

This Technical Data Sheet describes the *typical average properties* of the specified soil.

It is essentially a summary of information obtained from one or more profiles of this soil that were examined and described during the Topoclimate survey or previous surveys. It has been prepared in good faith by trained staff within time and budgetary limits. However, no responsibility or liability can be taken for the accuracy of the information and interpretations. Advise should be sought from soil and landuse experts before making landuse decisions on individual farms and paddocks. The characteristics of the soil at a specific location may differ in some details from those described here.

No warranties are expressed or implied unless stated.

Soil name: **Kauana**

Overview

Kauana soils occupy about 2,200 ha on rolling to hilly areas in central, northern and western Southland. They are formed in a thin layer of loess overlying limestone bedrock, or gravelly limestone colluvium on steeper slopes. Kauana soils are well drained, with a shallow rooting depth and low water-holding capacity that is limited by the gravelliness and bedrock that occurs within 45cm depth. They are used for pastoral grazing with sheep and beef cattle. Climate is cool temperate with regular rainfall. Shallow soils can occasionally dry out in dry summers.

Soil classification

NZ Soil Classification (NZSC): Typic Rendzic Melanic; lithic, limestone; clayey

Previous NZ Genetic Classification: Rendzina

Classification explanation

The NZSC of Kauana soils is consistent with the previous classification. This is reflected in the dark coloured topsoils and moderate to strong structure throughout the profile. Kauana soils are naturally fertile, with high base saturation and pH values of >5.8 throughout the profile. They typically have calcareous or limestone bedrock within 45cm depth, with clayey textures.

Soil phases and variants

Identified units in the Kauana soils are:

- Kauana rolling shallow (KzR3): has bedrock within 45cm depth; occurs on slopes of 7–15°
- Kauana rolling moderately deep (KzR2): has bedrock between 45 and 90 cm depth; occurs on slopes of 7–15°
- Kauana undulating shallow (KzU3): has bedrock within 45cm depth; occurs on slopes of 0–7°
- Kauana hilly moderately deep (KzH2): has bedrock or gravels between 45 and 90cm depth; occurs on slopes of 15–25°
- Kauana hilly shallow (KzH3): has bedrock or gravels within 45cm depth; occurs on slopes of 15–25°
- Kauana steep deep (KzS3): has bedrock or gravels within 45cm depth; occurs on slopes of >25°

The soil properties described in this Technical Data Sheet are based on the most common phase, Kauana rolling shallow (KzR3). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating, e.g., Kauana hilly shallow (KzH3).

Associated soils

Some soils that commonly occur in association with Kauana soils are:

- Te Mara: moderately deep to deep, imperfectly drained soil formed into mixed loess and fine colluvium from limestone.
- Isla Bank: deep, well drained soil formed into loess overlying limestone
- Lyoncross: deep, well drained soil formed into loess overlying terrace gravels
- Orawia: formed from loess and partly calcareous siltstones and sandstone; has silty clay texture

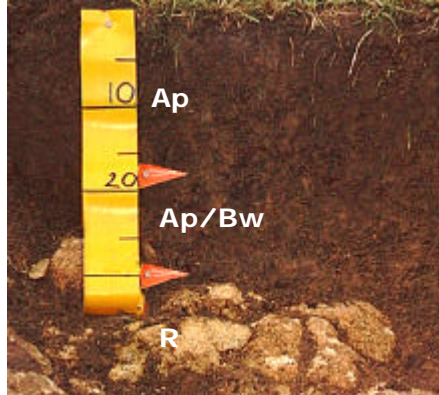
Similar soils

Some soils that have similar properties to Kauana soils are:

- Mclvor: shallow soil onto limestone in the Monowai area, and should be correlated into the Kauana series
- Mandeville: shallow soil forming onto tuffaceous sandstone bedrock
- Kaihiku: shallow soil forming into gravelly tuffaceous sandstone colluvium

Typical profile features

The following is a 'generic' or composite profile description representing the most common combination of characteristics for this soil type. The actual profiles for which descriptions and data are available are listed at the end of this Technical Data Sheet.

Kauana profile	Horizon	Depth (cm)	Description
	Ap	0–18	Brownish black moderately gravelly silty clay; slightly firm soil strength; moderately developed very fine to medium polyhedral peds; gravels moderately weathered; abundant roots
	Ap/Bw	18–30	Dull yellowish brown moderately gravelly silty clay; abundant worm casts; slightly firm soil strength; moderately developed fine to coarse polyhedral peds; gravels moderately weathered; abundant roots
	R	30+	Slightly weathered limestone; no roots

Key profile features

Kauana soils have dark coloured topsoils 12–20cm deep with a moderate to strongly developed structure. Subsoil structure is also moderately developed. Limestone bedrock occurs at shallow to moderately deep depths.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–18	Low – Moderate	<i>Moderate</i>	Silty clay	Moderately gravelly
Ap/Bw	18–30	Low – Moderate	<i>Moderate</i>	Silty clay	Moderately gravelly
R	30+	—	—	—	—

Profile drainage: Well
Plant readily available water: *Low*
Potential rooting depth: Shallow
Rooting restriction: Bedrock

Key physical properties

Kauana soils have a shallow rooting depth, restricted by the gravelliness and bedrock in the subsoil, and low available water. These soils are well drained, with good aeration and permeability throughout the soil. Textures are typically heavy silt loam to silty clay, but vary according to the proportion of loess in the soil. The topsoil clay content is 35–45%. The soils are gravelly throughout, and typically have at least 35% gravel and/or bedrock within 45cm depth.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–18	Moderate	Moderate	Very high	Very high	Very high	High	Very high	Moderate
Ap/BW	18–30	High	Moderate	Very high	Very high	Very high	Moderate	High	Low
R	30+	—	—	—	—	—	—	—	—

Key chemical properties

Topsoil organic matter levels are variable (7–14%); P-retention values are 30–40% and pH high (6–7). Cation exchange and base saturation are very high due to the limestone influence. Available calcium, magnesium and potassium are all high. Reserve phosphorus values are low and micronutrient levels generally adequate.

Vulnerability to environmental degradation

Note: the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
Structural compaction	slight	These soils have a slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage and high clay content.
Nutrient leaching	very severe	These soils have a very severe vulnerability to leaching to groundwater. This rating reflects the good drainage and permeability, and low water-holding capacity.
Topsoil erodibility by water	minimal	Due to the high organic matter and clay content, topsoil erodibility in these soils is minimal. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	moderate	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties and highly dependent on management practices (e.g., crop residue management and cultivation practices).
Waterlogging	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage and permeability. The hilly and steep phases will have nil vulnerability.

General landuse versatility ratings for Kauana soils

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive landuse. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification.

Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

KzR3 (Kauana rolling shallow)

KzR2 (Kauana rolling moderately deep)

KzU3 (Kauana undulating shallow)

Versatility evaluation for soil KzR3, KzR2, KzU3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Vulnerability to leaching to groundwater; restricted rooting depth
Arable	Limited	Vulnerability to leaching to groundwater: rolling slopes on rolling phases
Intensive pasture	Limited	Vulnerability to leaching to groundwater; restricted rooting depth for shallow phases
Forestry	Unsuitable	Shallow rock depth; moderately deep phase has limited versatility due to the restricted rooting depth

KzH3 (Kauana hilly shallow)
KzS3 (Kauana steep shallow)

Versatility evaluation for soil KzH3, KzS3		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly and steep slopes
Arable	Unsuitable	Hilly and steep slopes
Intensive pasture	Unsuitable	Hilly and steep slopes; restricted rooting depth
Forestry	Unsuitable	Shallow rock depth

KzH2 (Kauana hilly moderately deep)

Versatility evaluation for soil KzH2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes; vulnerability to leaching to groundwater
Forestry	Limited	Restricted rooting depth

Management practices that may improve soil versatility

- Management of nutrient applications that minimise leaching losses

Soil profiles available for Kauana soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
KzU3	XT11	13	✓	✓	✓	✓
KzU3	XT8	13	✓	✓	✓	✓
KzU3	168/73/3	18	✓			
KzS3	SB7578	18	✓			

Published by Crops for Southland with financial support from Environment Southland.

Copyright © 2002, Crops for Southland

This Technical Data Sheet may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. Crops for Southland and Environment Southland would appreciate receiving a copy of any publication that uses this Technical Data Sheet as a source.

No use of this Technical Data Sheet may be made for resale or for any other commercial purpose whatsoever without prior permission in writing from Crops for Southland.

Crops for Southland
 PO Box 1306, Invercargill. New Zealand



www.cropssouthland.co.nz