

Land development by flipping and hump & hollowing – updated guide for West Coast farmers

Miss Abie Horrocks¹, Dr Steve Thomas¹, Mr Craig Tregurtha¹, Mr Murray Craighead²

¹Plant & Food Research Limited, ²Nutrient Solutions Limited

A large proportion of the soils of the South Island West Coast of New Zealand are poorly drained due to impermeable iron pans and cemented gravels. Recent practices to improve drainage to increase dairy stocking include extreme land modification by flipping and hump & hollowing. Flipping is the deep inversion and mixing of soil, breaking up iron pans that are impeding drainage. Hump & hollowing involves excavating a hollow, using the spoil to form an adjacent hump, a sequence which is repeated across the land. This drastically alters the landscape mixing and burying organic material so that initially soil fertility within the rooting zone is low.

Recent Ministry for Primary Industries Sustainable Farming Fund studies were funded to provide better land management tools for West Coast dairy farmers on modified soils. One support tool that has been developed and distributed is an updated 'Land development by flipping and hump & hollowing' guide. We will describe some of the key factors that underlie successful land development ranging from identifying land that will respond to development to assessing potential agronomic and financial benefits.

We will also discuss the management challenges related to rapidly changing soil organic matter and improving fertility in this changing anthropogenic soil environment which farmers have to manage. Soil carbon (C) was observed to increase from 3.7% to 6.0% on humps within only 10 years after modification. Over the same period the soils moved from net nitrogen (N) immobilisation (C to N ratios > 20) to net N mineralisation. Pasture production was also closely linked to soil development increasing by 70% between 1 and 10 year old humps. Based on this new understanding of how soil organic matter and soil fertility changes over time, recommendations can be made to adjust fertiliser applications to target specific production and environmental goals.