

# Soils Skills and Capacity Gaps Report | Tasmania

*The Tasmanian Regional Soils Coordinator (RSC) is funded through the Australian Federal Department of Agriculture, Fisheries and Forestry (DAFF), and is supported locally through the Tas Farm Innovation Hub, situated at the University of Tasmania's Newnham Campus in the North of the state (Launceston), and NRM South, situated in the South of the state (Hobart). The Tasmanian RSC is based in the South, with regular statewide travel.*



*NRM Soil Biology workshop, Coal River Valley (2023)*

## Introduction

The Regional Soils skills and capacity gap analysis for Tasmania has been conducted from late 2022 – mid 2024, in line with priorities under Australia's National Soils Strategy (2021) and National Soils Action Plan (2023 – 2028). This report is a localised assessment of the current and possible future state of soils expertise and related initiatives in Tasmania, informed by a diverse range of perspectives from stakeholders across the state.

Tasmania has many advantages in agricultural production, with a highly diversified range of productive agricultural enterprises, generally good access to water, and a relatively favourable climatic outlook forecast into the future. It also faces many challenges as an island state, in resource availability, attracting and retaining a high-quality workforce, and access to trusted support and expertise. This report highlights both advantages and challenges for Tasmanian agriculture and soil management, where future work is required, and recommendations to address gaps in capacity and funding.

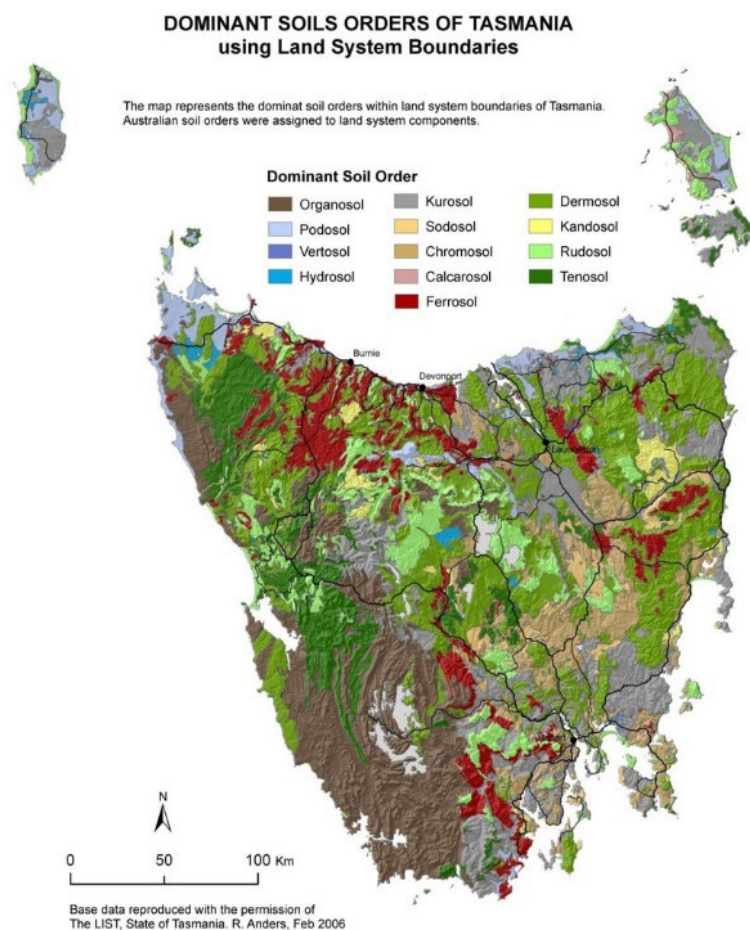
This report assumes a level of knowledge of Australia's National Soils Strategy and Action Plan, as well as some level of expertise surrounding agricultural production and soils within the agricultural context.

## History and Background

Agriculture is an inherently extractive industry. Under intensified production, significant quantities of nutrients are drawn out and exported from the system and soil condition, to varying extents, suffers as a result. Agriculture and associated practices have significant influence on the condition of natural resources across Tasmania, as well as being closely linked to the wellbeing of many communities and the economic standing of the state.

In 2020, The Tasmanian Government delivered policy that outlined an aspiration to grow the annual farm gate value of agriculture to \$10 billion by 2050<sup>1</sup>, a target that continues to drive productivity and investment within the industry. The continued investment in the Tasmanian Institute of Agriculture (TIA), rapid expansion of irrigation schemes, and capitalising on 'Brand Tasmania' are key examples of such initiatives that look to drive this growth. The island is also an important climatic differentiator for many large, high-value industries, including viticulture and horticulture, who are expanding production to build business diversification and resilience to changes in climate experienced on the rest of the Australian continent.

Agriculture in Tasmania is particularly diverse, spanning from large-scale grazing operations and high-value dairying enterprises to intensive horticulture, viticulture, cropping and forestry – across highly variable soil types. This variation is a strength for the industry, but also presents challenges for land managers in managing and accounting for differences in soils across production areas and commodities.



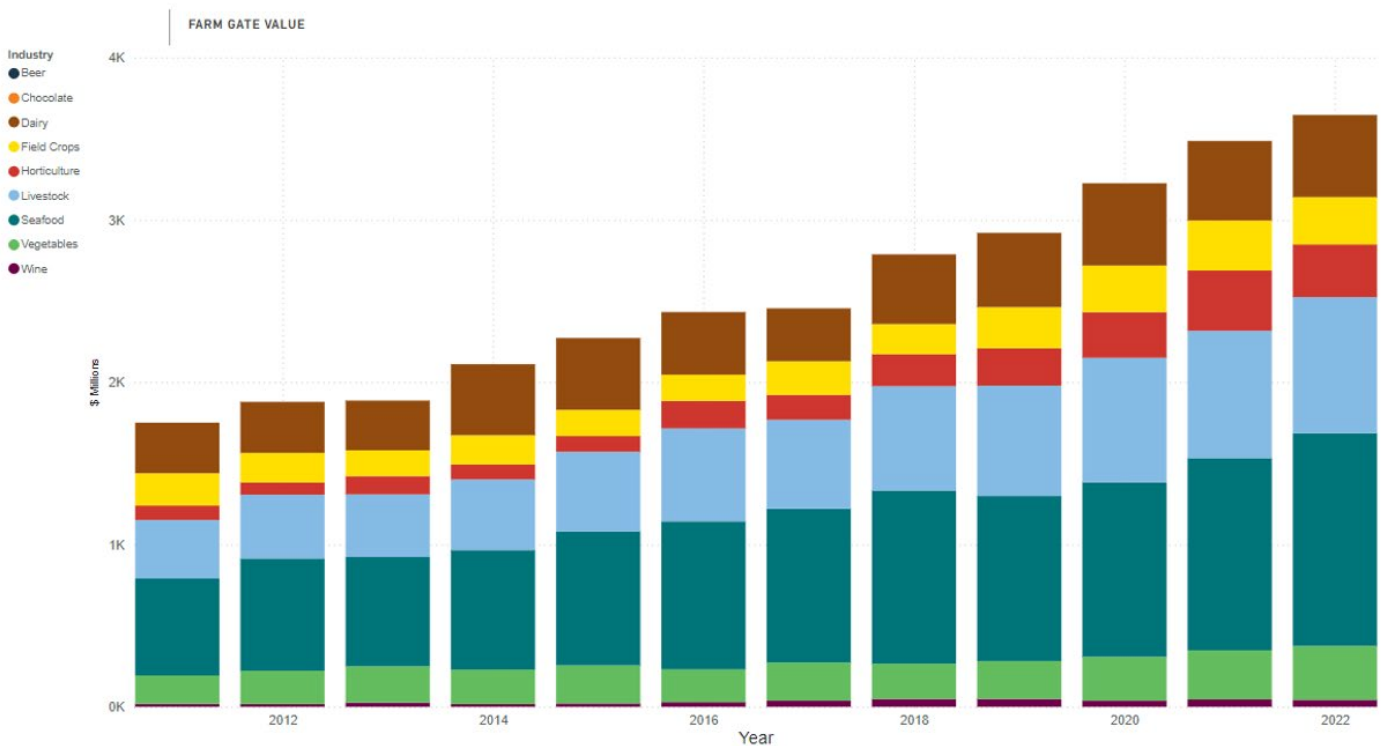
*Broadscale soil map of Tasmania. Source: Encouraging the Development of the Wine Sector in Tasmania (pp.98 - 125)*

<sup>1</sup> <https://nre.tas.gov.au/agriculture/agrivation-2050-tasmania-government-policies/competitiveness-of-tasmanian-agriculture-for-2050>

This variability also requires those working in extension, research, government, NRMs etc. to be able to communicate key messages that are relevant to a variety of stakeholders within an area, who may be dealing with different challenges.

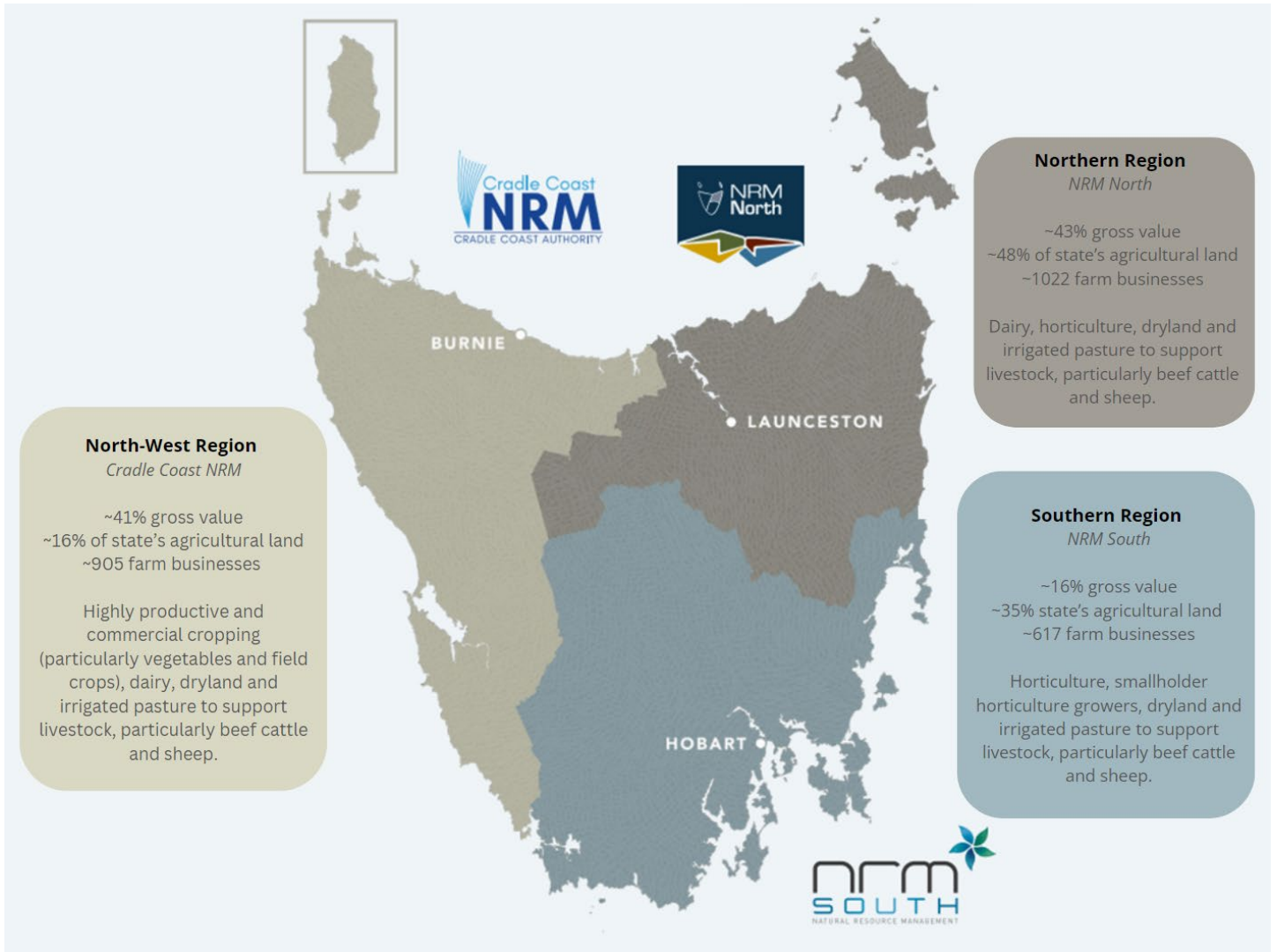
Tasmania’s production from primary industries is comprised of the following main commodity categories:

- **Livestock products** (incl. meat, dairy, other livestock products – eggs, honey, wool, hides and skins)
- **Fruit** (primarily berries, apples, cherries, nuts)
- **Vegetables** (primarily potatoes, salads, onions, carrots)
- **Seafood** (primarily salmonids, abalone, rock lobster, oysters)
- **Wine grapes**
- **Field crops** (incl. wheat, barley, canola, hops, hemp, poppies, fodder crops, seed crops, cut flowers, pyrethrum)
- **Non-food agriculture** (incl. wool, hay, silage, poppy, seeds, animal feed)
- **Forestry** (including private agroforestry and industrial forestry)



Farm gate value of major Tasmanian primary industry outputs. Source: [Agri Food Profile Dashboard](#), Department of Natural Resources and Environment Tasmania (2024)

At a statewide scale, regional differences in soils and enterprises across Tasmania can be broken down by approximate NRM Region jurisdiction:



Source: NRM South Strategy 2023, Tasmanian Agricultural Scorecard 2021

Historical tensions exist between the inherent state of Tasmania's natural resources and their use by industry – whether that be from agriculture, forestry, aquaculture, or energy. The reputation of Tasmanian agricultural production, in particular, is built on intrinsically beautiful landscapes, including rich, fertile soils that sustain many areas of intensive production.

Larger grower group structures that operate in other areas of Australia do not exist in the same way in Tasmania, rather, smaller, community-led farmer groups and/or some industry-focused groups are the norm. Examples of these groups include the Coal River Products Association, East Coast Primary Producers, and the Circular Head Beef Producers Group.

Some social challenges, including lower rates of literacy and numeracy across Tasmania<sup>2</sup> can form a barrier to engaging in agriculture's education and extension pathways, as well as influencing decision-making capabilities and confidence in some instances.

<sup>2</sup> Del Rio J, Jones K (2023) Saving money by spending: solving illiteracy in Australia. Equity Economics

## Methods and Development

Input into this report was largely collected through semi-structured consultations and interactions with a range of key personnel and soil stakeholders across Tasmania, including:

- NRM South, NRM North, Cradle Coast NRM
- The Tasmanian Institute of Agriculture (TIA)
- The TAS Farm Innovation Hub
- Soil Science Australia, Tasmania Branch
- The Department of Natural Resources and Environment (NRE) Tasmania
- Forestry Practices Australia (FPA)
- Dairy Tasmania
- Sprout Tasmania
- VegNet Tasmania
- Wine Tasmania
- TasFarmers (formerly Tasmanian Farmers and Graziers Association)
- Private consultants and advisors
- Education staff covering primary, secondary and tertiary educational levels
- Farmers in attendance at relevant local events and field days

Initial discussions with personnel and institutions informed the basis of initial information and report content, key points of which were summarised and presented to key soil stakeholders for feedback.

Supporting information was also sourced through desktop research, particularly outcomes of the SoilCRC *Social Benchmarking Report for Tasmania (2023)*<sup>3</sup> and data from the *Farmer & Ag-Industry survey of knowledge & extension gaps and opportunities for managing Australian soils*, designed and collated by members from the national network of Regional Soil Coordinators (2023)<sup>4</sup>.

## Current Baseline and Future Vision

### Current Baseline

Tasmania, much like other areas of Australia, has seen varied levels of investment into soils in recent history. Legacy work from the 1980s, 1990s and early 2000s has enabled strong foundational soils knowledge, databases and resources to be created and accessed by the public. This includes the widely used Land Information System Tasmania (LISTmap)<sup>5</sup> and various publications from the state government, industry, NRMs and prominent soil practitioners.

Fragmented pieces of soils information, research and extension, conducted at industry or localised scales exist in Tasmania, but exposure to relevant, long-term, robust research, for key agricultural stakeholders, is lacking. There will always be a need to continue building knowledge of fundamental principles of soil management, as well as more complex concepts around soil health, carbon, natural capital etc. Lack of funding and capability to support farmers to implement longer-term sustainability

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<sup>3</sup> Luke, H., Cooke, P., Allan, C., McDonald, S., & Alexanderson, M. (2023). *Land management in Tasmania: Rural landholder social benchmarking report 2023*. Southern Cross University. <https://soilcrc.com.au/wp-content/uploads/2023/10/TasmanianReport-withFinalChanges-prc.pdf>

<sup>4</sup> Fisher, P., Leckie, C., & Clausen, J. (2023) *Farmer & Ag-Industry survey of knowledge & extension gaps and opportunities for managing Australian soils*, Department of Agriculture, Fisheries and Forestry (DAFF).

<sup>5</sup> <https://maps.thelist.tas.gov.au/listmap/app/list/map>

and landscape resilience strategies may be eroding the resilience of Tasmanian farms and soils making them more susceptible to climate variations and extremes.

Industry-specific investment into soils research and extension in Tasmania is challenged by size and the diversity of commodities grown. Unlike some other areas of Australia, where the same commodity[ies] may be concentrated and present a sound investment for a particular Research and Development Corporation (RDC), Tasmania's diversity and comparatively small production area often presents a challenge to investment. Localised exceptions to this are some programs in different regions from dairy, viticulture, and some horticulture.

Supply chain demands and processes do not generally accommodate long-term monitoring of soil condition and place priority on crop quantity and quality, without robust, trusted advice on soil management that reaches beyond short-term commercial outcomes.

The longer-term effects of management practices on soil condition can largely go on 'unseen' or unmeasured and are generally not a high priority in short-term decisions made by producers given the multitude of demands on time and capacity that are involved in managing a profitable farming business. The effect of rapid and widespread development of irrigation schemes on soils in Tasmania is, and will continue to be, a prevalent example of this.

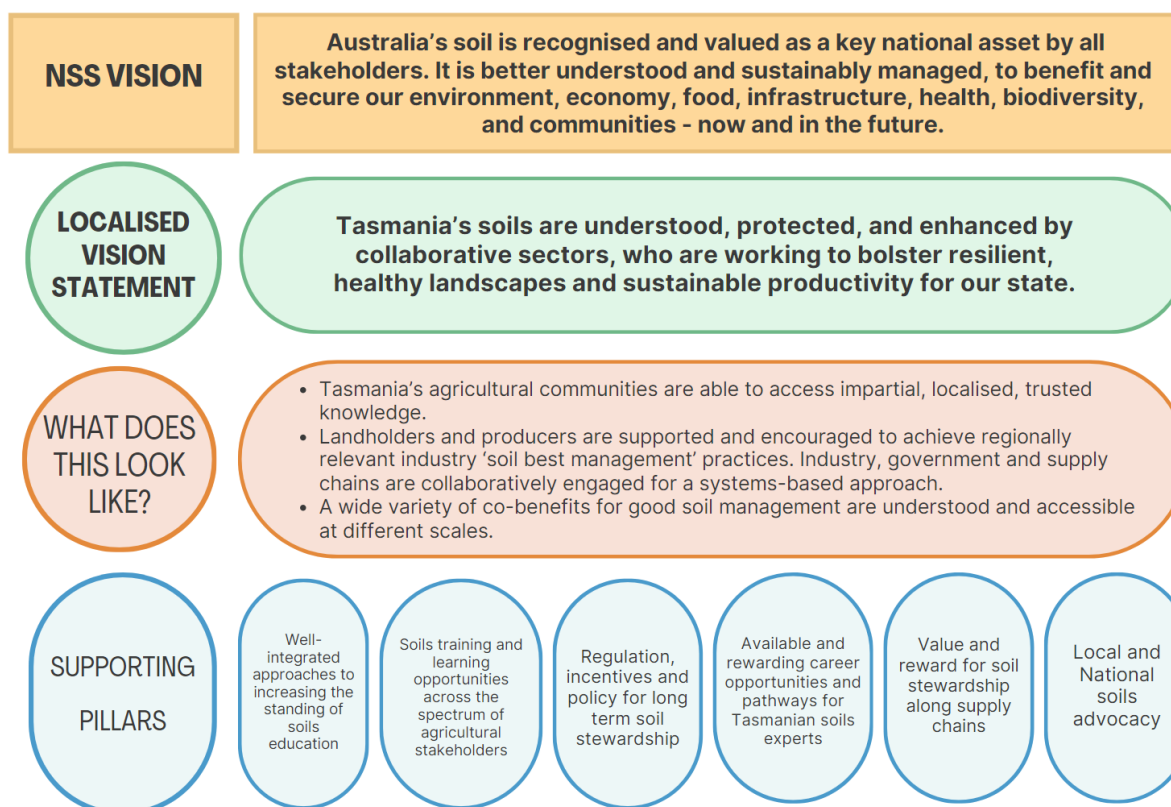
Soils expertise in Tasmania is scattered between the University of Tasmania, government and government-funded bodies, and the private sector. Historical investment in publicly funded soils research and extension has allowed for career-building experiences for many of these key soils personnel, a large proportion of whom are towards the end of their career. The change in funding, job availability, and thus attractiveness of a publicly funded job in soils has waned, with more graduates and early career professionals being attracted by employment prospects in the private sector, rather than public.

Educational and employment pathways for building a career in soil science are limited and disjointed with unclear outcomes. Tasmania also has the challenge of retaining graduates and skills locally, often needing to look interstate and internationally to fill expertise gaps. Generally, agriculture faces workforce recruitment issues with strong competition from other industries such as mining, construction and the armed forces. Lack of opportunities for ongoing professional development for teachers and other educators also limits exposure of students to newer information, technology, and diversity of real-world approaches to agricultural production and soil management.

The role of The University of Tasmania as the only tertiary establishment of its kind in the state cannot be overlooked in creating strong educational pathways, in combination with the role of TasTAFE and school-level opportunities to engage with soil. The Tasmanian Institute of Agriculture (TIA) is a joint venture between the Tasmanian State Government and the University of Tasmania, established in 1997. TIA sits within the University's governance structure and has responsibility for under-graduate and higher degree teaching, higher-degree research, applied research and industry engagement across Tasmania's agriculture and food sectors. Significant investment has been made to provide more accessible, agriculture-related educational pathways through TAFE and associate degree courses offered by the University, however, in the broader context of agricultural education, soil is considered a small subset and has challenges in industry-relevant application. Soils knowledge is being built through these educational institutions, however, currently lacks depth and richness in assisting landholders to achieve and maintain production and landscape benefits. At a minimum, two to three-generations of soils knowledge and mentoring is lacking. This must be funded, built and maintained for long-term capacity building for Tasmania.

## Future Vision

The Tasmanian soils landscape has significant potential in sustaining agricultural production and providing opportunities for training, learning, and development – if supported adequately over a reasonable time period. The National Soils Strategy (NSS) and Action Plan (2023 - 2028) provides overarching structure for building soils capacity in Australia – what could this look like in Tasmania?



*A possible framework for recognising the vision of Australia's National Soils Strategy, in the Tasmanian context.*

Ensuring impact and achieving sustainable soil management for Tasmania, under this future vision, will require working towards building:

- Coordinated programs of soil research, education, and extension, which are regionally and industry- relevant
- Experienced and highly motivated technical and scientific specialists who are effectively engaged with regional activities
- Regionally demonstrated solutions for addressing key soil issues
- Multi-generational investment in soils skills, education, and career pathways
- Collaboration with policy makers, farmer groups and soil researchers to define best practice soil management standards and different, accessible options for rewarding farmers who meet those standards
- Regulation and incentives for commercial buyers and supply chains to differentiate and reward sustainable farming practices, including long-term soil health incentives

## Gaps and Key Platforms for Change

Improving soils capacity for productive agriculture and healthy landscapes is multi-faceted, and requires the local context, networks, challenges and opportunities to be properly considered, with demonstrated solutions and workforce that are well-resourced over time.

Key platforms for change have been broadly categorised into 1. *Industry and value chain*, 2. *Education and training*, and 3. *Research, development, and extension*.

### Industry and value chain

Context-specific understanding of soil best management practices, and what good outcomes may look like, (without being prescriptive) need to be established in local conditions. Due to its size, Tasmania can often be grouped together as one, when, in reality, the island's diversity means that each catchment, and production systems within those catchment areas, can be vastly different. To support this, demonstratable improvements to landscape and soil health within local areas need to be possible. These must meet aspirations of local growers and industry, and not place growers in a position of following good environmental practices that are at odds with value chain expectations.

Generally, landholders are familiar with the properties of their soils that are relevant to managing production and have the desire to manage land to the best of their abilities. Most also have a vision to leave the land (and business) in good or better condition for the future. However, under tough times and or production pressures, the soil condition can suffer. Soils do not have the same priority within the farm business as elements such as animal health, crop pest and disease management, availability of water etc. The case for landholders to invest in soil knowledge and/or practice change needs further strengthening and must be supported through incentives and policy from both government and industry.

For Tasmania, brand perception and quality produce plays a large part in defining agriculture's importance in the marketplace. It is imperative that the public image of Tasmania and its produce is supported by proven environmental stewardship, particularly effective care of the land and soil resources, as to not incur reputational risk and/or negatively affect market access of Tasmanian primary products. This is largely considered by producers and companies who have built brand value off the Tasmanian image, and will become more important for others who are largely selling into commodity markets as sustainability frameworks and metrics increase in prevalence.

As consumers become more engaged with food production systems, reputational risk surrounding practices and community perception becomes more important. The value of investing into and supporting best-management practices also needs to be more clearly demonstrated to industry, to engage support and enact change along supply chains. This has been done successfully to differing degrees in the Tasmanian smallholder context, but needs to be broadened for the benefit of landscapes managed at larger scales.

### Education and training

Educational pathways and positive career prospects (e.g. salary, security, purpose etc.) impact the ability to retain and attract current and future workforces. Working with established education and career initiatives to increase the prominence of soils within the environment is a good start to increasing exposure to soils. There must be employment options available that include ongoing training and professional development opportunities to attract and build a skilled local workforce. Consideration of barriers for educators, and a re-working of how the soils discipline is integrated (and central) to a



systems-thinking approach in an agricultural context, where no one parameter works in isolation, is also required.

Multi-generational investment in building capacity and skills is required, across a reasonable timeframe. Soils knowledge is ‘slow knowledge’, it takes time and experience to build. The Tasmanian soil landscape is diverse and could provide a platform for in-depth training across a suite of soil types and enterprises – for farmers, farm workers, agronomists and other advisors, as well as students, researchers and extension personnel – locally and further afield interstate. A limitation of Tasmanian engagement in more nationally focused training schemes, is that the sessions run locally are far and few between. If employees wish to upskill, the cost of interstate travel and associated expenses is often a barrier. Relatively lower numbers of workforce compared to other areas of Australia often inhibits the running of training programs in Tasmania, and thus local workforces often miss out on upskilling opportunities.

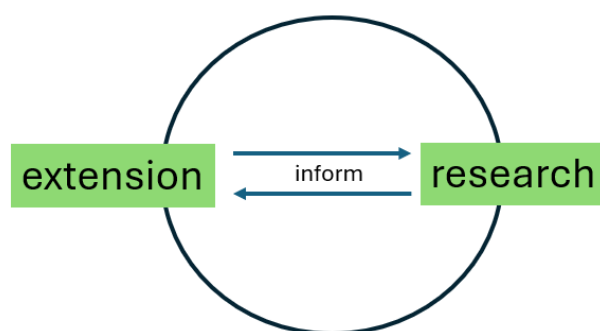
Literacy and numeracy rates are a challenge across areas of Tasmania, as well as a declining engagement of students with STEM education. Soils could provide an engaging platform for students with a mix of practical and lab or classroom-based activities, as well as being applicable across biology, chemistry, physics and environmental sciences. Place-based soils education and learning opportunities could prove very beneficial in re-engaging students and teachers with STEM education.

#### Research, development and extension

Research gaps and irregular engagement between different agricultural communities and research cohorts presents a barrier to the creation of an innovative, applicable, and strong research to development and extension system for soils in Tasmanian agricultural settings.

Varied in-field soils research presence, that is accessible, applicable, and farmer-led, as well as a perception of misalignment of research priorities from parts of different agricultural communities presents a barrier to the creation of an innovative, applicable, and strong research to development and extension system for soils in Tasmanian agricultural systems.

Extension efforts that connect people and resources are useful, however, those that provide practical, actionable advice for farmers, who are either afforded extra confidence or direct connection to an expert with confidence in a specific field is needed in the landscape, if practice change is to be achieved.



Ideally, research and extension should not be linear, but a circle of equal parties where each is continually informed and supported by the other (as above), and where practical, lived experience of extension practitioners and farmers is integrated with research knowledge to find solutions to complex problems.

Research staff are not numerous, have a high burden of workload, and are often limited in capacity and/or support to engage effectively with end-users of research. This lack of capacity may open the door to less robust science and knowledge being trusted over trialled research. There is an opportunity

for Drought Hubs, NRMs and others to address this gap and contribute to informed research, development and extension work.

As highlighted in earlier sections, expansion of irrigation and the impact of this on soils will be a major theme for Tasmanian agriculture in the future. Some solid work has been conducted on this locally, which should be continued and expanded – as well as continuing to upskill advisors and irrigation sales personnel where possible.

## **Next Steps and Recommendations**

This report outlines some priority areas for focus, investment and development over the life of the National Soil Action Plan(s) and National Soil Strategy. Implementing changes and achieving progress is contingent upon the ability of local and national stakeholders to work with a wholistic view of the agricultural system and identify where components related to soils can be better integrated and strengthened.

Increasing the appeal and availability of soils careers is fundamental to delivering against the priorities of the National Soil Action Plan(s), National Soil Strategy, and beyond. Coordination with education programs, curricula and other employment schemes at both federal and local levels could see greater integration of soils through primary, secondary and tertiary education levels, and prepare the future workforce with skills to manage soils, no matter which area of agriculture, land and/or natural resource management they may be exposed to throughout a career.

There is appetite across all scales of Tasmanian agriculture for more farmer-led, locally relevant research and trial sites that are hosted close to or within production areas. Defining catchment and industry-relevant soil best management practices and outcomes are a part of this work, and should be supported in the future.

Long-term funding for soils extension initiatives that have a broad scope (e.g. the ability to establish trial sites and provide training, as well as provide a career pathway for soils expertise) should be investigated. Appropriate hosts for these programs could include the Tasmanian Institute of Agriculture, and/or the Tasmanian NRM groups. These programs should have scope to meet farmer aspirations and be able to demonstrate scientific and practical knowledge to meet, and where appropriate, challenge local aspirations.

Systems that reward farmers, producers and others to sustain both production and soil health must be looked into, beyond that of large, complex schemes. The scale of many Tasmanian enterprises and landholder aspirations are often prohibitive to entering into larger crediting schemes. The strengths of the Tasmanian system mean that these rewards could be a reality, but need further investigation and coordination into how they may be applied practically. Visioning for what a strong local food system looks like for Tasmania has been conducted by a variety of institutions, however, a vision that foregrounds sustaining the soil and supporting producers, with reward and incentive for sustainable soil stewardship, has not yet been conducted.

Expansion of irrigation schemes and related infrastructure will remain significant for the Tasmanian landscape, for both on-farm and landscape scales (e.g. sediment and nutrient runoff into waterways). Soils-focused skills in managing productive farming under these systems are, and will continue to be, vital for landscape health across the state.

Tensions in land use change and urban expansion into areas suitable for agriculture is a continuing point of conflict between addressing food and housing security. These dynamics have not been fully explored through this report and should be considered moving forward.

## Appendix: Summary of relevant information identified from Soil CRC Benchmarking Survey (2023) and Regional Soil Coordinators National Survey (2023/24)

**SoilCRC:** Luke, H., Cooke, P.R., Allan, C., McDonald, S., & Alexanderson, M. (2023). Agriculture in Tasmania: Rural Landholder Social Benchmarking Report 2023. Southern Cross University, NSW, 2480.

**Regional Soil Coordinators:** Fisher, P., Leckie, C., & Clausen, J. (2023) Farmer & Ag-Industry survey of knowledge & extension gaps and opportunities for managing Australian soils, Department of Agriculture, Fisheries and Forestry (DAFF).

Both these data sources provide varied information about soils priorities for farmers, advisors and others in Tasmania. At a broad scale, from this data, respondents indicate an awareness of the impact and importance of soils issues in Tasmania, with varied levels of confidence and support to implement any management or practice changes.

Sample sizes of data acquired from the 2023/24 national survey are not sufficient (Tasmanian respondents = 30, total completed surveys = 18) to adequately inform decision-making, however, responses have been noted and any relevant information from this survey has been considered in composing this report.

Data from the Soil CRC survey paints a wholistic picture of farming in Tasmania, including where soils are or are not prioritised in the context of operating a business or maintaining a property for the different respondent categories (full-time farmers, part-time farmers, hobby farmers, non-farmers). These categories are important to note in the changing dynamics of Tasmanian farming and land ownership.

Data from the RSC National survey generally shows a high awareness of soil issues experienced by different industries. Strategies to mitigate these issues are varied in their use, and confidence in implementation is varied. This small dataset generally reflects trends highlighted by other, larger pieces of work.