



ADAPTING TO A CHANGING CLIMATE: FACT SHEET 3

PIPFRUIT IN NEW ZEALAND

The industry's future

PIPFRUIT IN NEW ZEALAND

- Hawkes Bay is New Zealand's largest pipfruit-growing region producing around 60 percent of the national crop.
- Nelson is second producing around 33 percent.
- Central Otago contributes approximately 3.5 percent of the crop with the balance of production spread between Gisborne, Waikato, the Wairarapa and other minor growing regions.

WHAT IS THE FUTURE OF PIPFRUIT PRODUCTION IN NEW ZEALAND?

- Adapting to a warmer climate.
- Water rationing and improving the efficiency of irrigation practices.
- Adapting orchard management practices to prevent damage from high temperatures and extreme events e.g. fruit sunburn.
- An increase in risk from pests and diseases.
- The potential for greater fruit size and earlier maturity.



This fact sheet explores the potential impact of changing climate on pipfruit production in New Zealand.

CLIMATE CHANGE

Projections for Hawkes Bay and Gisborne forecast warmer and drier conditions over the next 70–100 years. Mean temperatures are expected to increase by about 1°C by 2040 and 2°C by 2090. These regions could be up to 20 percent drier.

Predictions under a “low-medium” climate change scenario are that by the 2080s severe droughts are projected to occur at least twice as often as currently in parts of Otago, eastern parts of Canterbury and Marlborough, and parts of the Wairarapa, Hawke's Bay, Bay of Plenty, and Northland.

Under a “medium-high” scenario the frequency of severe drought in these areas could increase even more. Even in an average year, water deficits are projected to increase significantly in many of the areas listed above.

More varied rainfall patterns are also anticipated resulting in more dry periods interspersed with heavy rainfall and flooding could become up to four times as frequent by 2070.

Nelson is projected to become warmer, but could be up to 10 percent wetter with more varied rainfall patterns. Flooding could become up to four times as frequent by 2070.

An increase in climatic variability is also projected with models forecasting that a 1-in-20 year drought would be expected to occur, on average, up to twice as often based on a low-medium climate change scenario or 2–4 times more frequently in a medium-high climate change scenario.

“New Zealand's climate is changing. By the end of this century the whole of the country is predicted to be warmer, drier in the east, wetter in the west and experiencing more frequent extreme weather events such as heavy rain, flooding and droughts.”

Adapting to a changing climate will require:

- Efficient water use.
- Water budgeting and soil moisture monitoring to match water use with crop requirements.
- Adapting canopy management to reduce sunburn and maintain fruit quality.
- Developing and adapting monitoring and control programmes to meet new pest and disease challenges.

EXTREME WEATHER EVENTS

Adapting to more frequent and “extreme” climatic events is likely to be the biggest challenge for pipfruit growers in the future. This includes more frequent droughts, extreme temperatures and more “hot days”, strong winds, as well as heavy rainfall and flooding.

More days with higher maximum temperatures pose a risk to fruit quality by increasing sunburn damage. Management practices that can reduce the incidence of sunburn include modifying canopy structure, evaporative cooling or the use of overhead netting. In the future susceptibility to sunburn may be an increasing consideration in new cultivar selections.

Enhanced shelter may be necessary for young trees to protect against strong winds and whilst a decrease in the number of frost days is projected, the risk of damaging spring frosts will continue to exist.

SETTING THE SCENE

The 1997/98 pipfruit season was characterised by an El Nino event that produced a severe drought in Hawkes Bay. This gives us an insight into some of the potential challenges ahead for pipfruit production in a warmer, drier climate.

Some of the effects were increased levels of sunburn on fruit and increased levels of watercore in varieties not usually prone to this. Inadequate irrigation resulted in smaller fruit size on many orchards and a lack of cool night temperatures meant fruit struggled to develop sufficient colour for market.

On some blocks that received inadequate irrigation, return bloom the following season was also reduced.



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Access to sufficient water for irrigation is essential for sustainable and profitable pipfruit production.

WATER

Access to sufficient water for irrigation is essential for sustainable and profitable pipfruit production. With both a reduction in rainfall and an increase in frequency of drought events predicted, access to water for irrigation will become a greater challenge in the future, particularly on the East Coast. Regional authorities are likely to use water meters to ensure regional water resources are not depleted below sustainable levels.

Efficient use of irrigation water will become increasingly important. Tools such as water budgeting and soil moisture monitoring will be essential to ensure water use is matched to crop requirements. Expect an increase in the uptake of programmes designed to increase soil organic matter, thus improving soil water holding capacity. This will be especially important on light soils.

According to a report by Kenny (2001), surface water resources on the Heretaunga Plains in Hawkes Bay are already fully allocated. Groundwater sources currently have sufficient recovery during winter to offset losses to irrigation through the growing season. However, any depletion in recharge coupled with increased evaporative demand as a result of warmer temperatures and less rainfall, could change this situation.

In Nelson, summer water resources are fully allocated in the Waimea and Moutere catchments and the southern Motueka Plains. Water rationing has already been implemented in some drought years. The local Council is well advanced in efforts to develop a new dam with the aim to enhance water supply for pipfruit growers and other community groups.

PHENOLOGY OF PIPFRUIT

We are unlikely to see large changes in apple development as a result of climate change. Under current “mid–high warming” climate change scenarios there may be a trend towards increased fruit size, slightly earlier bloom and maturity dates. However, the current projected increases are small compared to the season–to–season variations we currently see in pipfruit production in New Zealand.

PEST AND DISEASE MANAGEMENT

The rate of insect development is directly dependent on temperature. As our conditions warm, insect development speeds up.

This may result in more generations of our key pipfruit pests, such as leafroller, codling moth, woolly apple aphid, scale and mealybug, being completed in one season.

Climate change also has the potential to negatively impact the pipfruit industry's very successful Integrated Pest Management program by disturbing the existing balance between biological control agents and the pests they help control. It could also make it easier for new pest species to become established because of the warmer climate.

Disease management may also have to adapt, however, effects are likely to vary more from one season to the next depending on timing of rainfall. For instance, predicted drier spring conditions on the east coast could result in less disease pressure from black spot and fire blight, while increases in summer rainfall could result in an increase in summer rot diseases if extra control measures are not implemented.

The industry will need to continue to develop and modify integrated management programs such as Apple Futures to meet new pest and disease challenges and minimise the risk of phytosanitary issues affecting our access to overseas markets.

THIS IS ONE IN A SERIES OF FACT SHEETS CALLED *ADAPTING TO A CHANGING CLIMATE* THAT CAN BE FOUND AT WWW.MAF.GOV.TZ/CLIMATE CHANGE

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Freephone: 0800 008 333

Web: www.maf.govt.nz

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Key points

- 1** The climate in Hawkes Bay and Gisborne is projected to become warmer and drier on average, while Nelson is projected to become warmer and wetter.
- 2** The frequency of extreme weather events is likely to increase across all major pipfruit-growing regions within New Zealand.
- 3** Access to water will become more difficult and efficient water use will be crucial.
- 4** Drought conditions on both the east coast of the North Island and in Nelson are expected to increase in frequency and severity.
- 5** Warmer growing conditions should result in larger fruit size and slightly earlier bloom and maturity dates.
- 6** Ongoing development of sustainable programmes such as Apple Futures and organics will be required to meet new pest and disease challenges.



Tools such as water budgeting and soil moisture monitoring will be essential to ensure water use is matched to crop requirements.

FOR MORE INFORMATION

- For more information on climate change projections for New Zealand visit the climate change section of the NIWA website www.niwa.co.nz/our-science/climate
- EcoClimate Consortium (2008) *The EcoClimate report: Climate change and agricultural production*. Available on the Ministry of Agriculture and Forestry website under climate change www.maf.govt.nz/climatechange
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- Savage (2006) *An overview of climate change and possible consequences for Gisborne district*. Available on the Gisborne District Council website under climate change reports www.gdc.govt.nz/climate-change-reports/

