectares of horticultural land in New Zealand - approximately 80,000 ha of this is fruit and vegetables. The remaining 40,000 ha is primarily made up of wine grapes and hops, which HortNZ does not represent.

It is not just the economic benefits associated with horticultural production that are important. The rural economy supports rural communities and rural production defines much of the rural landscape. Food production values provide a platform for long term sustainability of communities, through the provision of food security.

HortNZ's purpose is to create an enduring environment where growers prosper. This is done through enabling, promoting and advocating for growers in New Zealand.



HortNZ's Resource Management Act 1991 Involvement

On behalf of its grower members HortNZ takes a detailed involvement in resource management planning processes around New Zealand. HortNZ works to raise growers' awareness of the Resource Management Act 1991 (RMA) to ensure effective grower involvement under the Act.

Executive Summary

Horticulture is reliant on highly productive land (HPL) and infrastructure (transport networks, power, water etc) which in coastal and flood prone areas are vulnerable to impacts of climate change. Having the skills, financial incentives, guidance and knowledge will be essential for growers to adapt to a changing climate.

To enable horticulture growth to continue and increase, we need investment in the right areas and a regulatory/policy environment that enables the market to respond. Investment and policy support needs to occur now to enable outcomes to be achieved in the second and third emissions budgets—however, the alternative is to rely on technological solutions that do not yet exist.

New Zealand's existing food production systems are coming under increased pressure from population growth (and competing land use demands reducing availability of HPL) climate change, water concerns, emissions trading costs (ETS), the cost of energy, and the need to improve environmental outcomes.

Food Security

Food security is a nationally important issue which needs to be addressed at a strategic level. While New Zealand is a net food exporter, many of the vegetables and some of the fruit that we grow are only for domestic food supply.

*"Observed climate change is already affecting food security through increasing temperatures, changing precipitation patterns, and greater frequency of some extreme events ... Food security will be increasingly affected by projected future climate change."*¹

We have a national food producing system that relies on growing vegetables and fruit in pockets of HPL, with good climate and access to freshwater. Fruit and vegetables are essential for the human health of New Zealanders.

Over 80 percent of vegetables grown in New Zealand are for domestic consumption. For most vegetable crops, the domestic market is the primary market, but many growers produce export crops within their rotations for practical (soil health) and economic reasons. Most of the vegetables that New Zealand imports are processed. In 2019, the most imported vegetables were preserved tomatoes and frozen potatoes.² New Zealand also has an important role in exporting fresh vegetables to the Pacific Islands.³ New Zealand and our Pacific Island neighbours are too remote to import many fresh vegetables from elsewhere in the world.

¹ IPCC Special Report on Climate Change and Land. Chapter 05 Food Security (Executive Summary). <https://www.ipcc.ch/srccl/chapter/chapter-5/>

² Plant and Food, Fresh Facts 2019

³ For example, in 2016 76% of total exported potatoes went to Fiji, 87% of exported Kumara and 82% of exported cauliflower, 75% of exported cabbage went to the Pacific Islands. ([KPMG, 2017. New Zealand domestic vegetable production: the growing story](#)).

Some fruit crops grown in New Zealand have a predominately export focus - for example, it has been estimated by NZIER that 95% of kiwifruit and 83% of apples are exported⁴. These two crops account for approximately 75% of New Zealand's fruit and vegetable exports⁵. Many fruit crops are grown mainly for the domestic supply. For example, nectarines, peaches and plums, oranges, mandarins, feijoas, tamarillos, and strawberries.⁶

Sustaining productive food security through a changing climate will be critical and the elevation of impacted food security as a risk is essential.

⁴ NZIER, 2019. Farm share of retail prices. Analysis of domestic farmer margins in a globalised world.

⁵ Fresh facts 2020 data, as a proportion of total horticultural exports (excluding wine, hops, and 'other horticulture').

⁶ FreshFacts 2020

Submission

1. National Adaptation Plan

1.1. Objectives

We support the objectives and outcome areas proposed in the plan, however, we seek a specific objective for food security, within the economy and financial systems outcome area

1.2. Economy and Financial System Outcome Areas

We support the outcomes proposed but consider it vital that a specific outcome for food security is included.

A key theme in several of our submissions on climate related policy is the need to provide for our ongoing domestic food security.

The Paris Agreement recognises the fundamental priority of safeguarding food security Article 2b⁷, specifically seeks that our adaptation and resilience is achieved in a manner that does not threaten food production.

It is important that New Zealand retains the ability to provide for our own fruit and vegetables - in terms of availability, but also affordability. We consider that there is a need to protect New Zealand's food security and resilience of food production - as an important social and human health value.

Outcome sought

Include the following objective in the Economy and Financial System Outcome Area

- Our food systems are secure, and participants can identify and manage climate risks

2.3 System Wide Actions

1.2.1. FOCUS AREA ONE: REFORM INSTITUTIONS TO BE FIT FOR A CHANGING CLIMATE

The Climate Change Commission's report to government, included recommendations to support alternative, lower emissions land uses (refer box below):

⁷ https://unfccc.int/sites/default/files/english_paris_agreement.pdf

Ināia tonu nei: A Low Emissions Future for Aotearoa

- The demonstration path assumes 2,000 ha of land is converted to horticulture per year from 2025. The Climate Change Commission expects that this could include in future “if barriers – such as water availability, labour, supply chains and path to market – are addressed.”
- A path of less technological change and more behaviour change (‘Alternative Pathway A’) would require an additional 3,500 ha per year. By 2050 this would see horticulture increase by approximately 100,000 ha.
- “Opening up opportunities for more conversion to lower emissions production systems and land uses, including horticulture” is listed as a critical outcome.
- Policy direction for agriculture includes:
 - “Support systems and infrastructure for alternative, lower emissions land uses so that there is more potential to convert land to low emissions uses in future. This includes, for example, infrastructure and supply chains for horticulture.”

To enable horticulture growth to continue and increase, we need investment in the right areas and a regulatory/policy environment that enables the market to respond. Investment and policy support needs to occur now to enable outcomes to be achieved in the second and third emissions budgets—however, the alternative is to rely on technological solutions that do not yet exist.

This is important both from a perspective of climate change adaptation (adapting to changing climate may bring new opportunities for horticulture), climate change mitigation (through land-use change to a low emissions land use) and importantly, providing New Zealand with options for meeting our targets should other initiatives not proceed at the pace necessary.

Research has illustrated the connection between eating patterns, climate change and health outcomes and eating more plant-based foods and minimising food waste were one of the most important ways individuals could reduce their personal climate footprint, while also having health gains and health system savings⁸. This research reported annual diet-related emissions reductions of between 4 percent (following New Zealand Dietary Guidelines) to 42 per cent (waste free vegan diet), the latter being equivalent to one-fifth of the current emissions reduction needed to meet New Zealand’s commitment under the Paris Climate Agreement.

The reform of the RMA (resulting in the Natural and Built Environment Act (NBA), Strategic Planning Act, and Climate Adaptation Act presents opportunities for alignment with climate mitigation and adaptation.

- HortNZ supports the NBA promoting, as an environmental outcome, reduction in greenhouse gas emissions:

⁸ Drew, J et al. (2020) ‘Healthy and Climate-Friendly Eating Patterns in the New Zealand Context’. Environmental Health Perspectives <https://ehp.niehs.nih.gov/doi/full/10.1289/EHP5996>

- It is important to enable land use change to horticulture
- There is also a need to ensure the resource management framework is appropriate in terms of enabling the supply of low emissions fuels.

Diversification to horticulture presents an opportunity to reduce emissions while increasing food production. Plant based balanced diets are recognised as key mitigation strategy in the IPCC 6th Assessment Report⁹.

In New Zealand, there is 1,000,000 ha of land that could potentially be converted to horticulture. If this land was converted to horticulture, it would be as effective at reducing New Zealand’s agricultural emissions as a methane vaccine.

Compliance adaptation costs needs to align with scale and impact, it is otherwise inefficient and could limit opportunities for positive change. Regulatory pressure is preventing the expansion of vegetable growing from keeping up with population growth. This is predicted to result in increased cost for consumers, with tangible health consequences.

Outcome sought

For the horticulture sector there are seven actions that must be prioritised to manage impacts on food security:

1. To develop a National Food Strategy, that includes consideration of the importance of NZ in supporting food security in the Pacific
2. Specifically recognise the importance of food security in supporting human health in the NBA
3. Specifically recognise the importance of HPL for food production in the NBA
4. Ensure National Planning Framework under the NBA, promotes Te Oranga o te Taiao, in a way that enables the benefits of strategically important outcomes to be balanced against localised effects
5. In the NPS HPL specifically prioritise and support the use of HPL for low emissions food production
6. In the NPS HPL specifically recognise that the productive capacity of HPL is measured in its social, cultural and economic contribution.
7. To develop a National Environmental Standard for commercial vegetable growing, to provide a longer-term planning certainty that provided for by the NPFM SVGA.

⁹ <https://www.ipcc.ch/report/ar6/wg2/>

FOCUS AREA TWO: PROVIDE DATA, INFORMATION, TOOLS AND GUIDANCE TO ENABLE EVERYONE TO ASSESS AND REDUCE THEIR OWN CLIMATE RISKS

Growers will need support to adapt including understanding the financial impacts on operations. This could include:

- Industry specific climate change preparedness resources and information sessions
- Raising awareness of climate change adaptation and providing technical assistance
- Financial impacts of adaptation
- Government funded region specific climate forecasting. The Local Government NZ Vulnerable: The Quantum of Local Government Infrastructure Exposed to Sea Level Rise report looks at infrastructure exposed to sea level rise. Expansion into other areas - infrastructure/land exposed to flood risk and drought will be critical to help the horticulture sector identify vulnerabilities, plan and adapt
- Reliable modelling and scenario planning tools.

While the Adaptation Plan notes a range of actions government will undertake to ensure there is robust information about climate risks and adaptation solutions available to all, we would like to see more focus on industry specific guidance and what direct actions growers/businesses can take or start planning for.

Outcome sought

We seek consideration of the following initiatives:

- Specific industry guidance on adaptation planning
- Reliable Modelling and scenario planning tools in particular sea level rise modelling impacts on horticulture land
- Assessment of financial impacts of adaptation
- Industry specific climate change preparedness resources and information sessions

1.3. Natural Environment

We support the outcomes proposed for the natural environment and have provided specific comments on biosecurity, working with nature and breed enhancing technology.

1.3.1. ROBUST BIOSECURITY

A changing climate is expected to alter New Zealand's biosecurity risk¹⁰. New Zealand's temperate climate means that some tropical and sub-tropical high-risk biosecurity threats are currently unable to establish here. A warmer climate would likely mean that some of these unwanted pests could permanently establish in New Zealand in the future.

As well as an increased threat from new pests, it is possible that 'sleeper' pests, pathogens and weeds that are already present in New Zealand, could become much more

¹⁰ <https://www.mpi.govt.nz/dmsdocument/10979-Effects-of-climate-change-on-current-and-potential-biosecurity-pests-and-diseases-in-New-Zealand>

problematic under warmer temperatures. Incursions of new biosecurity threats and the emergence of damage from existing 'sleeper' pests both present a significant risk to the future success of the horticulture industry. Access to tools and capability will be required to respond to these challenges.

The adaptation plan states that *"Robust biosecurity reduces the risk of new pests and diseases spreading (objective NE2). This means: plants and animals are more resilient, through the control of invasive pests and diseases, and the risk of these establishing and spreading is reduced."* HortNZ would like to ensure that access to crop varieties that are resistant to pests, diseases and adverse environmental conditions is captured in this concept of resilience. A focus on controlling invasive species is important, but so is enabling the use of growing systems and plant varieties that make crops less susceptible to pests.

1.3.2. WORKING WITH NATURE - FLOOD PROTECTION, WATER STORAGE, WATER QUALITY TREATMENT

Horticulture occurs on our most HPL. These highly productive soils have formed over thousands of years. This HPL is a natural resource that will need to be carefully managed with a changing climate so this land can continue to meet the reasonably foreseeable needs of future generations.

With a changing climate we can expect the following impacts on:

- Increased risk of flooding and poorer drainage threatening the viability of some HPL for horticulture
- Increased drought, reducing the capacity of receiving environments to assimilate abstractions to support fruit and vegetable production
- Increased temperatures, reducing the capacity of receiving environments to assimilate discharges associated with fruit and vegetable production.

Water infrastructure will be critical in enabling the horticulture sector to adapt to the changing climate, while reducing impacts on ecosystems and safeguarding the HPL resource for future generations. Sea level rise may cause intrusion in coastal groundwater which may enable aquifers unusable.

Flood protection will be critical to protect growing operations vulnerable to sea level rise and floods. Current levels of flood protection infrastructure will need to adapt as the climate risk grows.

Water Storage

In the face of climate change, water storage infrastructure is essential as part of New Zealand's adaptation response.

As reported in the MPI Water Availability and Security in Aotearoa New Zealand (WASAG) report,¹¹ climate trends indicate that New Zealand is getting warmer and drier and more prone to climate extremes (e.g. flood and drought) - this poses significant challenges in terms of water availability for the food and fibre sector and rural communities (as well as urban communities). Water storage is a key climate change adaptation option.

¹¹ <https://www.mpi.govt.nz/dmsdocument/47770-Water-Availability-and-Security-in-Aotearoa-New-Zealand>

The report identified that increased water security (required to transition towards more resilient, higher economic and lower environmental footprint land uses) will require 'a strategic focus and serious investment'.

Policy rationale for proposed changes to provisions in the NPSFM 2020 and NESFM 2020 (including a proposed change to provide a consenting pathway for water storage infrastructure that meets certain policy criteria) recognises that water storage is '*an essential and growing part of New Zealand's infrastructure in the face of climate change*'.¹²

While many water storage projects are driven from the perspective of rural water security and enabling land-use change potential - they also play an important role in urban water supply for drinking water. There could also be a role for water storage in providing benefits for flood management/flood attenuation. For example:

- The Tai Tokelau Water scheme under development in Northland will enable land use change (e.g., for conversion of pastoral farming to horticulture with likely improvements in water quality and emissions), benefit municipal drinking water supply improving the resilience of local communities, enable expansion of local electricity supply and maintain ecological health¹³
- The Waimea Community Dam will improve the security of water supply in the region, improve water quality, and strengthen the economy¹⁴
- The (now abandoned) Wakamoekau Community Water Storage Scheme in the Wairarapa would have enabled land use diversification, supplemented municipal water supply, and mitigated the impacts of drought¹⁵

HortNZ is mindful of the need for water storage development to be consistent with Te Mana o Te Wai principles and hierarchy of obligations. It is important that in discussions around water storage, the hierarchy of obligations (first freshwater, then health needs of people and then everything else) does not mean that uses 'higher-up' in the hierarchy should be immune to sharing in the cost of such projects - which ultimately can enable freshwater to be provided for while also providing for other uses in a less water secure environment.

Water storage can have environmental, social, economic and cultural benefits and should feature in the National Adaptation Plan.

1.3.3 BREED ENHANCING TECHNOLOGY

While HortNZ has previously not supported use of genetic modified organism technologies, we have been advised by scientists that gene editing (advanced breeding technologies) is going to be essential for the primary sector and in particular horticulture to adapt growing systems to enable a transition to a changing climate while still being productive. An enquiry by the Productivity Commission that focussed on a central aspect of New Zealand's productivity performance¹⁶ found that:

¹² Consultation on exposure draft of proposed changes in June - July 200, specifically 'Ministry for the Environment. 2022. Managing our wetlands: Policy rationale for exposure draft amendments 2022. Wellington: Ministry for the Environment.'

¹³ <https://www.mpi.govt.nz/dmsdocument/47770-Water-Availability-and-Security-in-Aotearoa-New-Zealand>

¹⁴ <https://www.tasman.govt.nz/my-council/projects/waimea-community-dam/#:~:text=The%20Waimea%20Community%20Dam%20is,people%2C%20plants%2C%20fish%20and%20animals>

¹⁵ <https://www.beehive.govt.nz/release/funding-unlock-economic-growth-wairarapa>

¹⁶ <https://www.productivity.govt.nz/assets/Documents/Final-report-Frontier-firms.pdf>

Genetic modification (GM) research is an important pathway to innovation, including in New Zealand's primary industries. It offers new opportunities for boosting productivity, solving biosecurity risks, and responding to climate change risks and other environmental problems effectively and efficiently.

Gene-editing technologies can be used to improve plant traits such as drought tolerance, disease resistance and fruit ripening. These technologies can also speed up conventional plant-breeding processes, allowing innovations such as new cultivars to be developed more quickly. Improved disease resistance in crops can in turn reduce the need for chemical herbicides and pesticides.

Sustaining (and growing) production outputs through a changing climate is essential to supply fresh fruit and vegetables for New Zealanders, Pacific Nations and to export markets however the current regulatory settings are restrictive and do not allow innovation to proceed. HortNZ supports a full regulatory review into existing regulations and welcomes the opportunity to be part of this conversation.

Outcome sought

For the horticulture sector there are four actions that must be prioritised to improve our resilience to biosecurity risks associated with climate change:

- Urgently review and update the HSNO Act. The act is stifling the ability to introduce the tools New Zealand needs to respond to pests and diseases under a changing climate in a timely manner
- Invest in climate-change relevant skills and capability, both in the public service and in the science system. In particular, invest in modelling capability and projects to better understand the interaction between a change in climate and biosecurity risk in a New Zealand context. This should include climate matching between New Zealand and the world under current and future climates with the high-resolution climate data now available
- Maintain a formal process to monitor and analyse changes in biosecurity risk that may result from evolving passenger/trade pathways coupled with a warming climate. This can be used to inform biosecurity risk assessment and regulations
- Invest in plant breeding programmes so we have crop varieties that are resilient to the changing climate and to new pest and disease threats. The traditional breeding technologies we are currently restricted to take years or decades to come to fruition.

Other outcomes sought

- Ensure maintaining the productive capacity of HPL for future generations and specifically including food security, when determining how investment in the next generation of flood protection, water storage and water quality treatment infrastructure is designed and funded
- Analysis on sea level intrusion into coastal ground water sources
- A full review into gene editing technology legislations (HSNO Act)

- Inclusion of water storage solutions in the National Adaptation Plan.

1.4. Infrastructure

While we support the development and implementation of the proposed Waka Kotahi Climate Change Adaptation Plan, we remain concerned on the direction the government is taking in relation to providing and approving arterial routes for freight movements.

Improving freight connections is one of the four strategic priorities in the Government Policy Statement on Land Transport¹⁷ and as an example two key projects that would see reduced travel times and safer routes have been either delayed or scrapped by the government. For example:

- Changes to the Mill Road upgrade in Auckland
 - A report by Auckland Transport¹⁸ found that without the necessary upgrades, congestion on this route will achieve unreasonable levels by 2024
- Delays and changes to State Highway 2 from Omokoroa to Tauranga
 - Upgrades to a four-lane motorway to support the key arterial route from Auckland/Northland to New Zealand's largest port and to reduce accidents and fatalities on one of New Zealand's most dangerous roads have added to unsafe levels of congestion and increased travel times

An efficient roading network means less emissions and manageable costs for freight operators. Increased freight times due to congested networks means a significant cost increase. There is a huge cost component (which is passed on to consumers with higher food prices)

Extreme weather events are putting pressure on already stressed networks. Gisborne is a region that has had a number of extreme rain events which has caused flooding and road closures. It is extremely difficult to remove fresh produce from the region to market when there is not the roading infrastructure to support delivery.

There are several climate change projection reports¹⁹ on infrastructure which provide useful information on impacts to infrastructure, particularly around coastal areas. Real time impacts on infrastructure will enable growers to plan.

Adapting to climate change impacts will be critical to support a resilient transport network. On-farm vehicles, including light commercial vehicles (e.g., utes) and machinery for cultivation and harvest are important to growers and while alternatives are available in some areas (e.g. forklifts) this is not the case for other types. Beyond the orchard gate, trucks are frequently used to transport fruit and vegetables to New Zealand consumers or ports. Some growers have their own truck fleets.

¹⁷ <https://www.transport.govt.nz/assets/Uploads/Paper/GPS2021.pdf>

¹⁸ <https://at.govt.nz/media/815804/Integrated-Transport-Assessment.pdf>

¹⁹ <https://www.lgnz.co.nz/assets/Uploads/d566cc5291/47716-LGNZ-Sea-Level-Rise-Report-3-Proof-FINAL-compressed.pdf>
<https://environment.govt.nz/assets/Publications/Files/Climate-change-projections-2nd-edition-final.pdf>

The sector is particularly reliant on trucks as a mode of transport between the orchard/farm and packhouse, and/or processing facility and port. Due to the distributed nature of horticulture and the perishability of fresh product - this creates limitations around the use of rail and coastal shipping (particularly for domestic distribution). Airfreight transportation is used for fruit that have a short shelf life. However, there could also be strategic planning opportunities which support mode shift, where the location is appropriate - e.g. A rail hub near Pukekohe connecting to Auckland and Tauranga Ports would significantly reduce road freight movements through Auckland.

The definition of 'infrastructure' in the Adaptation Plan differs from the RMA²⁰ and is very broad and quite open to interpretation.

The designed and built set of physical systems, along with their institutional arrangements, that interact with the broader environment to provide services to people and communities that support economic growth, health, quality of life and safety.

We support a consistent approach to definitions and suggest linking the infrastructure definition in the Adaptation Plan to the RMA.

Outcome sought

- Increased focus on improving freight connections
- Recognition that mode shift for freight is unlikely to be sustainable

1.5. Economy and Financial System

While we generally support the outcomes of the Economy and Financial System section, it is critical that transitioning to adaption is achievable without disrupting production and supply chains. For example: the glasshouse sector is at risk of becoming economically unviable due to ETS costs. Investment and strategy to enable transition for greenhouses, so we can continue to grow these crops in New Zealand is needed.

Global trends suggest that covered cropping will have an increasingly important role to play in feeding people. An increase in covered cropping will be essential to adapt the food production system to the changing, more volatile world climate while still producing enough food in a way that also uses less water and nutrients and mitigates the risks associated with unpredictable climatic events. A 2019 Intergovernmental Panel on Climate Change report into land use stated "*The stability of food supply is projected to decrease as the magnitude and frequency of extreme weather events that disrupt food chains increases*".²¹ Covered cropping can reliably deliver high yields of quality produce using less land and water.

Additionally, it is important to ensure that economic and environmental sustainability of primary production is considered when protecting the productive capacity of HPL.

²⁰ <https://www.legislation.govt.nz/act/public/1991/0069/latest/DLM230272.html>

²¹ [IPCC, 2019: Summary for Policymakers. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems](#)

For future generations, it is critical that HPL is protected and its value for current and future generations for food production and enable its use for food production recognised. HPL is a finite resource and intergenerational asset that is under threat in New Zealand - most significantly due to urban development.²²

There is a clear need to manage this natural resource strategically. HortNZ's experience shows that at all levels of the regional and district planning process, it is possible for HPL to be inappropriately zoned and/or developed, and thus lost. For HPL, we consider the emphasis should be in enabling this land for food production.

Outcome sought

- Protection of highly productive land in adaptation planning
- Increased investment into transition to covered crop growing

2.8 Research

Research, science and innovation will play an important role in climate change adaptation. Science can help to develop new cropping systems and varieties that are more climate resilient. Research can also support the transition to low emissions land uses (e.g., horticulture), including research into new products/varieties, robotic technology and new generation orchard design.

This is important both from a perspective of climate change adaptation and importantly, providing New Zealand with options for meeting our targets should other initiatives not proceed at the pace necessary.

There are three key areas that Hort NZ would like to see prioritised:

- Research into sea level encroachment impacts on horticulture land and impacts on highly productive land for future use. Land purchases will become reliant on climate change impacts, particularly for food producers. Knowing now (or in the relative short term) if current or soon to be purchased land will be impacted enable growers to start adaptation planning
- The Environmental Protection Agency (EPA) has 43 chemicals on the product priority reassessment list, and they also reassess chemicals not included on this list e.g. Hydrogen Cyanamide (critical for kiwifruit production. The EPA has proposed to ban the chemical which would mean most green growers would be out of business which would result in higher emission land use change. The government needs to fund research into loss of food production and into sustainable and effective alternatives where existing productive chemicals are removed from use
- Research into climate resilient fruit and vegetable varieties. See Natural Environment section (breed enhancing technologies).

²² Our Land 2021. Ministry for the Environment.

Outcome sought

- Investment in innovation to develop new cropping systems and varieties that are more resilient
- Research into transitioning to horticulture as a low emissions land use activity
- Research into loss of production from removing agrichemicals from use and research into effective and sustainable alternatives to agrichemicals - support low emissions land use