



📍 Horticulture Business students, ReidFruits

TIA Strategies and Initiatives to make a difference

UNIVERSITY of TASMANIA —



Tasmanian Institute of Agriculture

Message from the Vice-Chancellor

When it comes to agriculture, Tasmania is unique and very special in lots of ways. From our rich and diverse soils, favourable climate with enough variation suited to a range of endeavours, strong biosecurity and some of the cleanest air and water found anywhere. Harnessing these unique qualities of our Island, we cultivate some of the finest agricultural products in Australia and indeed the world. We do this ever mindful that the qualities we are drawing on are finite and exist in a delicate balance. As such we have a responsibility of stewardship and care, in ensuring that we build on our ecological and socially sustainable practices. This matters as much for our Island and its places and creatures as it does for future generations that live here.

Agriculture is vitally important to our place and to our identity here. There is of course the critical role it plays in providing food, fibre and other produce to our State and across the world but there are also the jobs, prosperity and pride the industry brings to our communities. We know that for people working in agriculture it is much more than a vocation. It is a way of life.

In that spirit, agriculture is one of the great enablers of bringing people and communities together. Be it the food-based markets or festivals or the many agricultural shows we see across the Island. What these all have in common are the many passionate and committed people at their core. People who are proud of what they do and how they do it and are keen to showcase it.

Along with the importance agriculture holds for people and place; it is also a very important contributor to our economy. The gross value of the commodities produced in 2019-20 was equivalent to 5.1% of Tasmania's gross state product.

The industry has maintained consistent growth over the last ten years, driven by many factors including new knowledge development, adaptation and investments in irrigation, wide-ranging advances in technology, and changes to not only agricultural products but production practices broadly. This success has also been driven in no small part by our adaptations to climate change and deregulation of the market to enable farms of all sizes to prosper.

In many ways our success in agriculture is founded in our innovative and creative approach. The kind of thinking and ingenuity that is a part of our way of living here.

Despite all of these successes, Tasmanian agriculture faces very real and complex challenges. Our task is to adapt to meet these challenges, maintaining the strength of the industry while also balancing and caring for those qualities only found here.

The goals we have set for ourselves are ambitious. To achieve the target of \$10 billion farmgate value by 2050 set by the Tasmanian Government, Tasmania's farmgate value will need to grow 5.5% each year, for the next thirty years. Achieving this will require maximising benefit for farmgate value, optimising the value-add opportunities post-farmgate, and enhancing our resilience to climate change. Addressing the kinds of challenges we face will require us to work ever more closely with industry, government, and our communities. It is going to require careful listening and collective thinking and acting.

We are committed to deliver on these challenges. While we have already started on the journey, we are accelerating our progress. Within a few years we will be co-located with our government partners in the north of the State, where most of our agricultural production on the Island happens.

This shift will enable us more effectively to transfer the knowledge developed across agriculture broadly, food production and post farmgate practices to our students and industry partners. Through learning together in-place, this shift will also help to build and foster our local community where they live and work, and it will bring the much-needed knowledge and skills intensity to this region of Tasmania.

We will deliver graduates for Tasmania, with strengths in Industry 4.0 Technologies, entrepreneurship, and innovation and with the ability to deliver agricultural solutions to Tasmania and across the world. Through building on our existing strengths in climate resilience, we will further limit greenhouse gas emissions and improve the health of our soils.

We will do this working closely with our partners and the community to not only keep Tasmania and its agricultural sector thriving but also to ensure that the Island and all that it is remains on a sustainable trajectory.

This strategy outlines our commitment and vision.

Professor Rufus Black, Vice-Chancellor



Message from the Interim Director

The Tasmanian Institute of Agriculture (TIA) has the mandate to progress the agricultural industry of Tasmania through the provision of industry relevant research and development, encouraging the industry adoption of findings, and through the delivery of educational offerings relevant to Tasmania. From the advantages that Tasmania offers us, we deliver to the world.

TIA is a joint venture between the University of Tasmania and the Tasmanian Government, and this strategic plan stems from, and is aligned with the strategies of each.

The University is committed to the responsible use of Tasmania's agricultural resources for economic growth and the sustainable management of the island's unique environment. Equally, the Tasmanian Government sees agriculture and food production as a key driver of the state's economic growth, as it aims to foster a sustainable upswing in the competitiveness of the agriculture and food sectors. TIA is well positioned to be a key enabler of these aims.

This updated strategic plan will see TIA focusing on six strategies:

1. TIA will work to transform the knowledge of agriculture, food production and post-farmgate practices of Tasmania's farmers, contributing to a sustainable economic benefit for Tasmania.

In doing this, TIA will focus on Tasmania's distinctive agriculture, aligning our research strengths to the industry, its areas of growth, and the State's economic future. We will invest in the industry development team, to facilitate the adoption of findings by industry. We will invest in leadership in agribusiness, to underpin the development of the structure of the industry. We will invest in the technologies of the fourth industrial revolution: the application of data-driven precision technologies to agricultural production. We will invest in capacity and capability in soil health, as well as in irrigation.

TIA will also support the value of the Tasmanian agricultural industry by working with the State Government in the control of biosecurity risks. We will do more to see that our research is commercialised.

2. TIA will work to build resilience to climate change as well as to limit greenhouse gas emissions from agriculture and food production.

TIA will develop practices and knowledge for climate resilience and carbon neutrality through drought adaptation, emissions avoidance, carbon sequestration, not least through supporting the Tasmanian Drought Resilience Adoption and Innovation Hub. Further, TIA will establish a Crop Stress Physiology Hub with other academic units to develop a new generation of high-yielding and nutritious crops, resistant to degraded soils, flooding, drought, heat, and biotic damage.

3. TIA will shift the perception of agriculture in school-age children to increase student recruitment, engagement with the agriculture and food industry, and its careers.

TIA will offer professional learning opportunities for science teachers to showcase and embed real-world agricultural science in collaboration with the Department of Education and TasTAFE to help build the image of agriculture.

4. TIA will refocus the curriculum and student experience to enable the growth of agriculture and food in Tasmania.

TIA will provide a curriculum that empowers graduates for the agricultural industry of Tasmania, and for professions and in areas where Tasmania's farmgate and post-farmgate value is growing. We will do this by also incorporating outputs from this TIA strategy into the curriculum. We will create opportunities for students to undertake work-integrated learning as part of their course through work experience in the agri-food sector.

5. TIA will deliver solutions to agricultural problems for Tasmania and the world through partnerships that leverage and complement our research and teaching strengths.

TIA will continue to strengthen areas of international research excellence to attract the best students and researchers from around the world. TIA will build on the existing partnerships we have while building others.

6. TIA will evolve its business model to better connect with industry and, build our collaborative partnerships.

TIA will be headquartered in Launceston; part of our strategy to deliver to the whole state. TIA will map and strengthen engagement with industry, government, and community stakeholders to create mutually beneficial, transparent, and authentic relationships.

The headquartering of TIA in Launceston will begin a new chapter for the Institute. While the process is anticipated to be complete by mid-2024, there will be a gradual build-up of resource in Launceston between now and then. From Launceston, and with a retained presence in Hobart and Burnie, TIA will be able more readily to deliver for the whole state of Tasmania. The headquartering of TIA in Launceston is accompanied by a large investment in the Institute's infrastructure, including new grow spaces and laboratories. Coupled with the State and University investment in the TIA Research Farms, as well as other investments, TIA has been enabled to deliver for Tasmania and from Tasmania to the world.

This updated Strategic Plan was developed in close consultation with staff and stakeholders, and I would like to take this opportunity to thank everyone who contributed to its development. I would like to thank the respondents to the fore sighting exercise who enabled the initial scope of the strategy, the past and present members of the TIA Advisory Board for their support, and all our staff who engaged with this process.

Professor Michael Rose
Interim Director, TIA



Message from the Minister

A strong Tasmanian Research, Development and Extension (RD&E) sector is central to the Tasmanian Government's ambitious target to sustainably grow the farm gate value of Tasmanian agriculture to \$10 billion per annum by 2050.

Our Growing Tasmanian Agriculture: Research, Development and Extension for 2050 White Paper sets out the Tasmanian Government's approach to achieving the productivity gains and innovations that will be needed to meet this target, while our Competitiveness of Tasmanian Agriculture for 2050 White Paper affirms our ongoing commitment to research and innovation.

Our partnership with the Tasmanian Institute of Agriculture (TIA) is the cornerstone of our agricultural RD&E approach. For more than two decades, this partnership has supported world-class agricultural RD&E that is delivering practical, on-farm benefits to our state's agri-food producers.

This partnership is being strengthened through the establishment of the new nation-leading Agricultural Precinct in Launceston. The Tasmanian Government recently entered into a Memorandum of Understanding with the University to deliver this precinct which will maximise the opportunities created by the strategic co-location of agricultural science, water management, industry development and biosecurity in a single agricultural precinct. This exciting development will bring together best practice in research, skills and development across industry, government and academia, providing a massive boost to the agricultural sector.

Another area in which we continue to partner with TIA is in the modernisation of Tasmanian research farms. The Tasmanian Government has strategically invested \$7 million to modernise the Crown's research farm portfolio, as set out in our *Plan for Tasmania's Research Farm Capacity*. \$5 million has already been allocated to developments at the TIA dairy and vegetable research facilities and I look forward to seeing these farms become centres of excellence for the next decade.

We are also supporting the RD&E activities of TIA through the establishment of the \$3 million Agricultural Development Fund for industry-driven RD&E projects. This funding is on top of the \$3 million Agricultural Innovation Fund launched in 2019 which is available for RD&E addressing emerging opportunities and issues likely to have a direct impact on Tasmanian agriculture.

Access to high-surety water is transforming Tasmanian agriculture, creating jobs and expanding production to meet the growing demand for Tasmania's premium and value-added produce. The Tasmanian Government has been a strong supporter of irrigation development in Tasmania, and the ongoing work of TIA with farmers to help ensure the effective and sustainable use of irrigation water is extremely important.

I congratulate TIA on their recent successful bid to establish a Tasmanian Drought Resilience Adoption and Innovation Hub with support from the Australian Government's Future Drought Fund. This is an exciting initiative made possible by the hard work of TIA staff and extensive support from a broad range of industry stakeholders. The Hub will play a strategic role in the state's agricultural RD&E landscape, helping to deliver on-farm adoption and uptake of research that improves drought resilience in a changing climate.

In addition to TIA's key role as the Tasmanian Government's preferred provider of publicly-funded RD&E, I also acknowledge the important role of TIA in training and equipping the next generation of agricultural industry leaders. This skill development is critical for the continued competitiveness of Tasmanian agriculture.

TIA continues to attract students into careers in agriculture through their outreach programs and provides the training and skill development necessary for an increasingly sophisticated, technology-focussed and data-driven sector. TIA's relocation to Newnham will provide even more opportunities to have an industry-embedded and immersive experience amongst significant areas of agricultural production.

I also wish to acknowledge the work of TIA in delivering the Extension Accelerator program with funding support from the Tasmanian Government. This highly successful program was co-designed with industry to provide professional development for graduates working in agricultural extension and has fast-tracked the development of young Tasmanian agricultural professionals in partnership with industry employers.

The strategies and initiatives set out here provide a solid basis for further strengthening the valuable partnership between industry, university and government to continue the delivery of RD&E and education needed to support a prosperous, innovative and sustainable agri-food sector.

Hon Guy Barnett MP
Minister for Primary Industries and Water



Vision for 2025

TIA will enable Tasmanian food producers and processors to accelerate primary sector productivity while maintaining and improving Tasmania's land and water quality for future generations.



Horticulture Business students, Bushy Park.

Current Context of Tasmanian Agriculture

Agriculture and food are important to Tasmania. The industries that produce them are a source of employment, income and economic growth, especially in rural communities. The quality of the produce, the setting of its production, the care of the land and the state's GMO-free status, sees agriculture contribute to Tasmania's image as a place of clean, green production.

THE IMPRESSIVE GROWTH OF FARM GATE PRODUCTION

The **value of agricultural commodities produced in Tasmania plays a significant role in the Tasmanian economy**. The gross value of the commodities produced was equivalent to 5.1% of the State's gross state product in 2019-20, higher than the relative contribution in New South Wales (1.9%), Victoria, (3.5%) and Queensland (3.6%).¹ In dollar terms in 2019, the farmgate value of Tasmanian agricultural production was \$1.9 billion.

Over the past decade, **agriculture has become an even more important contributor to the Tasmanian economy**. The sector has experienced consistent and strong growth, with farmgate value growing by a compound 6.5% per year between 2009-10 and 2018-19.²

This growth rate has outstripped the average rate of growth in the state of 1.64%³ which means that agriculture is becoming a proportionately larger part of the Tasmanian economy. Indeed, the growth rate in the 10 years to 2019 has been considerably higher than in the previous period 1999-2009.⁴

The underlying foundations for the accelerated growth are:

Irrigation

The area of irrigated land has grown in recent years. Tasmanian Irrigation was established in 2008, with the aim of growing the wealth of Tasmania by developing and enhancing the productive capacity of the state's agricultural industries.⁵ As of December 2020, Tasmanian Irrigation has 17 schemes in operation, and a further five, known as 'Tranche Three- Phase 1', in the development phase.⁶ Irrigation, largely driven by this initiative, has enabled the accelerated growth in Tasmanian farmgate value in recent years. More broadly, irrigation supported approximately 64% of gross agricultural production value in 2019, up from 61% in 2009.⁷ It plays a critical role in the performance of some of Tasmania's highest value commodities, including dairy, vegetable, and fruit production.⁸

¹abs.gov.au, value of Agricultural commodities produced, Australia, 2010/11-2018/19 ²dpiw.tas.gov.au/agriculture/facts-figures/tasmanian-agri-food-scorecards/previous-industry-scorecards ³treasury.tas.gov.au/Documents/State-Accounts.pdf ⁴dpiw.tas.gov.au/Documents/Tasmanian%20Agrifood%20ScoreCard%2014/15-2018/2019 ⁵tasmanianirrigation.com.au/about-tasmanian-irrigation ⁶tasmanianirrigation.com.au/source-assets/map-data/NMIS/7.-NMIS-Scheme-Overview.pdf ⁷abs.gov.au/statistics/industry/agriculture/gross-value-irrigated-agricultural-production ⁸abs.gov.au/statistics/industry/agriculture/gross-value-irrigated-agricultural-production/2017-18

Adoption of technologies

Technological progress has been a key driver of long-term productivity growth in agriculture in Australia over the decades, principally in better breeding, nutrition and management of plants and animals.⁹ The underpinning determinant of that technological progress is investment in research and development, which, of that adopted, has been estimated to be responsible for more than half of the average annual productivity growth in Australia's agriculture sector.^{10,11} This is notwithstanding the relatively poor adoption of technology, as compared with other industries.¹² There is scope for further growth based on digital agriculture: according to the report 'Accelerating Precision Agriculture to Decision Agriculture', the "conservative best case" estimate of full implementation of digital agriculture has the potential to lift the gross value of the Australian agricultural sector by an additional 25% and add 1.5% GDP value to the Australian economy.¹³ This assumes 100% uptake of digital agriculture, and likely represents the best-case scenario.

Policy reforms and deregulation

Worldwide, agriculture remains the most highly protected industrial sector, particularly in Europe and the United States. In contrast, Australia has provided the second lowest levels of support to agriculture, after New Zealand, among OECD countries.¹⁴ The Government of Australia has deregulated the market for primary production, thereby removing monopolies, which has allowed farmers a range of marketing options. Some farmers have prospered under the new arrangements, while others have struggled with the changes.¹⁵

New products and the mix of products

The product mix of Tasmanian agriculture has maintained consistency in some areas but has shifted in others over time. Livestock products equate to more than 60% of the gross value of Tasmanian agriculture. Where commodity prices of many other agricultural products have long been variable, prices for meat and milk have been relatively stable over the last 30 years, due to higher worldwide demand for animal protein, particularly in middle income countries, as well as temporary factors such as drought in the US.

Despite the dominance of livestock products, the mix of other agriculture products grown by Tasmanian farmers has changed over the years. For example, pyrethrum, fodder crops, seed crops, hemp, berries and poppies have been introduced to the state at various times over recent decades, while all livestock industries in the state, particularly dairy, have grown in value, adding to the accelerated growth seen. This growth has also significantly changed the shape of Tasmanian primary food production over recent years. The most substantial changes in the value of production have been seen for dairy (from \$293M in 2009 to \$458M in 2019), lamb and mutton (from \$46M in 2009 to \$139M in 2019), beef (from \$161M in 2009 to \$334M in 2019), and berries (value not recorded in 2009, while the farmgate value was \$115M in 2019).^{16,17}

⁹futuredirections.org.au/wp-content/uploads/2014/08/a7.pdf ¹⁰researchoutput.csu.edu.au/ws/portalfiles/portal/9715905/PID36597postpub.pdf ¹¹Grey, E.M., Oss-Emer, M., and Sheng, Y. (2014) Australian agricultural productivity growth: past reforms and future opportunities. ABARES Research Report 14.2, February 2014 ¹²abs.gov.au/statistics/industry/technology-and-innovation/characteristics-australian-business/latest-release ¹³crdc.com.au/sites/default/files/CRD18001-001%20CRDC%20P2D%20Report%20low%20res.pdf ¹⁴pc.gov.au/research/completed/agriculture/agriculture.pdf ¹⁵online.library.wiley.com/doi/pdf/10.1002/j.1839-4655.2003.tb01137.x#:~:text=As%20a%20leader%20in%20the,deregulation%20in%20agri%2Dfood%20trade.&text=Deregulation%20inevitably%20invokes%20structural%20adjustment,There%20are%20also%20environmental%20ramifications. ¹⁶agriculture.gov.au/sites/default/files/abares/documents/snapshot-australian-agriculture.pdf ¹⁷oecd-ilibrary.org/docserver/ece4ff0c-en.pdf?expires=1618284925&id=id&accname=ocid53016515&checksum=5E16BAAEFC6A405874F7AA2B242D54C4 ¹⁸dpiwwe.tas.gov.au/Documents/Tasmanian%20Agri-Food%20Scorecard%202018-19.pdf ¹⁹dpiwwe.tas.gov.au/Documents/2008-09-Food---Beverage-ScoreCard.pdf ²⁰dpiwwe.tas.gov.au/Documents/Tasmanian%20Agri-Food%20Scorecard%202018-19.pdf ²¹dpiwwe.tas.gov.au/Documents/Competitiveness%20of%20Tasmanian%20Agriculture%202050%20White%20Paper.pdf ²²sciencedirect.com/science/article/pii/S0306919218302422?via%3DIihub ²³agriculture.gov.au/abares/research-topics/aboutmyregion/tas#agricultural-sector ²⁴abs.gov.au/ausstats/abs@.nsf/2f762f95845417aeca25706c00834efa/A27F2AD2BF4DAAA9CA257264000CB161?opendocument#:~:text=The%20Greater%20Hobart%2DSouthern%20Region%20had%20the%20largest%20average%20farm,was%20444.9%20hectares%20in%202001. ²⁵dpac.tas.gov.au/divisions/climatechange/adapting_to_climate_change_in_tasmania/appendix_1_predicted_changes_to_tasmanias_climate ²⁶dpac.tas.gov.au/divisions/climatechange/adapting_to_climate_change_in_tasmania/appendix_1_predicted_changes_to_tasmanias_climate ²⁷dpac.tas.gov.au/_data/assets/pdf_file/0011/134210/CFT_-_General_Cli-mate_Impacts_Technical_Report_-_WEB_lo-res_content_hi-res_cover_-101003.pdf



Horticulture Business students, Bushy Park.

All of this has been achieved by a sector that still operates with a relatively high proportion of smaller scale farms and relatively modest uptake of leading-edge farming practices and technologies.²¹ It is well documented that there is a positive correlation between farm size and productivity for farms in Australia.²² The Agricultural Bureau of Statistics notes that there were 1,979 farms in Tasmania in 2017-18 (with an average area of each holding of 960ha);²³ which compares to 4,536 holdings in 1997 (with an average holding of 445 ha), though these averages hide a lot of individual variation across farms.²⁴

ADAPTING TO A CLIMATE CHANGED WORLD

The success of Tasmanian agriculture is driven in no small measure by the inherent high productivity of Tasmanian soils and relatively reliable rainfall. While the state has seen the climate change modestly through the last century, farming practices to date have

adapted well to those changes. Since the 1970s, annual Tasmanian rainfall in many regions has declined; rainfall, along with other aspects of the climate, is variable from year to year and season to season, though the reduction in rainfall is of the order of 10% over the twentieth century.²⁵ Average annual temperatures are more than a degree warmer than those in the 1950s and hot days are more extreme than historically, with fewer very cold days.²⁶ The greatest reduction in seasonal rainfall has been in autumn, associated with an increased frequency of El Niño events and strengthening of the Southern Annular Mode.²⁷

On the back of this success, the Tasmanian Government has set the ambitious goal to continue the high growth rates of the Tasmanian agricultural sector in order to achieve an annual farmgate value of Tasmanian agriculture of \$10 billion annually by 2050. Achieving that goal would see the sector continue to become a proportionately larger part of the Tasmanian economy.

THE VALUE-ADD OPPORTUNITY

Beyond the farmgate, there is an opportunity to grow the scale and value-add of the food processing and packaging industry in Tasmania, by taking advantage of growing local production and supporting the Tasmanian Government's emerging priority to develop a circular economy. While farmgate production was worth \$1.9 billion in 2019, the value of food processed and packaged in Tasmania was more than double this figure, at approximately \$4.86 billion. Farmgate production therefore delivers far greater value to the Tasmanian economy when considering value-adding through processing, food service and retail.

Considerations must be given to the costs of processing, packaging, marketing and distribution and the amount of value added through processing varies by product.

However, the potential for value-adding is great: grapes/wine have the highest value added through processing, with 70% increased value, followed by vegetables with 60% increased value.

The location of processing enterprises is also an important consideration as we look to maximise the value-add opportunity. Currently, the North West contains the highest proportion of milk, potato, vegetable and pork processing enterprises, with beef processing plants located in both the north and north west.²⁸ Wine and beer manufacturers are located in the north and south of Tasmania, with chocolate and salad processing completed mostly in the south of the state.²⁹ However, processing enterprises are not necessarily located where products are grown; it is important that emerging enterprises are supported where high-demand products are created.

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Key issues facing Tasmanian agriculture

To achieve the target of \$10 billion by 2050 set by the Tasmanian Government, Tasmania's farmgate value will need to grow 5.5% each year, for the next 30 years.³⁰

Sustaining sector growth over the long run, that is at least double the long-term average GDP growth for Australia and Tasmania, is a serious challenge. To achieve that kind of growth, there are critical questions around productivity, long-term sustainability and the workforce that need to be answered.

Productivity: how do we maintain high rates of farm productivity over the long run?

The productivity rate of the last 10 years has been exceptional and achieved through quite specific drivers. There are important questions about how those drivers continue to be utilised, and what we do when the returns start to diminish.

What changes in farm practice will drive significantly increased productivity in the sector once irrigation has been fully rolled out?

Tasmanian Irrigation calculates that despite only 8% of Tasmania's agricultural production being irrigated, it produces 52% of the state's gross annual value of agricultural production,³¹ indicating that irrigation has been a key driver of the State's growth in recent years. In terms of the agricultural value growth, irrigation investments will continue in coming years (the Tasmanian Government has a target of doubling the amount of water available

through Tasmanian Irrigation schemes by 2025),³² enabling further growth, but the pace of investment is unlikely to be sustained through to 2050. As the amount of new land under irrigation starts to slow, there will need to be new drivers to maintain a high rate of improved agricultural productivity.

How can we assist the acceleration in the shift in mix of production to accelerate the value created by the sector?

The mix of products produced by our farms today do not maximise benefit for farmgate value, with a disproportionately low amount of farming occurring in high-growth areas. For example, 19% of Tasmanian farms focus on dairy production, despite dairy contributing more than 45% of Tasmania's total farmgate value, and continues as an area of growth.³³ Similarly, 2% of Tasmanian farms produce berries, despite this product contributing 70% of total fruit value, also demonstrating sustained strong growth.³⁴

²⁸dpiwwe.tas.gov.au/Documents/Tasmanian%20Agrifood%20ScoreCard%202014/15-2018/2019 ²⁹dpiwwe.tas.gov.au/Documents/Tasmanian%20Agrifood%20ScoreCard%202014/15-2018/2019 ³⁰dpiwwe.tas.gov.au/Documents/Tasmanian%20Agrifood%20ScoreCard%202014/15-2018/2019 ³¹tasmanianirrigation.com.au/source-assets/map-data/Pipeline-to-Prosperity-Summary.pdf ³²tasmanianirrigation.com.au/source-assets/map-data/Pipeline-to-Prosperity-Summary.pdf ³³agriculture.gov.au/abares/research-topics/aboutmyregion/tas#agricultural-sector ³⁴dpiwwe.tas.gov.au/Documents/Tasmanian%20Agri-Food%20Scorecard%202018-19.pdf, agriculture.gov.au/abares/research-topics/aboutmyregion/tas#agricultural-sector

What can be done to support the evolution of the industry structure so that the benefits of scale can be more fully captured?

There is an important discussion about whether the Tasmanian agricultural industry is structured to maximise productivity and competitiveness, and if not, how this might be achieved. In its snapshot of Australian Agriculture, ABARES notes that improvements in farm productivity are driven by the largest and most productive farms; that farms have tended to get larger in size over the years; and that smaller farms tend to be less profitable than their larger counterparts.³⁵ In the same report, ABARES also notes that the increased productivity of larger farms is associated with access to better technology, better and more flexible labour management, better knowledge management and access to economies of scale.³⁶ Cooperatives have value in allowing small businesses to achieve economies of scale, allowing competition with larger businesses, and for supply to markets that would otherwise be beyond their reach, and these may have greater value in Tasmania in the coming decade.

Hiring capital services (instead of using self-owned capital) may also offer an opportunity, particularly for small farms, to lift productivity levels compared to their larger counterparts.³⁷ According to the Australian Bureau of Statistics, Characteristics of Australian Businesses survey, in 2018-19 the agriculture

fisheries and forestry industry in Australia had only 34% 'innovation active businesses' (businesses that have introduced any kind of innovation during the reference period), which was the lowest of the industry sectors reported.³⁸

LONG-TERM SUSTAINABILITY

Given the 2050 timeframe, there are important questions of how we ensure the long-term sustainability of the sector.

How will we ensure that the increased use of irrigation is environmentally and socially sustainable over the long-run and does not ultimately reduce productivity?

Already in Tasmania, irrigation schemes encompass ~325,200 ha of soils classed as being either unsuitable for cropping or having severe limitations for production, and 51% of the area covered by irrigation schemes have soils that are vulnerable to degradation, thus irrigation in these areas should be used in a sustainable way. There are parallel concerns for waterway quality.³⁹

How do we ensure the long-term health of our soils?

In Tasmania, in soils that have been cropped continuously, the soil carbon content has halved over the last 40 years. Without change in practices, some areas of irrigated land will become uncultivable within the next generation.⁴⁰



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How do we ensure the sector adapts and is resilient to a changed climate?

Despite global and local efforts to reduce greenhouse gas emissions, climate change will continue, presenting both significant opportunities and challenges for the agricultural sector in Tasmania.⁴¹ For example, by the end of the 21st century, the number of frosts will reduce by half, while the number of heat waves that exceed 28°C will be two to four times more frequent compared with heat waves during 1961-1990.⁴² Such changes in climate may have implications for the sustainability of Tasmanian agricultural production in the absence of adaptation. For example, increased temperature can hasten plant development, leading to greater growth of crops and pastures during winter but shorter overall growing seasons.⁴³

For livestock, reduced pasture growth in the Midlands is likely to increase the need for supplementary feed, reduce profitability and place increased risk of soil erosion over summer.⁴⁴ The Tasmanian climate is currently unsuitable for the persistence of the Queensland fruit fly. However, with a warming climate, populations could establish on the Bass Strait islands and in the north and north-east of the state, with implications for biosecurity in Tasmania and the value of the Tasmanian fruit industry.⁴⁵ Not all changes will be detrimental. For example, increases in the number of growing days for grapes are likely, which will have impacts for wine quality and suitable vineyard locations.⁴⁶

³⁵agriculture.gov.au/abares/products/insights/snapshot-of-australian-agriculture-2021#economic-performance-is-driven-by-the-most-productive-farms
³⁶agriculture.gov.au/abares/products/insights/snapshot-of-australian-agriculture-2021#economic-performance-is-driven-by-the-most-productive-farms
³⁷sciencedirect.com/science/article/pii/S0306919218302422?via%3Dihub ³⁸abs.gov.au/statistics/industry/technology-and-innovation/characteristics-australian-business/latest-release ³⁹Cotching, W.E. (2018) Organic matter in the agricultural soils of Tasmania, Australia – A review. Geoderma 312; 170-182
⁴⁰Cotching, W.E and Kidd, D.B. (2010) Soil quality evaluation and the interaction with land use and soil order in Tasmania, Australia. Agriculture, Ecosystems and Environment 137; 358-366 ⁴¹dpac.tas.gov.au/divisions/climatechange/Climate_Change_Priorities/Climate_action_21_-_implementation_plan
⁴²White CJ, Grose MR, Corney SP, Bennett JC, Holz GK, Sanabria LA, McInnes KL, Cechet RP, Gaynor SM & Bindoff NL (2010) Climate Futures for Tasmania: extreme events. Technical Report, Antarctic Climate & Ecosystems Cooperative Research Centre, Hobart, Tasmania. Available: https://www.researchgate.net/publication/236116527_Climate_Futures_for_Tasmania_Extreme_Events_Technical_Report ⁴³Harrison, M.T., Cullen, B.R., Rawnsley, R.P., 2016. Modelling the sensitivity of agricultural systems to climate change and extreme climatic events. Agricultural Systems 148, 135-148. ⁴⁴Harrison, M.T., Cullen, B.R., Armstrong, D., 2017. Management options for dairy farms under climate change: Effects of intensification, adaptation and simplification on pastures, milk production and profitability. Agricultural Systems 155, 19-32. ⁴⁵Sultana, S., Baumgartner, J.B., Dominiak, B.C., Royer, J.E., Beaumont, L.J. (2020) Impacts of climate change on high priority fruit fly species in Australia. <https://doi.org/10.1371/journal.pone.0213820> ⁴⁶dpipwe.tas.gov.au/Documents/Wine-Production-V8--31-May-FINAL.pdf

How do we change agriculture so that it contributes to the reduction of Greenhouse Gas (GHG) emissions, builds in resistance to climate change, while increasing value creation?

Agriculture was responsible for about 16% of Australia's greenhouse gas emissions in 2013, and of these agricultural sources, approximately two thirds was from enteric (digestive tract) fermentation in ruminant livestock.⁴⁷ Most of the remainder was from prescribed burning and from agricultural soils.⁴⁸ This is also broadly the case for Tasmania. GHG emissions from Tasmania's agriculture sector decreased by approximately 9% between 1990 and 2015.⁴⁹ Tasmanian agriculture will have to continue the reduction in its GHG output, in addition to preparing for increased resilience to climate change, while maintaining its high economic output.

How do we ensure the high levels of biosecurity needed to prevent the long-term damage to productivity and value creation?

The biosecurity of Tasmania underpins the Tasmanian brand and the value of its agricultural production. The economic basis of Tasmanian agriculture is dependent on Tasmania remaining free of certain diseases, weeds, insects and other pests. Livestock are susceptible to a range of diseases that are not currently found in Tasmania.⁵⁰ Outbreaks of these diseases can be costly to eradicate, and relevant export markets are restricted while the disease remains. For example, the 2001 outbreak of Foot and Mouth Disease in the UK cost £3.1 billion (c. AU\$5.6 billion) to eradicate (over 40% of the value of UK agriculture in that year).⁵¹ 73% of the value of Tasmanian cherries

(\$36.6 of \$50 million) is dependent on exports to Queensland fruit fly sensitive Asian markets, which will be lost should the fly gain a foothold in Tasmania.⁵² Other emerging issues that will have an effect on the biosecurity challenge in Tasmania include globalisation and increased movement of people, increased international trade, and climate change.

Workforce: how do we ensure there is large enough workforce in Tasmania with the skills needed to meet the growth and long-term sustainability challenges?

The quality and number of the graduates in agriculture that we produce has the potential to have long-term impact and benefit for the state. However, an analysis by the Australian Council of Deans of Agriculture suggests that Australia is not producing enough graduates in agriculture to meet labour force needs;⁵³ recently there has been only one graduate for every four jobs advertised.⁵⁴ Correcting this is not helped by the fact that careers in agriculture have a negative image among young people.^{55,56} This is a complex issue, with drought and other events affecting the image of agriculture, as well as barriers of finance for those who wish to become farmers.⁵⁷ Nevertheless, in the words of a report for the Australian Commonwealth Government, "two broad solutions were offered to address the image problem suffered by agriculture and forestry—"to correct misconceptions within the broader community about the problems and prospects facing those industries; and to raise the profile of agriculture and forestry in schools...".

Increasing post-farmgate production is an opportunity for Tasmania in its own right, but an especially large one if it can take advantage of the increased scale of high-value primary production.

To capture that opportunity there are also important questions to be tackled.

How do we support the development of new post-farmgate enterprises?

Strengthening supply for post-farmgate processing would help stabilise the volatility experienced by processing enterprises, which are currently susceptible to supply-related disruptions such as weather, and variable farmgate prices.⁵⁸ Inefficiencies with transport and infrastructure in the sector have had significant effects on Tasmania's ability to be as competitive on the global stage. For some agricultural commodities, the cost of transport from farmgate to an overseas market can exceed 40% of the value of the product.⁵⁹ These are only some of the emerging barriers to see these sorts of enterprises grow, and we need to better understand the market forces influencing post-farmgate enterprise to help them succeed.

How do we support innovative technologies that will increase the value of post-farmgate production?

The potential of value-adding through applying new technologies needs to be examined more deeply. Food innovation technologies such as Microwave Assisted Thermal Sterilisation (MATS) also have potential to provide further value generation for agricultural food products, as well as health and performance benefits. MATS allows the sterilisation of foods with in-container processing, offering better nutrient retention than conventional technologies. The MATS process circumvents problems encountered in the past when using microwaves as a sterilisation approach, such as the avoidance of non-uniform heating.⁶⁰ There has been considerable interest from industry in Tasmania in the commercial application of the process, though developments are at an early stage, with the need for applied research, product development and training.

⁴⁷agric.wa.gov.au/climate-change/how-australia-accounts-agricultural-greenhouse-gas-emissions#:~:text=Agriculture%20is%20an%20important%20source,15.5%25%20from%20agricultural%20soils ⁴⁸agric.wa.gov.au/climate-change/how-australia-accounts-agricultural-greenhouse-gas-emissions#:~:text=Agriculture%20is%20an%20important%20source,15.5%25%20from%20agricultural%20soils ⁴⁹pac.tas.gov.au/_data/assets/pdf_file/0015/332106/Climate_Action_21_Tasmanias_Climate_Action_Plan_20172021_-_October_2019_web.pdf ⁵⁰pipwe.tas.gov.au/biosecurity-tasmania/animal-biosecurity/animal-health/hotifiable-animal-diseases ⁵¹Thompson, D et al. (2002). Economic costs of the foot and mouth disease outbreak in the United Kingdom in 2001. DOI: 10.20506/rst.21.3.1353 ⁵²pipwe.tas.gov.au/Documents/Tasmanian%20Fruit%20Fly%20Strategy%202017_2050.pdf ⁵³The future of agriculture | Insight – Charles Sturt University (csu.edu.au) ⁵⁴The future of agriculture | Insight – Charles Sturt University (csu.edu.au) ⁵⁵grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2014/03/bringing-the-next-generation-of-farmers-to-australian-agriculture ⁵⁶aphref.aph.gov.au_house_committee_primind_ruralskills_report_chapter1.pdf ⁵⁷aphref.aph.gov.au_house_committee_primind_ruralskills_report_chapter1.pdf ⁵⁸farmonline.com.au/story/3625193/agribusiness-conditions-tough-beyond-farm-gate/ ⁵⁹Australian Bureau of Statistics, 2019. Value of agricultural products in 2017-18. [Online] Available at: <https://www.abs.gov.au/AUSSTATS/abs> ⁶⁰Advanced retorting, microwave assisted thermal sterilization (MATS), and pressure assisted thermal sterilization (PATS) to process meat products – ScienceDirect



How does TIA change its practices and culture to further ensure it plays an integral role in answering the questions needed for the sector to achieve its ambitious goals sustainably?

How do we shift to focus on commercialisation as well as research excellence?

Australian universities are outstanding in knowledge creation: the last Excellence in Research in Australia assessment rated 90% of Australian research as at, or above, world standard. This excellence was noted particularly for Agriculture, amongst other subjects.⁶¹ **Excellence in Research in Australia does not necessarily extend to excellence in commercialisation of that research**, however. The 2020 WIPO Global Innovation Index ranks Australia as the 23rd most innovative country overall.⁶² Universities have strong incentives to increase their publication impact, but the commercialisation of outcomes does not have the same incentives for promotion. The Commonwealth Government has published a consultation paper seeking ideas on how Australia may more effectively commercialise the scientific output of the University sector⁶³ to promote economic growth of the country. What is true of Australia is also true of the Tasmanian Institute of Agriculture. While the research conducted is excellent,⁶⁴ with high impact,⁶⁵ the commercialisation of that research has not been extensive.

How do we partner more closely with industry and government?

The Joint Venture Agreement between the University of Tasmania and the Government of Tasmania is a critical partnership to grow the agricultural industry into the future. There remains however, an opportunity to develop closer links with industry in setting the research agenda and industry development and adoption activities. It has been noted that the body of existing relevant agricultural research knowledge has not yet been adopted by many farmers, making the provision of industry development support from TIA a key requirement in helping Tasmanian agriculture reach the 2050 target.⁶⁶ There is further work that can be done to strengthen existing and emerging partnerships with our key stakeholders.

⁶¹Universities Australia, *Clever Collaborations: The Strong Business Case for Partnering with Universities*, 2020 ⁶²WIPO, *Global Innovation Index: Australia*, 2020. ⁶³[dese.gov.au/about-us/resources/university-research-commercialisation-consultation-paper](https://www.dese.gov.au/about-us/resources/university-research-commercialisation-consultation-paper) ⁶⁴dataportal.arc.gov.au/ERA/Web/Outcomes#/for/07 ⁶⁵dataportal.arc.gov.au/EI/Web/Outcomes#/for/07 ⁶⁶dpipwe.tas.gov.au/Documents/Growing%20Tas%20Agriculture-RDE%20for%202050.pdf



Strategies to make a difference



1.

TIA will transform the knowledge of agriculture, food production and post farmgate practices of Tasmania's farmers, creating sustainable economic benefit for Tasmania and the world.

We will work to transform the growth and sustainability of agriculture in Tasmania, by identifying and then researching the key areas that will enable that growth. We will listen to and work with the agricultural industry and Government to identify their concerns and enhance our approach to demand-driven research, industry development and curriculum design. We will focus on key enabling technologies, for example irrigation, industry 4.0, and disciplines, for example soil health and biosecurity, for both horticulture and livestock production. We will invest in post-farmgate processing and in capacity and capability in agricultural business management.



2.

TIA will work to build resilience to climate change as well as to limit greenhouse gas emissions from agriculture and food production.

TIA will prioritise projects focusing on resilience to climate change. Tasmania needs climate resilient plants and growing systems; we will lead a Crop Stress Physiology Hub, bringing together silos of work in TIA and elsewhere in CoSE.



3.

TIA will shift the perception of agriculture in the community, with a focus on getting school-age children excited about a career in the agriculture and food industry.

TIA will put more resources into working with schoolteachers, to excite young people about the potential, challenges and rewards of a career in agriculture.



4.

TIA will refocus the curriculum and student experience to enable the growth of agriculture and food in Tasmania.

TIA will review the curriculum in the light of growing Tasmanian agriculture, the enabling technologies required, student experience and the needs of employers, while placing more emphasis on work-integrated learning.



5.

TIA will deliver solutions to agricultural problems for Tasmania and the world through partnerships that leverage and complement our research and teaching strengths.

TIA will leverage current, developing, and new international relationships to enhance its research and teaching for Tasmania.



6.

TIA will evolve its business model to better connect with industry and, building our collaborative partnerships, will improve the sustainability of the University and College.

TIA will be headquartered in Launceston, and we will work to eliminate barriers to study, facilitate study closer to home for Tasmanians and deliver agricultural and food research targeted to the needs of Tasmania by an innovative delivery of teaching and learning. TIA will also map and strengthen engagement with industry, government, and community stakeholders to create mutually beneficial, transparent, and authentic relationships.

Initiatives

| Key strategic question | Strategy number | Initiative number | Initiative Description |
|--|-----------------|-------------------|--|
| What changes in farm practice will drive significantly increased productivity in the sector once irrigation has been fully rolled out? | 1. | 1. | TIA will work directly with the agricultural and food industries of Tasmania, including the TIA Advisory Board, via a strong partnership model, to identify and address the main opportunities and challenges facing the industries. |
| | 1. | 2. | TIA will invest in capacity and capability in industry 4.0 technologies to maximise the opportunity of TIA's farms to gather sensor data, to demonstrate how data-driven information can be used to optimise sustainable productivity, with an emphasis on water management, soil health and animal welfare, and translate to industry via the industry development team. |
| | 1. | 3. | TIA will increase engagement with farmers and farming groups by investing in the industry development team to better enable on-farm adoption and improved efficiency in farming practices, empowering informed decision-making that builds on comparative and competitive advantages. |
| How can we accelerate the shift in mix of production to accelerate the value created by the sector? | 1. | 4. | TIA will focus capacity and capability on agricultural commodities and products with potential or demonstrated capacity for sustainable high growth and where Tasmania has a natural competitive advantage, for example berries and dairy. |
| | 1. | 5. | TIA will identify the farmers who are succeeding in areas of high growth and, with the industry development team, communicate their methods with industry. |

| Key strategic question | Strategy number | Initiative number | Initiative Description |
|--|-----------------|-------------------|---|
| What can be done to support the evolution of industry structure so that the benefits of scale can be more fully captured? | 1. | 6. | TIA will be at the forefront of the discussion on competitiveness in Tasmanian agriculture by co-investing with the College of Business & Economics (CoBE) in leadership in agribusiness , to underpin sustainable business growth. |
| How will we ensure that the increased use of irrigation is environmentally and socially sustainable over the long-run and does not ultimately reduce productivity? | 1. | 7. | TIA will build on the investments in irrigation in Tasmania to work with farmers to equip them with the right skills and information to increase their profits and sustainability from their investment in water. |
| How do we ensure the long-term health of our soils? | 1. | 8. | TIA will invest in research capacity and capability in soils and soil health and enable adoption with industry and other stakeholders to determine best-practice on-farm processes. |
| How do we change agriculture so that it contributes to the reduction of Greenhouse Gas (GHG) emissions, builds in resilience to climate change, while increasing value creation? | 2. | 9. | TIA will resource new and ongoing projects in climate adaptation and mitigation , and carbon neutrality through drought preparedness, emissions avoidance, and carbon sequestration, including the Drought Resilience Adoption and Innovation Hub, for the delivery of research and industry development for climate resilience. |
| | 2. | 10. | TIA will lead the establishment of a Crop Stress Physiology Hub , bringing together Scientists from across the College of Sciences & Engineering (CoSE) to develop high-yielding and nutritious crops, that are resistant to degraded, saline and low-nutrient soils, flooding, drought, heat, and biotic damage. |

Initiatives

| Key strategic question | Strategy number | Initiative number | Initiative Description |
|---|-----------------|-------------------|---|
| How do we ensure the high levels of biosecurity needed to prevent the long-term damage to productivity and value creation? | 1. | 11. | TIA will engage with Biosecurity Tasmania to inform the delivery of the Tasmanian Biosecurity RDE plan. |
| How do we ensure there is large enough workforce in Tasmania with the skills needed to meet the growth and long-term sustainability challenges? | 3. | 12. | TIA will offer professional learning opportunities for science teachers to showcase and embed authentic real-world agricultural science in collaboration with the Department of Education and TasTAFE to help change the misconceptions around agriculture. |
| | 4. | 13. | TIA will create industry-prepared graduates through embedding opportunities into the curriculum for all students to undertake work-integrated learning and direct work experience in the agri-food sector. |
| | 4. | 14. | TIA will provide a curriculum that enables graduates for professions in areas where Tasmania's farmgate and post-farmgate value is growing by incorporating outputs from other initiatives into the curriculum. e.g., industry 4.0 technologies, irrigation, climate resilience, areas of growth for Tasmanian agriculture. |
| | 6. | 15. | TIA will implement the UTAS Regionally Networked Strategy for the headquartering of TIA in Launceston: eliminating barriers to study and facilitating study closer to home for Tasmanians, delivering agricultural and food research and graduates targeted to the needs of Tasmania . This will be delivered in a people-centric way, ensuring we have high levels of staff engagement. |

| Key strategic question | Strategy number | Initiative number | Initiative Description |
|--|-----------------|-------------------|---|
| How do we support the development of new post-farm gate enterprises? | 1. | 16. | TIA will work closely with farmers and industry to innovate and develop the science, models and technologies (e.g., MATS) to grow value for the Tasmanian food and beverage domestic and export systems . |
| | 1. | 17. | TIA will work with CoBE to understand the drivers for post-farmgate value , to determine where value can be most readily made post-farmgate, and to develop those ideas for adoption by industry. |
| | 4. | 18. | TIA will collaborate with CoBE in the creation of short-course and micro-credentials for post-farmgate enterprise creation , including embedding knowledge of the circular economy. |
| How do we shift to focus on commercialisation as well as research excellence? | 1. | 19. | TIA will establish a pipeline model for the commercialisation of its research , with the aim of having 4–5 opportunities being actively worked on in pre-commercial research and 2–3 opportunities progressing to commercial trials at any time. |
| How can we support sustainable and socially acceptable farming practices that enhance the value and reputation of our agricultural products? | 1. | 20. | TIA will invest in capacity and capability to investigate socially acceptable and sustainable agricultural practices , and build industry understanding of implications for their businesses and pathways to adoption. |
| How do we partner more closely with industry and government? | 6. | 21. | We will work differently with our partners, co-designing a renewed approach to projects, problem-solving and networking to create a stronger partnership model . |
| What can be done to support the evolution of the industry structure so that the benefits of scale can be more fully captured? | 5. | 22. | TIA will develop a partnership plan which identifies congruent institutions internationally to support the enhancement of our learning and teaching quality, and research outcomes. |



📍 Mobile Interactive Learning and Engagement (MILE) truck, Fortside, North-West Tasmania.



utas.edu.au/tia

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