

# Securing Tasmanian Agricultural Soils

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Tasmania, Australia, is currently experiencing an expansion in its agricultural sector, driven by State Government policy and the development of new irrigation schemes; with this comes increased pressures on the agricultural soil resource. To guide the expansion, a Digital Soil Assessment was commissioned to assess the suitability of 20 important broad-acre and perennial horticulture crops. This has evolved to spatially test the 'Soil Security' concept, quantified by the five key dimensions; Capability, Condition, Capital, Connectivity and Codification.

Suitability surfaces were combined to form a 'versatility index, while soil vulnerability surfaces were developed to assess wind and water erosion, salinity, and sodicity hazard as a combined 'soil resilience index'. Capability was quantified as a product of versatility and resilience. Gross-margins were applied to each suitability surface as a sliding measure of economic capital, with natural capital mapped as a function of ecosystem services, (carbon storage and riparian filtration). Soil Condition was mapped using soil order and attribute surfaces intersected with land use and existing soil condition monitoring rulesets; Codification was uniformly applied to the agricultural soils under the Tasmanian Protection of Agricultural Land Policy. Landholder Connectivity was spatially quantified by farms having 'Property Management Plans', which are divided into uniform soil management zones.

The five mapped dimensions were spatially combined into an Agricultural Soil Security Index; the more secure soils being the Red Ferrosols in the State's North West and North East, with the Midlands duplex soils being relatively less secure. This preliminary exercise demonstrates the potential of the Soil Security concept to quantify soils with respect to present and future threats to soil function (food and water security, biodiversity, ecosystem services and climate change) , and could be applied to other soil uses, such as forestry and conservation, as a measure of Total Soil Security.