



TODAY

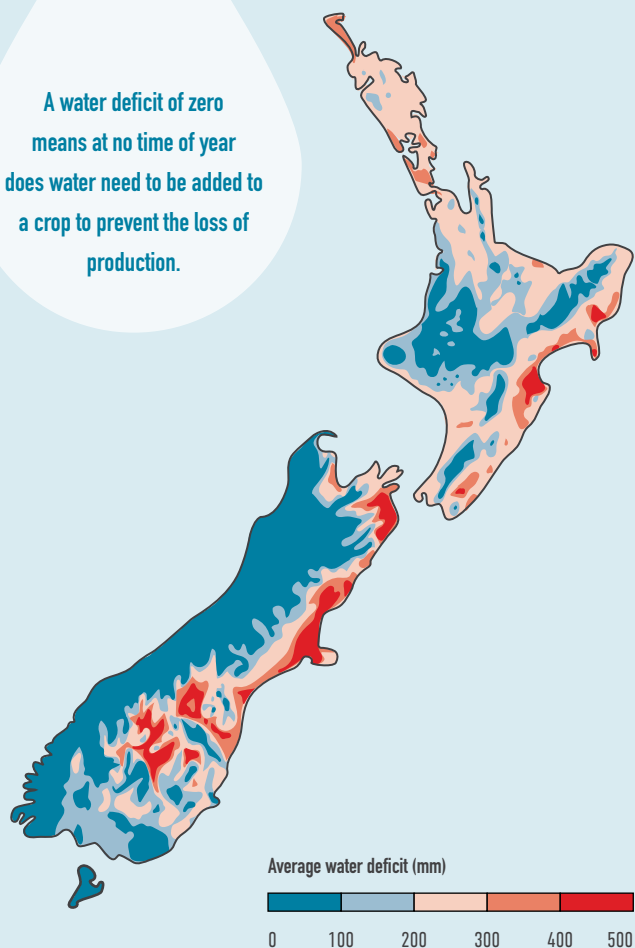
Dry soil conditions in New Zealand vary by region.

Drier conditions are caused by a number of climatic factors, including how much rain falls, how high temperatures are, and how much wind the country experiences.

AVERAGE water deficit (mm)

1972 to 2012

A water deficit of zero means at no time of year does water need to be added to a crop to prevent the loss of production.



A water deficit of 30 mm corresponds to approximately one week's reduced grass growth, with no irrigation.

20-70 YEARS

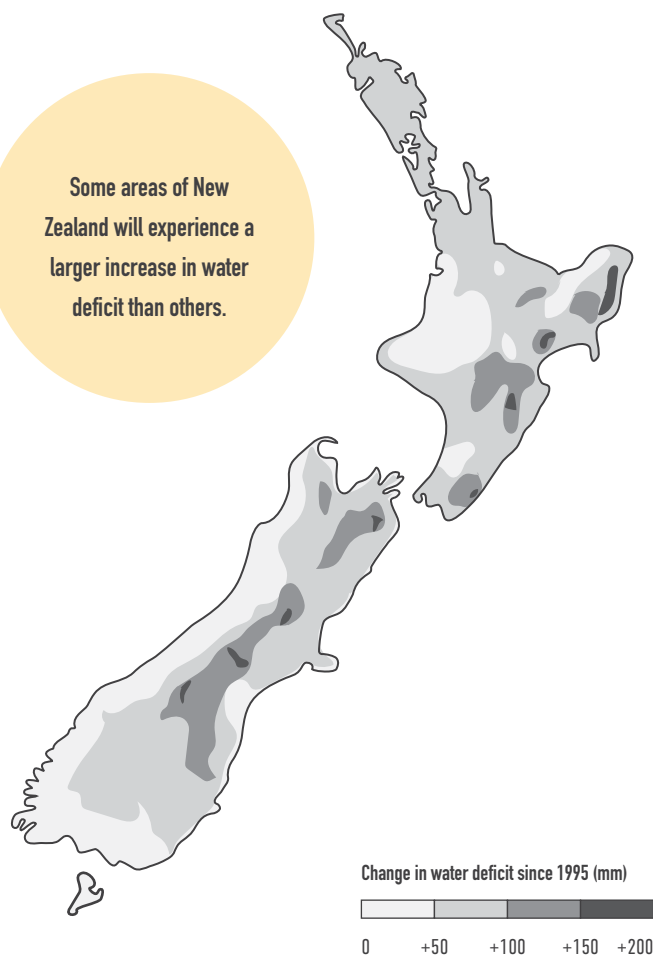
The risk of dry conditions and drought is increasing due to global warming.

Drier conditions are likely to become the "new normal" in some parts of eastern and northern New Zealand. Over the next 20 to 70 years, water deficits are projected to increase between 50 mm and 250 mm across most of the country.

CHANGE in water deficit (mm)

1995 to 2040

Some areas of New Zealand will experience a larger increase in water deficit than others.



Ministry for the Environment (2018). Change in PED, based on RCP 8.5

By 2050, most parts of the country will spend 35 more days on average each year in drought. A drought currently occurring once in 20 years on average, could become a 1-in-10 year, or even a 1-in-5 year, event in that same area.

IMPACT

Increasing drier conditions will impact our primary sector production.

Of all of the threats posed to New Zealand by climate change, drier conditions (and drought) could have the largest effect on our agriculture-based economy.

BENEFITS of drier conditions

- Decreased fungal disease in crops
- Decreased infection of crops by moisture-loving pathogens
- Some areas may become better suited to growing new products

RISKS of drier conditions

- Other aspects of climate change could be exacerbated
- Increased risk of drought
- Increased need and cost for irrigation
- Increased conditions that could result in animal welfare issues
- Decreased production during summer
- Heat tolerant weed species could flourish
- A change in the risk profile of pests and diseases
- Certain pests could be more damaging e.g. black beetle
- Dry soil is weak, causing it to erode and lose minerals

RISKS of drought

- Decreased growth of supplementary feed
- Increased supermarket prices, due to a higher production cost
- Increased psychological stress on rural communities, with negative effects on mental health



Niwa: Changes in drought risk with climate change (2005)

MPI Technical Paper (2012/18): The 2012-13 drought: an assessment and historical perspective

Manaaki Whenua Landcare Research (2019): Climate change impacts on land use suitability

ADAPTING

Adapting agricultural land management and use, could help to mitigate risk.

Changes may be required as water efficiency and production practices evolve across pastoral, horticultural, and arable production systems.

TACTICAL changes

Modifying production practices within a current system.

- 💧 **Improving existing water systems**
 - Better use of technology for on farm water monitoring
 - More efficient use of water resources
- ⚙️ **Altering current production practices**
 - Changing cultivars or stock breeds
 - Changing timetables (e.g. earlier sowing date for maize)
 - Applying different sprays to reduce competition from weeds

STRATEGIC changes

Substantial changes to the current system.

- 💧 **Develop new water supply systems**
 - New water storage or irrigation schemes
 - Further develop water reticulation
- ⚙️ **New production practices**
 - Using new cultivars
 - Developing more organic matter in the soil through new soils or farm management, helping the soil hold more water

TRANSFORMATIVE changes

Adopting new production systems (land-use change), or locations.

- ⚙️ **New production systems**
 - Changing to another known production system
 - Developing new production systems or industries e.g. the planting of mānuka plantations
- ▲ **New uses of agricultural land**
 - Purchasing additional land in another area to make the existing system more flexible and resilient
 - Contraction of operations in existing areas, and expansion into new regions