Truffles - crop suitability maps, rules and yield information

Description

Crop (Truffles) suitability information includes:

1. map of suitability categories (1 - Well suited, 2 - Suitable, 3 - Marginally Suited, 4 - Unsuitable)
2. rules used to generate the suitability maps
3. map of suitability categories where biophysical constraints are managed through irrigation, artificial drainage, or liming
4. map of the potential yield (provided as a lower/upper range)
5. map of the potential yield where biophysical constraints are managed through irrigation, artificial drainage, or liming (provided as a lower/upper range)

Date: December 2023 **Version**: v2

Owner: MPI, Plant & Food Research, Manaaki Whenua - Landcare Research, NIWA
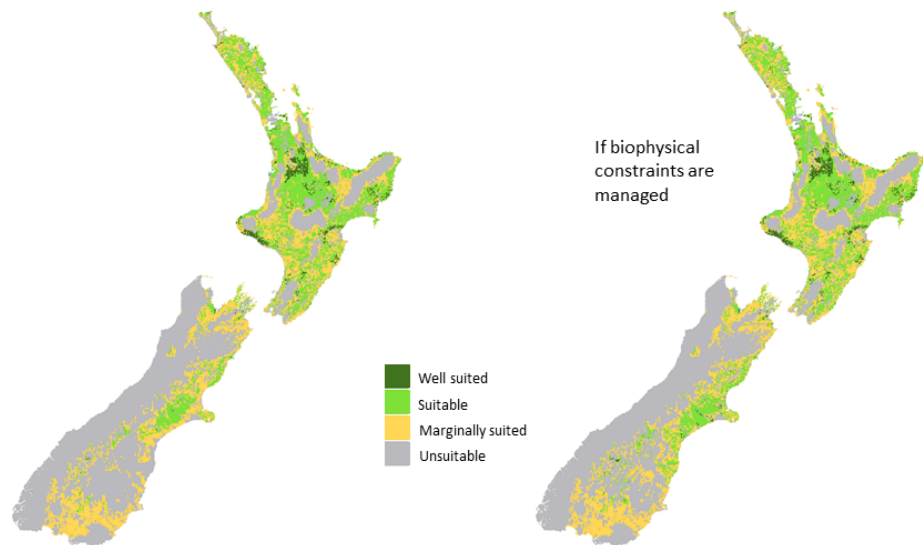
Contact: Dr Steve Thomas, Plant and Food Research

Our Environment

You can view the data in this dataset on a map-based web app here: Truffles Suitability Categories

Preview Image

Truffles

If biophysical constraints are managed

- Well suited
- Suitable
- Marginally suited
- Unsuitable

Crop	Unsuitable		Marginally		Suitable		Highly suitable		Units	*n*
	Low	High	Low	High	Low	High	Low	High		
Truffles	0	7	8	19	20	40	41	100	kg FW/ha	1

Dataset attributes

Spatial extent	New Zealand
Spatial resolution	500 m pixel size. Resolution is based on the NIWA Virtual Climate Station Network 5km climate grid, and S-map / FSL sampled on a 500 x500 m grid
Temporal extent	30 year average, climate data 1971-2000
Temporal resolution	Yield values are mean annual estimates
Evaluation method (Validation)	Expert assessed
Evaluation result (Numeric)	N/A
Evaluation result (Categorical)	N/A
Uncertainty method	None
Uncertainty data format (Numeric)	Yield information: provided as a range (low - upper each provided as a raster layer)
Uncertainty data format (Categorical)	Suitability: Moderate reliability at national scale (there is a reasonable understanding of crop requirements but key inputs have limited accuracy)

Methodology

The land suitability concept is used to characterise the degree of fitness of a given environment for specific agricultural activities. The key principle in the method is that land suitability for the growth of different plant species can be estimated from geo-referenced information on climate (e.g. temperature and rainfall regimes), soil (e.g. soil depth and pH) and terrain conditions (e.g. slope and aspect). The suitability model utilises a wider range of GIS-rules adapting the method from Kidd et al. (2015) and simplified "categorical" parameter ranges. To quantify land suitability for a given

environment, the model translates the "biophysical attributes" into "suitability indexes" through crop-specific "suitability rules". For example, suitable growing conditions might occur between temperature ranges of 5 to 25°C for a given crop, with an optimum within a narrower range (e.g. 15 and 20°C). Suitability classes (4 classes were defined, they are well suited, suitable, marginally suited, and unsuitable) for different attribute-crop combinations can be estimated based on such suitability rules. The overall suitability index of a crop at a specific location takes value from the worst index (limiting factor) out of all the attributes index at that location. Suitability rules were either generated from the literature and through consultation with crop-specific experts. Each crop went through one or more iterations where experts would evaluate the resulting national map from current rules, identify areas where suitability was not sensible and suggest improvements to the rules to obtain expected spatial patterns.

The suitability rules are simplifications of biophysically sound principles that operate at a much lower scale of organisation (e.g. crop and plant physiological responses to the environment). Such simplification is necessary, given that suitability assessments are performed at the landscape level.

Yield ranges for each suitability class were estimated by crop experts. The upper range of the well-suited class is based on the maximum "field" yields observed in New Zealand. Upper and lower bounds of national average crop yields are used for the suitable class range. Yield ranges in the marginally suited class are those limited by the environmental conditions with varying impact from year to year. Environments where yields are predicted to be zero or crops are considered uneconomic to harvest are classed as unsuitable.

References:

Kidd D, Webb M, Malone B, Minasny B, McBratney A. 2015. Digital soil assessment of agricultural suitability, versatility and capital in Tasmania, Australia. Geoderma Regional. 6: 7-21

Thomas S, Ausseil AG, Guo J, Herzig A, Khaembah EN, Palmer D, Renwick A, Teixeira E, Van der Weerden A, Wakelin S 2021. Evaluation of profitability and future potential for low emission productive uses of land that is currently used for livestock SLMACC Project 405422. MPI Technical Paper No:2021/13 Ministry for Primary Industries

Fitness for purpose / limitations   ❶

This table indicates whether the dataset is suitable for different types of questions at different scales.

Note: Users should carefully consider their purpose as this dataset may not be suitable.

	Operational	Absolute	Relative	Screening/scoping
Block/farm	No	No	No	Maybe
Multi-farms(5+)	No	No	Maybe	Yes
Catchment	No	Maybe	Maybe	Yes
National/regional	No	Yes	Yes	Yes
Caveat(s)	*Intended for national/regional use so limited accuracy especially at finer scales*			

Data and Resources

Truffles - crop suitability map   ↪

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Truffles - crop suitability map with biophysical constraints managed
License: CC BY 4.0 Date: December 2023 Version: V2 Attribute to: MPI, Plant &...

Truffles - map of the potential yield (lower end of range)
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Truffles - map of the potential yield (upper end of range)
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**Truffles - map of the potential yield with biophysical constraints mar
range)**
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**Truffles - map of the potential yield with biophysical constraints mar
range)**
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Truffles - the rule set used to derive the suitability categories
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Truffles - Crop suitability maps & Yield (2023 v2)_PREVIEW.png
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Data Supermarket
Land Use Opportunities for Aotearoa

Version: 61 © 2025

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