

Soil Orders

There are 15 soils orders in the New Zealand Soil Classification (NZSC). Key attributes such as drainage and structure, as well as the ability to provide key processes and services, vary according to soil type.

Below provides a brief guide to the soil selections in the Pasture potential tool at dairynz.co.nz/pasture-gap.

Allophanic Soils are mostly extensive in **Taranaki**, around **Mt Taranaki**, and in parts of the **Waikato**. Smaller areas also occur in **King Country, Bay of Plenty, South Auckland and Whanganui**. They mainly are yellow-brown loams but also includes weakly weathered brown loams and red loams. These soils occur predominantly in the North Island volcanic ash and in the weathering products of other volcanic rocks. They also occur in the South Island high country.

Anthropic Soils are constructed by (or disturbed) by people. This include soil materials formed by earthworks or by severe soil mixing. They are most extensive in urban areas or areas that have been mined.

Brown Soils cover **43% of New Zealand**. Brown Soils have a brown or yellow-brown subsoil below a dark grey-brown topsoil. They occur in places where summer drought is uncommon and that are not waterlogged in winter. Most soils occur in areas with rainfall greater than 1000mm. Most Browns Soils have relatively simple soil profiles without major visual differences between layers and are predominately well drained.

Gley Soils together with Organic Soils, represent the original extent of New Zealand wetlands. They are poorly drained or very poorly drained soils. Gley soils occur **throughout New Zealand** where there are high ground-water-tables or in places where there are seepages. Gley Soils have been drained to form productive farmland. Gley soils are strongly affected by waterlogging and have been chemically reduced. Waterlogging occurs in winter and spring, and some soils remain wet all year. Gley soils have light grey subsoils, usually with reddish brown or brown mottles, textures range from sands to clay.

Granular Soils occur only in the **northern North Island**, including in the lowlands of the **Waikato** and **South Auckland** region. Granular Soils generally have high clay content. Dry or moist soil samples may be easily parted into small hard fragments. When wetted and rubbed between the fingers the clay becomes sticky and may be easily remoulded with little cracking. They are known as highly productive soils and used continuously for horticulture in Pukekohe.

Melanic Soils have black or dark grey topsoils that are well structured. The subsoil either contains lime, or has a well-developed structure and is neutral or only slightly acid. Melanic Soils occupy small areas scattered throughout New Zealand, in association with lime-rich rocks or dark volcanic rocks. Areas include parts of **Northland, Lower North Island notably Hawkes Bay, Wairapa, Whanganui, North Canterbury and Otago**.

Organic Soils serve as giant sponges and can hold up to 20 times their weight in water. These soils are formed in the partly decomposed remains of wetland plants (**peat**) or forest litter. While Organic Soils are dominated by organic matter, some mineral material may be present. Organic Soils have high cation exchange capacities, are usually strongly or extremely acid, and nutrient deficiencies are common.

Oxidic Soils are only known in the **Auckland and Northland** region. They are clay soils but despite high clay contents are friable with fine structure. They have a limited rooting depth, well-developed and relatively stable structure. Soil water deficits are common in summer.

Pallic Soils occur on the east coast of the South Island from Southland to Canterbury. They are also found on the rolling and hilly land of the **Manawatu** Hawkes Bay, Wairarapa, Marlborough and Nelson Districts. Pallic Soils are weakly to moderately leach soils that comprise of mostly yellow-grey earths. They have water deficits in summer and a soil water surplus in winter or spring.

Podzol Soils are common to **Northland**, North Island High country, the **West Coast**, and high country of the South Island. Most Podzols occur in areas of high rainfall and are usually associated with forest trees and acid litter. They usually have a bleached horizon immediately below the topsoil.

Pumice Soils occupy a large area in **central North Island**, particularly in the Volcanic Plateau centered around Lake Taupo. They are sandy or gravelly soils dominated with pumice or pumice sand. They are low in clay content.

Raw Soils lack in topsoil development and develop in environments where the development of topsoil is prevented by rockiness, active erosion and deposition. They include beach sands, alpine rock areas, screes, lagoons and tidal estuaries.

Recent Soils occur throughout New Zealand in young landscapes including **alluvial flood plains**, unstable steep slopes and slopes mantled by young volcanic ash. Soil development is mostly confined to topsoil. Drainage is good and natural fertility is generally high, but soils are susceptible to erosion and /or sedimentation.

Semiarid Soils occur in the **inland basins of Otago and Southern Canterbury**, where annual rainfall is less than about 500 mm. They are dry for most of the growing season. Nutrients are relatively high but must be irrigated to produce crop.

Ultic Soils are most common in the **northern North Island** and in the **Wellington, Marlborough and Nelson** regions. They are strongly weathered soils that have a well-structured, clay enriched subsoil horizon. These soils are acidic, well structured but are often imperfectly drained. They can be susceptible to trading damage and compaction during wet period.

Referenced from: McLaren & Cameron (2006) Soil Science: sustainable production and environmental protection. Oxford University Press. Landcare Research. NZ soil classification, Soil Orders <https://soils.landcareresearch.co.nz/describing-soils/nzsc/soil-order/>.