



*Land Use Opportunities for Aotearoa*

## **GUIDANCE DOCUMENT**

**AGRESEARCH**

# Table and spatial layer of dairy types and their associated loss rates for Nitrogen, Phosphorus and Greenhouse Gases

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V2.0

## HOW TO USE THIS INFORMATION

The spatial layer contains information on potential dairying areas of New Zealand, partitioned into 24 types based on wetness, topography and soil properties (see table below). For a full description of the methodology and results, please consult Smith et al. (accepted). Each dairy type contains estimated minimum and maximum loss rates for nitrogen (N), phosphorus (P), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>) (where CO<sub>2</sub> relates to emissions following urea application to land).

If using the GIS data (TIF file), users clicking on a dairy type will be shown a table of the estimated minimum and maximum losses of N, P, CH<sub>4</sub>, N<sub>2</sub>O and urea-derived CO<sub>2</sub>. One of the types ('Irrigated + Easy + Poorly drained': number 20) had no data on existing dairy farms available in DairyBase, therefore the GIS data for this type is replaced with NULL values.

If using the tabulated data (PDF), users can select the relevant table row for the dairy type that represents the area of interest (based on the wetness, topography and soil properties – see below) for estimated minimum and maximum losses of N, P, CH<sub>4</sub>, N<sub>2</sub>O and urea-derived CO<sub>2</sub>. As for the GIS data layer, the tabulated type number 20 has no data.

Primary attribute	Class within attribute	Description
<b>Wetness</b>	Dry	farms where mean annual rainfall was less than 1100 mm
	Irrigated	farms where >50% of the farm area is irrigated
	Moist	farms where mean annual rainfall was between 1100 and 1700 mm
	Wet	farms where mean annual rainfall exceeded 1700 mm
<b>Topography</b>	Flat	flat or undulating (0-7°)
	Easy	rolling (7-15°)
<b>Soil</b>	Light	soils, defined as having plant available water holding capacity to 60 cm (PAW60cm) of less than 85 mm
	Poorly-drained	soils, classified as having 'imperfect', 'poor' or 'very poor' soil drainage classes
	Well-drained	soils, classified as 'well' or 'moderately well' drained.

The data provides pastoral farmers and rural professionals with information to guide initial conversations on N, P and GHG losses for contrasting dairy typologies. Where catchment-scale or farm-scale data is required, alternative sources of information are recommended (e.g. catchment-scale modelling, farm-scale decision support tools).

## REFERENCES

Smith C, van der Weerden T, Selbie D. 2023. Quantifying co-benefits and trade-offs of mitigation measures to reduce dairy farm N and P losses to water on greenhouse gas emissions from New Zealand dairy systems. J. New Zeal. Grasslands, (accepted).