

FACT SHEET

Climate change impacts on cherry



Climate change will affect where crops can be grown in the future.

We developed models to map how suitable areas around the country currently are, on a scale of 0 to 1. These combined several identified criteria based on their relative importance. We used simulated climate data as model inputs to forecast how suitability will change in the future, for two Representative Concentration Pathways (RCPs) which are scenarios for greenhouse gas (GHG) concentrations in the atmosphere:

1. RCP 2.6 (A low GHG concentration pathway consistent with significant emissions reductions)
2. RCP 8.5 (A high GHG concentration pathway consistent with unabated emissions).

Criteria considered	Importance	
Climate related		
Growing degree days	High	●
Fruit cracking	High	●
Low frost risk	Moderate	●
Winter chill	Moderate	●
Soil or land related		
Drainage	High	●
Potential rooting depth	Moderate	●
Land use capability class (LUC)	Moderate	●
Slope of land	Low	●

Please note irrigation is assumed to be available if needed and rainfall is not evaluated.

Criteria suitability scores

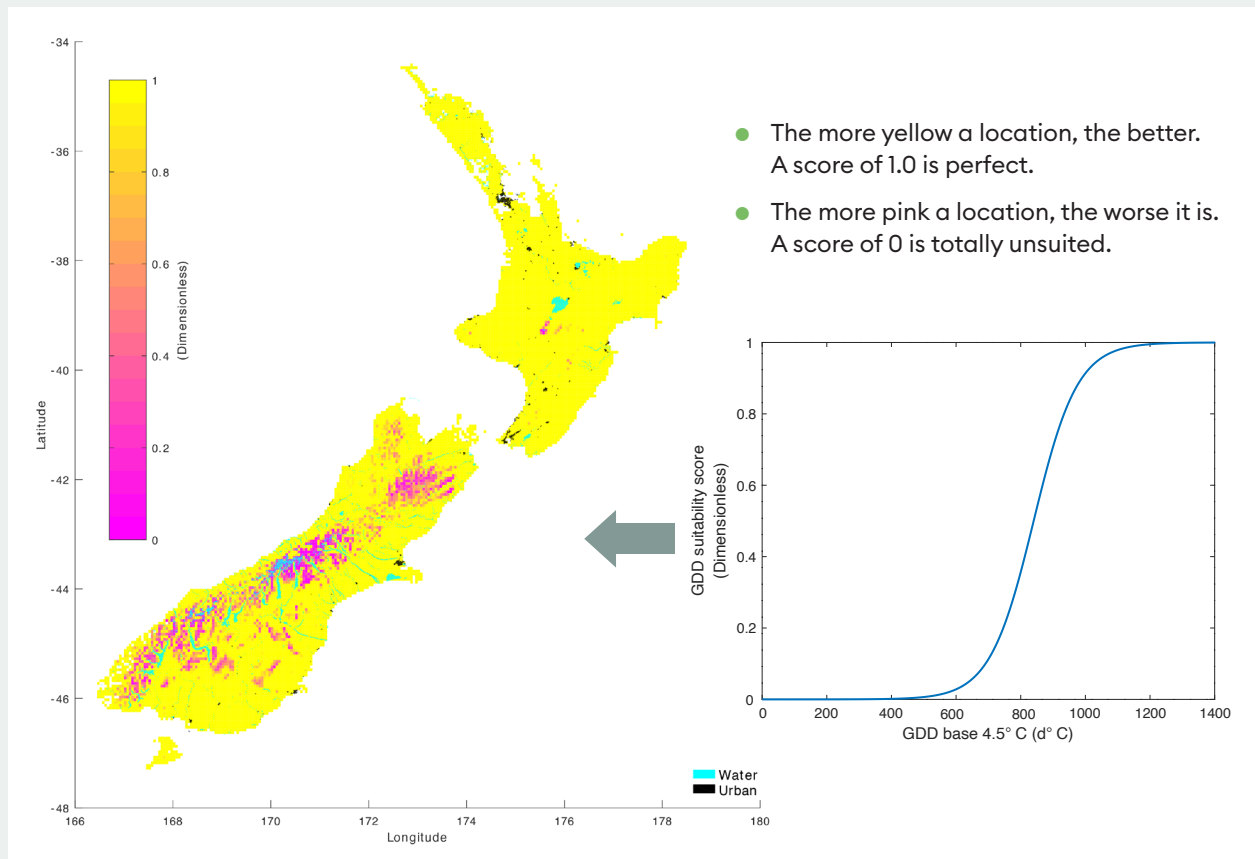
For each criterion we calculated a sliding-scale suitability score.

- Criteria were based on literature and expert knowledge.
- Scores were mapped and checked by experts for accuracy.
- Suitability scores calculated for each location across the country.
- Uses GIS databases with climate and land information.

Overall suitability scores

- Scores for criteria were combined, weighted by importance.
- Weighting was decided by experts.
- Allows locations to be ranked on relative merit.

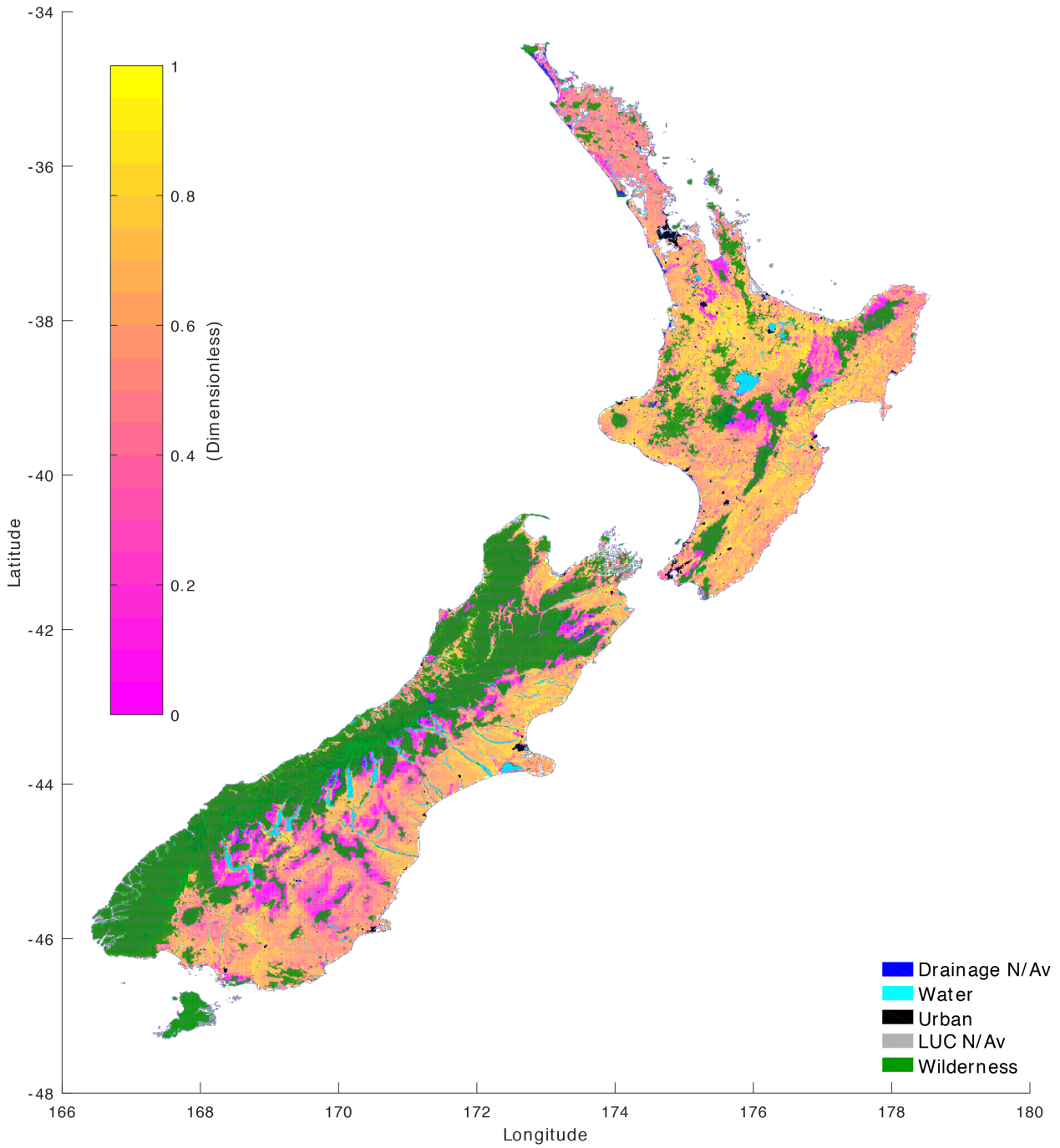
Example: Growing degree days (GDD) suitability score for cherry



Low scores indicate mitigation may be needed, e.g.

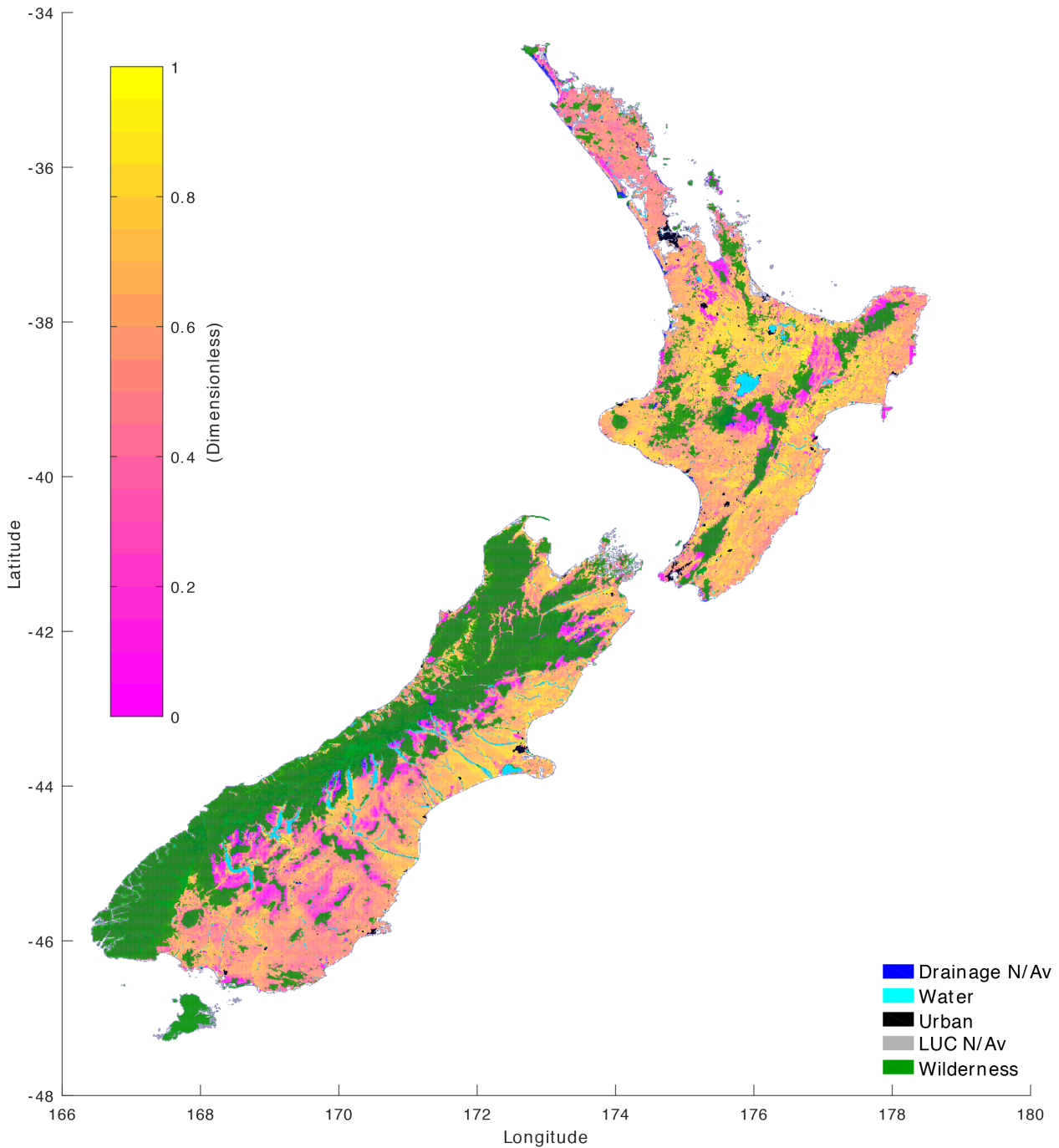
- Frost protection if frost suitability is low
- Drainage improvement if drainage suitability is low
- Low-chill cultivars in warmer climates.

Overall suitability map from calibrated cherry rules



Our modelled suitability score is in agreement with current cherry-growing regions around the country, most notably Central Otago and Hawke's Bay.

Mid-century forecast for cherry under the low GHG concentration pathway (RCP 2.6)

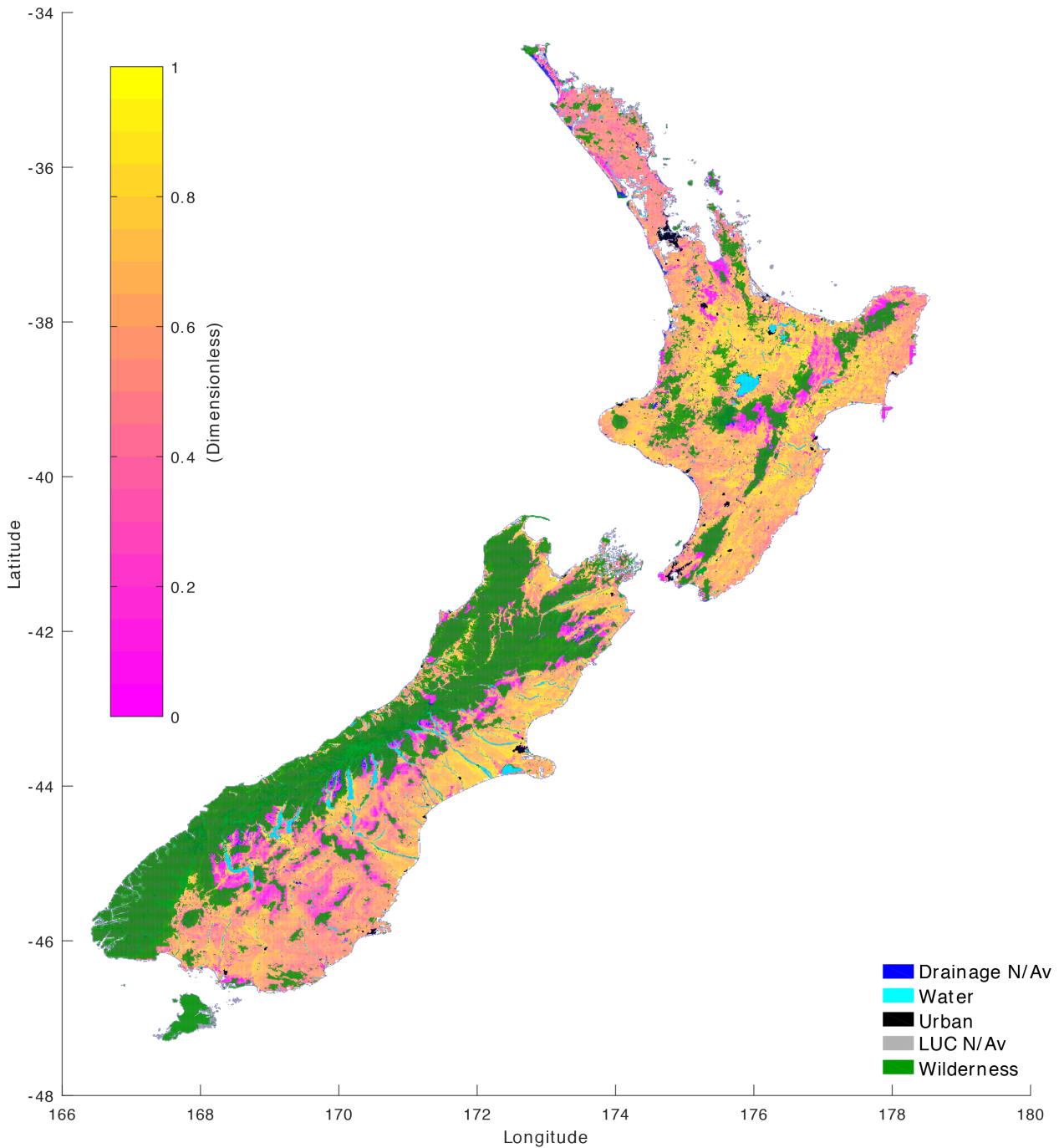


Land area (km²) of suitability ranges under the low GHG concentration pathway (RCP 2.6)

Suitability range	Historic (1972–2004)	Mid-century	Late-century
0.6–0.7	36,700	39,000 (36,800–40,700)	39,100 (36,800–41,000)
0.7–0.8	28,400	33,000 (31,700–35,400)	33,400 (31,900–35,500)
0.8–0.9	14,700	17,400 (14,200–20,300)	16,700 (13,600–19,900)
0.9–1.0	317	350 (170–592)	273 (103–494)

Ranges in brackets indicate prediction uncertainty

Mid-century forecast for cherry under the high GHG concentration pathway (RCP 8.5)



Land area (km²) of suitability ranges under the high GHG concentration pathway (RCP 8.5)

Suitability range	Historic (1972–2004)	Mid-century	Late-century
0.6–0.7	36,700	39,800 (38,100–41,400)	39,900 (39,300–40,700)
0.7–0.8	28,400	35,500 (34,600–36,600)	40,300 (37,900–41,400)
0.8–0.9	14,700	18,200 (15,000–21,400)	19,100 (15,500–21,200)
0.9–1.0	317	420 (153–1,000)	1,400 (615–4,970)

Ranges in brackets indicate prediction uncertainty

Summary: Climate change effects on cherry

Differences between climate change pathways are more pronounced by late-century (maps not shown) than by mid-century.

Under the low GHG concentration pathway (RCP 2.6)

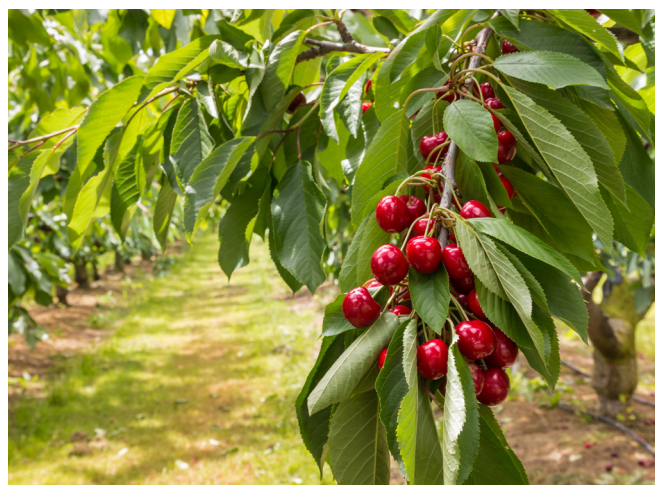
- Waikato northwards and coastal North Island areas will see a reduction in suitability.
- Most inland areas of the North Island and nearly the whole of the South Island will see improved suitability for cherry production.
- This means Otago cherry growers will see their suitability increase, while Hawke's Bay producers will have a slight but mixed result depending on their location.
- Most changes in suitability will occur by mid-century but a slight worsening of the suitabilities will occur in the second half of the century.

Under the high GHG concentration pathway (RCP 8.5)

- By mid-century, the changes to the suitability will be on par with the low GHG concentration pathway.
- By the end of the century, changes will be more pronounced:
 - Increased suitability for the South Island, Central North Island and elevated areas of the North Island.
 - A further worsening for other parts of the North Island.

Main climate factors affecting changes

- Decreased winter chill will reduce suitability in many areas of the North Island, particularly by the end of the century under the high GHG concentration pathway.
 - Mitigation strategies, such as low-chill cultivars, will be needed to enable successful cherry production in these areas.
- In other areas, such as inland areas of the North Island and in much of the South Island, reduced cracking and frost risk, along with better GDD, will lead to an improvement overall.



For more information

This is one in a series of fact sheets about climate change impacts on the spatial footprint of horticultural crops that can be found at plantandfood.co.nz.

Prepared by The New Zealand Institute for Plant and Food Research Limited.

DISCLAIMER: While every effort has been made to ensure the information in this fact sheet is accurate, The New Zealand Institute for Plant and Food Research Limited (Plant & Food Research) cannot guarantee its accuracy and does not give any assurance as to the suitability of any such information for any particular use. Plant & Food Research will not be liable in any way for any loss, damages or costs which may be incurred by any person in relation to this information.

JO09258

Acknowledgements

Research was completed under the Ministry for Primary Industries Sustainable Land Management and Climate Change (SLMACC) project 405421. Climate data were made available by the National Institute for Water and Atmospheric Research Limited (NIWA). Soil and slope data were reproduced with the permission of Manaaki Whenua – Landcare Research.