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Growing Tasmanian Agriculture

- Research,
Development and
Extension for 2050:
Green Paper
May 2017

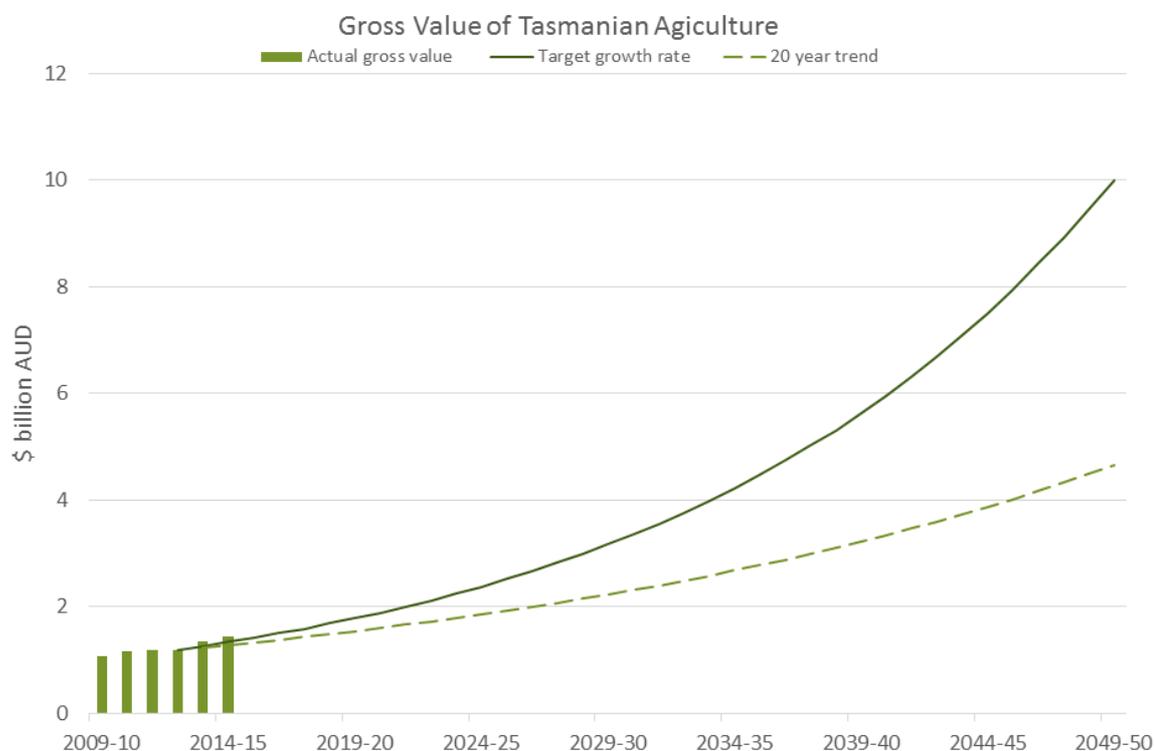
Foreword from the Minister

The agricultural sector is a key pillar of Tasmania's economy. In 2014-15, agriculture was worth almost \$1.5 billion at the farm gate. It contributes 5.6% of the Gross State Product in Tasmania, well above the national average of 3.3%. Tasmania also has the most dispersed population of any Australian State or Territory, and it is very dependent on a vibrant agricultural sector to sustain jobs and economic activity in rural and regional areas.

The Tasmanian Government is proud of our achievements in this vital sector since 2014. We started with an ambitious goal – to increase the value of the sector tenfold to \$10 billion by 2050 and have delivered on a range of commitments towards achieving that goal.

In 2016 we launched Tasmania's Agri-Food Plan which is the Government's system for sustainably growing the agriculture and food sectors in Tasmania. It presents a framework for action, articulates goals and provides an update on the initiatives we are delivering and our achievements so far. In short, it encapsulates what we all must do together to reach that \$10 billion target – Grow, Make, and Protect. The Plan is available on-line from <http://dpiwwe.tas.gov.au/agriculture/tasmanias-agri-food-plan-2016-2018>

Meeting our target will, however, require the sector to grow at more than double the growth rate experienced over the past 20 years. The chart below clearly shows the difference between the growth that we have traditionally experienced, compared with the growth that we need:



This is not an issue unique to Tasmania. Productivity growth in agriculture across Australia is declining. In broadacre agriculture, productivity grew at a rate of around 2 – 2.5% per year until the 1990s. The rate of growth is now less than 1%, even allowing for bad seasons.

That is why the Government is setting a new direction for advancing agricultural research in Tasmania. We want to work closely with farmers, researchers and agribusiness to develop a *White Paper: Growing Tasmanian Agriculture – Research, Development and Extension for 2050* to guide future Government investment, industry partnerships, and set a contemporary framework for achieving the productivity improvements required to grow the value of agriculture to meet our \$10 billion by 2050 target.

The aim of this important project is to ensure that we have the right priorities and the right delivery model for RD&E services to ensure we get the best outcome. Ultimately that is to ensure our investment into agricultural research, development and extension (RD&E) delivers new technologies and improved practices that are adopted on-farm, benefitting Tasmanian farmers, boosting local agribusiness and creating jobs.

Whether it is investing in the right research programs or making better use of our research farm assets, it is more practical engagement with farmers and industry expansion that we want to stimulate more of through this review process. It is an opportunity to take a broader range of perspectives into account. It is therefore very much focused on looking forward into what is possible and desirable in the future, rather than an audit of what has happened in the past.

Importantly this process for reviewing Tasmania's approach to RD&E is also in response to requests from industry and considerable engagement with the Tasmanian Farmers and Graziers Association, DairyTas, Tasmanian Agricultural Productivity Group, Fruit Growers Tasmania, Wine Tasmania, agribusiness and the Tasmanian Institute of Agriculture (TIA) itself.

This process will not reduce the resources dedicated to agricultural RD&E in Tasmania. In fact, the Government has increased the total investment into RD&E by \$2.9 million since 2014 on top of the annual core funding to TIA. This is an opportunity to consider new and innovative ways to effectively maximise the impact of our investment and deliver outcomes that will help grow the value of Tasmanian agriculture.

Your input is important. This Green Paper has been prepared to guide public submissions. It also provides further information on how agricultural RD&E is undertaken now in Tasmania, including the institutions, investments and assets that are currently dedicated towards this work.

This review process started in late 2016 with DPIPW, assisted by some leading agricultural economists, undertaking preliminary consultations with a range of Tasmanian agricultural stakeholders.

Your responses to this Green Paper will help inform a White Paper, which will present the Government's long-term strategic direction and policy commitments on agricultural RD&E.

I strongly encourage you to make a submission, and the Government looks forward to receiving your feedback.

Hon Jeremy Rockliff
Deputy Premier
Minister for Primary Industries and Water

May 2017

About the process

TERMS OF REFERENCE

The Department of Primary Industries, Parks, Water and Environment (DPIPWE) is leading the development of the Green and White papers.

In doing so DPIPWE is investigating whether the current arrangements and resources for publicly-funded Tasmanian agricultural RD&E are in keeping with contemporary best practice. It is doing this through consulting with industry and the Tasmanian community to evaluate the approach required to maximise agricultural productivity, to best utilise Crown-owned assets and to guide future government and industry investment in RD&E to support Tasmanian agriculture. This includes an examination of:

- How RD&E programs and projects funded by the taxpayer are chosen; and
- How physical assets ultimately owned by the taxpayer, such as research farms, are best utilised as part of the delivery of agricultural RD&E.

Out of Scope:

This review is investigating only RD&E pertaining to land-based agriculture. Aquaculture, fisheries and forestry RD&E matters are out of scope. The tertiary educational services of UTAS/TIA in agriculture are also out of scope.

THE REVIEW PROCESS

This Review Process was initiated in December 2016, when agricultural economists Dr John Mullen and Associate Professor Bill Malcolm were engaged by DPIPWE to help them undertake background research and to meet with farmers and other stakeholders in agribusiness, agricultural consulting firms and other RD&E professionals.

The next stage is this current Green Paper for public comment, to be followed by a final White Paper - *Growing Tasmanian Agriculture – Research, Development and Extension for 2050*, later in 2017.

HOW TO HAVE YOUR SAY

All submissions must be made in writing and are to be received by **5pm, 2 June 2017**.

Send your submission by **post** to:

The Project Team – RD&E for 2050
DPIPWE, GPO Box 44 HOBART TAS 7001

Or by **email** to: RDE@dpiwwe.tas.gov.au

Or make a submission **online** at: <http://dpiwwe.tas.gov.au/RDE>

All submissions will be treated as public information and made available on the Department's website. If you wish for your submission to be treated as confidential, either whole or in part, please note this in writing at the time of making your submission.

No personal information other than the name of individual submitters will be disclosed.

The Right to Information Act 2009 and confidentiality

By law, information provided to the Government may be provided to an applicant under the provisions of the *Right to Information Act 2009* (RTI). When making your submission, please detail any reasons why you consider the information that you have provided is confidential or should not be publicly released. Your reasons will be taken into account in determining whether or not to release the information in the event of an RTI application for assessed disclosure.

NOTES FOR THE READER

- The Department of Primary Industries, Parks, Water and Environment (DPIPWE) and the Tasmanian Institute of Agriculture (TIA) will be consistently referred to by their current acronyms throughout this Paper, although both have been known by other names/acronyms throughout the time periods discussed.
- References to 'RD&E' throughout this document refer to land-based agricultural research, development and extension, except where noted otherwise.

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Contemporary Agricultural Research, Development & Extension in Australia

Australian governments, including the Tasmanian Government, have a long history of partnering with agricultural industries to jointly fund agricultural RD&E. This is largely because agricultural RD&E provides broad benefits at the farm, community and economy level.

However, Tasmanian agricultural RD&E does not occur in isolation. It is undertaken as part of an Australia-wide system, which includes an array of different institutions and organisations.

The broad structure of Australian agricultural RD&E, and how Tasmania fits within it, is briefly set out below.

The National RD&E Framework

Any one State or Territory acting alone cannot satisfy all the RD&E needs of its agricultural sector. Research undertaken nationally and internationally often leads to outcomes that are also relevant to Tasmania.

The 'National RD&E Framework' dates back to 2005. It acknowledged that basic and strategic research can be delivered from a distance, and that the uptake of innovation by industry could be achieved largely through local adaptation and extension.

Under the National Framework, individual governments perform one of three roles in relation to a number of sector-specific and cross-sector topics. They can be a **major** if they take on a national leadership role, a **support** to another jurisdiction, or a **link** where they focus on local development and extension only.

The Framework means that RD&E is now more coordinated and collaborative, reducing capability gaps, fragmentation, and unnecessary duplication. Member bodies (including state departments of agriculture, universities, RDCs and the CSIRO) retain and build capability in fields strategically important to their jurisdictions and industries, leading over time to stronger national centres and networks. They also exit capability in some areas that are not strategically relevant.

In land-based agriculture, Tasmania has a major research and development role in relation to cherries and processed potatoes. It has a 'support' role in a variety of other sector-specific and cross-sector topics.

Rural Research and Development Corporations (RDCs)

Australia's Rural Research and Development Corporations (RDCs) are the main way that the Australian Government and primary producers co-invest in RD&E for industry and community benefits. RDCs are funded primarily by statutory levies on various commodities, with matching funding from the Australian Government, generally capped at 0.5% of the determined industry gross value of production.

RDCs are accountable to both industry and government, and are expected to deliver economic, environmental and social benefits to rural industries, rural and regional communities, and the nation through strategic investments in research, development and technology transfer or adoption.

There are now 15 RDCs, including Dairy Australia, Meat and Livestock Australia (MLA), Australian Pork Limited, the Grains Research and Development Corporation (GRDC) and Australian Wool Innovation. RDCs with Tasmanian levy-payers undertake RD&E activities here, and local delivery is sometimes by a specific body - such as DairyTas for Dairy Australia.

Cooperative Research Centres (CRCs)

Cooperative Research Centres (CRCs) are partnerships formed to undertake R&D in specific areas, with a particular emphasis on applied R&D. They receive funding from the Australian Government, which must be matched by participants' cash and in-kind contributions. CRCs must include a university and an end user – often an RDC, CSIRO, or a peak industry body.

There are currently 16 agriculture-related CRCs. One example is the Sheep CRC at the University of New England in Armidale, which brings together over 40 organisations from all sectors of the sheep supply chain including UTAS.

TIA researchers are leading key components of two recently announced CRCs – the CRC for High Performance Soils and the iMove CRC.

State Departments of Agriculture

State Departments of Agriculture (such as DPIPW) were historically major providers of agricultural research, development, and extension services. In Tasmania (and in all other Australian jurisdictions), this role has reduced over time, and RDCs have gradually expanded their traditional research and development functions to take on a much greater role in extension.

Tasmania's publicly-funded RD&E is now delivered primarily by the Tasmanian Institute of Agriculture (TIA). There is also now a substantial private sector providing professional extension and advice to farmers, including (in some cases) extension activities on behalf of RDCs.

Private sector investment in RD&E

Private sector investment in agricultural RD&E is often funded by large multinational firms, which have the resources and expertise necessary to successfully make such investments. To a lesser extent, smaller privately owned agribusinesses also invest in agricultural RD&E. It is by nature less transparent, and therefore more difficult to monitor. Estimates of annual RD&E investment by the private sector range from \$200 million to \$600 million. While such investment has been rising, it is considered unlikely to ever exceed 20% of Australia's total agricultural RD&E investment.

This is partly because the relatively small, and often unique, Australian agricultural sectors are not large enough to self-fund research. The Productivity Commission noted that, although private sector investment in RD&E has been increasing in most developed countries, in Australia it is hampered by the high cost of undertaking research locally, and by Australia's limited market size.

By contrast, in the United States of America (USA), private sector investment makes up between 30% and 50% of total agricultural RD&E investment.

Producer Support of RD&E

There are many factors that can impact on producer confidence that money invested in RD&E is delivering benefits to their individual businesses.

There are sometimes long lags in the order of 35 years from commencement of research to the point at which its impact becomes negligible. It can also take several decades before innovations are adopted.

Farmers may adopt new technologies or practices only after they see it successfully implemented by a neighbour or peer, who was an 'early adopter' and direct beneficiary of a new technology and extension effort. Many of these 'later adopters' may therefore not be aware of the original source of the information.

In some cases, connections between service providers and sources of funding may not be obvious. Farmers may criticise Dairy Australia, but praise the efforts of its local service delivery arm, DairyTas. A farmer participating in an extension activity delivered by a private firm might not realise that it highlights research funded by the relevant State Government or RDC.

Impact of Agricultural RD&E

The Australian Farm Institute estimated that, in 2016, joint public/private investment in agricultural RD&E in Australia totalled approximately \$1 billion dollars. This comprised \$500 million from the Australian Government (\$200 million to CSIRO agriculture, \$250 million to the RDCs, \$50 million to Cooperative Research Centres), \$250 million from farmers through compulsory RDC levies, and \$250 million from State Governments.

There is strong evidence, at both a sector and a project level, that the returns to investment from RD&E in Australia (and internationally) are high.

The Productivity Commission thoroughly investigated investment into agricultural RD&E in 2011. It concluded that the investment has made a significant contribution to productivity growth. The original econometric analysis for broadacre agriculture by Mullen and Cox (1995) estimated that, from 1953 to 1988, the rate of return from public investment in R&D had been in the order of 15-40%. Sheng et al. (2011) updated this analysis and estimated a rate of return of nearly 30%.

Questions:

- 1. Can you identify personal, business or community benefits from the investment in agricultural RD&E?**
- 2. Many commentators believe that significant effort will be required to return productivity growth in Australian agriculture to (at least) historic rates. If you agree, what do you think needs to happen to grow RD&E capability and impact, and how do you believe this effort should be resourced and funded?**
- 3. Are you aware of more effective RD&E models that Tasmania could learn from?**

The Tasmanian Institute of Agriculture (TIA)

The Tasmanian Institute of Agriculture (TIA) is a joint venture established in 1996 between the University of Tasmania (UTAS) and the Department of Primary Industries, Parks, Water and Environment (DPIPWE). Prior to this, UTAS and DPIPWE had separate agricultural research programs and associated personnel.

TIA is governed by a Joint Venture Agreement (JVA) between DPIPWE and UTAS, and it is anticipated that this arrangement will continue into the foreseeable future.

In 2007, development and extension staff from the dairy and vegetable areas within DPIPWE were transferred to TIA, followed by the perennial horticulture and extensive agriculture staff in 2009.

TIA now conducts the majority of agricultural RD&E on behalf of the Tasmanian Government and supports tertiary education through UTAS. It also provides the Tasmanian Government with specialised services, information and advice to support its planning, policies and operations. This close integration with UTAS ensures the latest industry-relevant research, including cross-disciplinary, is integrated into world-class teaching.

TIA provides an 'interface between university research, other sources of knowledge and those who can benefit from that research'. Its strategic objective is to conduct solution-orientated RD&E that contributes to a productive, competitive and sustainable Tasmanian agricultural and food sector. A key focus of TIA is the development of technologies and practices that are enabling and transformational for rural industries and communities. This objective strongly aligns with the Government's AgriVision 2050.

The TIA model is predicated on the highly successful model of 'Land Grant Universities' in the USA that were established in the late 1800's, and that now form the backbone of the agricultural innovation system in the USA. Tasmania is the only State in Australia that has fully embraced this approach. Other States, such as Queensland, South Australia and Western Australia have implemented aspects of this system, but face challenges because each of their university sectors contains multiple players.

TIA consists of approximately 130 scientists, educators and technical experts, and has recently re-structured to better support implementation of its Strategic Plan. The new model includes two commodity centres: Horticulture, and Dairy and Grazing, and two program centres: Food Systems and Agricultural Systems. This structure is designed to position TIA to better adapt to industry goals and to support common capability needs such as agricultural economics, soil modelling and science policy.

TIA sits within the School of Land and Food, in the Faculty of Science, Engineering and Technology of UTAS.

The Tasmanian Government's core financial contributions to TIA since 2012-13 have been:

YEAR	CORE GRANT TOTAL (\$)*
2012-13	5,026,819
2013-14	4,832,801
2014-15	4,814,263
2015-16	4,873,913
2016-17	4,934,828

**Note: does not include additional specific project grant funding to TIA*

The Government's financial contribution to TIA is matched by UTAS. In 2015, TIA attracted a further \$8.1 million in competitive industry and research grants. TIA competes strongly on the national stage for Australian Government and RDC funds to invest in agricultural research in Tasmania. It leverages a \$5 million investment from the State Government to attract additional funding and has a research portfolio valued at approximately \$72 million. This includes, for instance, a \$7.6 million five-year partnership with Dairy Australia to deliver research aimed at driving dairy farm profitability and sustainability in the State.

TIA also partners with the private sector to undertake agricultural RD&E, including both small local companies and global operations.

TIA also receives funding from the Tasmanian Government for additional specific outcome-focused project work. For example, since 2014 TIA has lead or been a key part in a number of State Government funded and industry-aligned projects, including the emergency response to poppy downy mildew, the wine yield variability project, the vegetable productivity (bio-fumigation) project, maximising returns from irrigation through the 'Water for Profit' program, and improving on-farm practices through the precision agriculture project.

TIA conducts a range of extension activities, including field days, grower discussion groups, demonstrations and joint events with funding partners to distribute relevant information and encourage uptake of new research and technologies.

TIA has made a significant effort to align its work with the increasingly important private agricultural consulting sector. The Agri-food Collaboration Tasmania (ACT) is a Memorandum of Understanding established between TIA and four major consulting firms in the State, 'to facilitate efficient and co-ordinated processes for designing and resourcing pro-active research and intermediary functions that enable purposeful outcomes'.

TIA's reputation and standing is rising, both nationally and internationally. In 2015, the Excellence in Research for Australia (ERA) Report awarded UTAS (through TIA) its highest possible rankings in two areas: Horticultural Production, and Agriculture, Land

and Farm Management. UTAS/TIA is also ranked in the top 100 universities in the world for agriculture by the 2016 QS World University Ranking by Subject.

The TIA Advisory Board is the major mechanism within the JVA to ensure that TIA meets the needs of the Tasmanian agricultural industries, and of the Tasmanian community. The Board has 13 members: five from UTAS (three from TIA); five industry representatives; and three officials from DPIPWE. The role of the Board is to:

- Provide advice to the collaboration partners in respect of management structure, operating policies, funding allocations and performance.
- Provide active consideration to the strategic direction, RD&E priorities, budget and communication strategies and to advocate for TIA.
- Oversight the actions of the TIA Director with respect to operation plans and programs, application of the budget and communication of RD&E outputs.

The views of the agricultural industry stakeholders on the effectiveness of the TIA model that were recently gathered during the preliminary investigations for this White Paper process were mixed, and sometimes varied significantly by sector. There appeared to be some confusion amongst stakeholders about which organisation they were interacting with, possibly because some individuals that were previously DPIPWE staff are now employed by TIA or consulting firms.

Further information on TIA's structure, research centres, current projects and staff is available on-line from: <http://www.utas.edu.au/tia/home>

Questions:

- 4. What interactions do you have with TIA, if any?**
- 5. Can you describe some of the benefits that your business, industry or community have experienced from TIA?**
- 6. What other ways do you access research, information and/or agricultural education to enable practice changes that contribute to increased agricultural productivity?**
- 7. What changes would you support to TIA's role, programs, suite of projects, or staff that would improve outcomes for your business, industry or community?**
- 8. Do you have any views on the structure or role of the TIA Advisory Board?**

History and experience in state-owned research and demonstration farms

Dedicated farms for research and demonstration purposes have long played a role in publicly funded agricultural RD&E. Tasmania has a number of such facilities, but initial feedback is that the views of agricultural industry players vary as to the value they provide.

There are many highly effective state-owned **research farms** all around the world, and some types of agricultural research can only be conducted using substantial areas of land. The research indicates that the key to success is to have a clear definition of the role of the facility, and ensure it is funded adequately so that the human and physical resources can deliver high quality outputs. The evidence is clear that, properly resourced and operated, such facilities can contribute significantly to research output and to economic welfare.

The operation of research farms can be complicated by demands of the owning entity that the farm produce surpluses to fund the research. This can divert significant areas of farmland, and risk compromising research aims.

There are also other legitimate ways to undertake agricultural research, such as with cooperating commercial farms. For example, this characterises the approach currently undertaken by TIA in their viticulture program, which involves research conducted in commercial vineyards around Tasmania with strong support from industry.

A **demonstration farm** differs from a research farm, as it is used primarily to demonstrate various agricultural techniques. They are often owned and operated by educational institutions or government ministries, and they have been attempted many times in Australia and around the world.

History indicates that demonstration farms can be difficult to operate successfully over time. Such farms cannot totally recreate commercial reality, because they are not strictly commercial, like for example, a family-owned farm. They do not necessarily face the same goals and imperatives, labour conditions, incentives, disincentives, risks, resource constraints and opportunities as the owners of commercial farm businesses. To be successful demonstration farms would require ongoing capital and investment to ensure they keep pace with contemporary agriculture practices and avoid the risks of becoming obsolete or run-down.

The Lincoln University Dairy Farm (LUDF) in New Zealand is one frequently cited exception. Despite recent difficulties, dairy is one of the most rapidly growing sectors of agriculture in Tasmania, and it is considered to be one of the sectors in which the State has a strong competitive advantage. As such, some leading industry players have suggested that Tasmania would benefit greatly from the establishment of a local dairy demonstration facility, modelled on LUDF, which is run by the South Island Dairying Development Centre (SIDDC). SIDDC is a partnership of seven key New Zealand organisations involved in

South Island dairying. Established in September 2001, the venture is a partnership between Lincoln University, DairyNZ, South Island Dairy Farmers (represented by the South Island Dairy Event (SIDE) network), Ravensdown Fertiliser Cooperative Limited, Plant & Food Research, Livestock Improvement Corporation (LIC), and recently AgResearch.

Further research into this facility has indicated that it is managed to an incredibly demanding set of criteria. Imperatives that might otherwise undermine the commercial focus of LUDF, such as research or providing teaching or experience to students, are pursued in alternative ways. Any added costs from being a publicly-owned demonstration farm, such as additional management requirements or demonstration activities, are funded externally and not from the farm activity.

The most important ingredient in the success of the LUDF appears to be Lincoln University itself. It has a long history of and strong emphasis on land use matters, and specifically with research and extension in agricultural science and farm management, which has developed organically over time. Lincoln University also has deep expertise in farm management and farm management economics.

The difficulties maintaining successful demonstration farms have led to the development of the '**focus farm**' concept, which has become widely used (particularly in dairy) and is generally held in high regard. Focus farms are well-run commercial farm businesses that often represent a particular segment of the industry, and are engaged in an organised discussion/ extension program. The business becomes the focal point of structured extension activity. There are also some types of farm demonstration that can be delivered on cooperating commercial farms.

Questions:

- 9. What is your experience with government or educational institution-owned research and demonstration farms? Has this experience provided benefits to your business, industry, or your community?**
- 10. Are you aware of other models that showcase best practice and which could be adopted in Tasmania to benefit the agriculture sector?**
- 11. Are there further best practice principles for such facilities that you are aware of?**

State-owned farms in Tasmania

There are a number of Crown or UTAS-owned agricultural properties around Tasmania that are (or were once) used for RD&E and capability development purposes.

Cressy Research and Development Station (CRDS)

The 454ha farm at Cressy in the Northern Midlands was historically used for dryland sheep production and training of farmers. It is owned by the Crown.

Cressy is used by TIA for a number of projects, including the national pasture seed bank program. TIA plays a lead role in this program by maintaining the purity of the temperate pasture seed supply. The site is also used by TIA for a number of other RD&E projects.

A private pasture seed breeder conducts trials on a small portion of the farm under a 15 year lease, and sub-leases some of the farm infrastructure to another private interest.

Recent views collated from stakeholders indicated there is concern that Cressy has suffered from under-investment for many years.

TIA Dairy Research Facility (TDRF)

The TDRF at Elliot in the north-west of Tasmania is a dairy research farm which forms part of the TIA Dairy Centre. The farm comprises a milking area of 112ha, with 40% under irrigation. There is an additional 70ha of support area. The herd of 360 milkers produces around 380kg of milk solids per head. There are six staff on core-funding, with another 12 staff funded on a project basis. The majority of TDRF staff salary costs are met from farm income.

Research conducted at Elliot includes variable rate irrigation, virtual herding technology and precision grazing, and some fee-for-service trial work.

The land at Elliot is owned by UTAS, under restrictions which mean it cannot be sold without the agreement of the Tasmanian Government.

TIA Vegetable Research Facility (TVRF)

The TVRF is a 54ha vegetable research centre, located at Forthside in north-west Tasmania. The TVRF has three core staff who conduct research of a public good nature (e.g. controlled traffic, soil health) on approximately a quarter of the land, commercially-funded research on a further quarter, with commercial horticulture on the remainder. The majority of TVRF staff salary costs are met from farm income.

There is a concentrated private sector in the vegetable industry which is capable of doing (and does) much of its own RD&E. Some of the industry sources consulted claimed Forthside was unable to deliver commercial research services in efficient and cost-competitive ways.

However, the availability of a research facility to undertake trials was considered to be of value in vegetables, because running trials on commercial farms is fraught, as timeliness of operations is critical in production and research, and there are challenges fitting trials into stages of commercial rotations.

The land at Forthside is owned by UTAS, again under restrictions which mean it cannot be sold without the agreement of the Tasmanian Government.

Grove

Grove is a 30ha property in the Huon Valley, south of Hobart. It is owned by the Crown. It is not currently used by TIA for RD&E. Grove was originally the site of a Heritage Apple Orchard, which is still there and is now managed by 'Tahune Farms', a not-for-profit entity of OAK Tasmania, which leases the entire facility. Tahune undertakes a number of activities at Grove, including providing training and work for disabled people.

The only peripheral service to agricultural RD&E the facility serves at the moment is the maintenance of the heritage apple orchard.

Freer (Burnie)

Freer Farm is a 200ha property attached to the TAFE Burnie campus.

Cambridge

Cambridge is a 350ha research farm owned by UTAS at Cambridge, north of Hobart. It is leased to eight commercial operators, including a vineyard and winery, a distillery and a sheep farmer. It is not currently actively utilised by UTAS or TIA, but UTAS is considering using it more strongly within its teaching programs, including undergraduate and higher degree research.

Questions:

12. What is your experience with these facilities?

13. What is needed to enable or enhance world class research at these facilities?

Summary of Questions

Section 1: Contemporary Agricultural RD&E in Australia

1. Can you identify personal, business or community benefits from the investment in agricultural RD&E?
2. Many commentators believe that significant effort will be required to return productivity growth in Australian agriculture to (at least) historic rates. If you agree, what do you think needs to happen to grow RD&E capability and impact, and how do you believe this effort should be resourced and funded?
3. Are you aware of more effective RD&E models that Tasmania could learn from?

Section 2: The Tasmanian Institute of Agriculture

4. What interactions do you have with TIA, if any?
5. Can you describe some of the benefits that your business, industry or community have experienced from TIA?
6. What other ways do you access research, information and/or agricultural education to enable practice changes that contribute to increased agricultural productivity?
7. What changes would you support to TIA's role, programs, suite of projects, or staff that would improve outcomes for your business, industry or community?
8. Do you have any views on the structure or role of the TIA Advisory Board?

Section 3: History and experience in State-owned research and demonstration farms

9. What is your experience with government or educational institution-owned research and demonstration farms? Has this experience provided benefits to your business, industry, or your community?
10. Are you aware of other models that showcase best practice and which could be adopted in Tasmania to benefit the agriculture sector?
11. Are there further best practice principles for such facilities that you are aware of?

Section 4: State-owned farms in Tasmania

12. What is your experience with these facilities?
13. What is needed to enable or enhance world class research at these facilities?

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Glossary

Applied R&D (research and development): A form of systematic inquiry involving the practical application of science, accessing and using the research communities' accumulated theories, knowledge, methods, and techniques, for a specific purpose (often state, business, or client-driven).

Broadacre agriculture: Extensive crop and livestock production in Australia not including horticulture, dairying, intensive livestock and irrigated agriculture.

Productivity: Productivity is a measure of the efficiency of a person, machine, factory, or system in converting inputs into useful outputs. Productivity is computed by dividing average output by the total costs incurred or resources (capital, energy, material, personnel) consumed.

Research, Development and Extension (RD&E): RD&E is a term used almost exclusively in agriculture. RD&E refers to three closely linked processes which ultimately support the adoption of innovations on farms. *Research* generally refers to the scientific process of discovering new plants, fertilisers, animal feeds or treatments that potentially offer some benefits to agriculture. *Development* is the process of adapting research findings to practical Tasmanian agriculture. *Extension* refer to the activities that introduce new technologies or practices to farmers and show them where and how they can fit into their production system, to assist new technologies or practices to be ultimately adopted.

Acronyms

ACIAR	Australian Centre for International Agricultural Research
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPIPWE	Department of Primary Industries, Parks, Water and Environment
JVA	Joint Venture Agreement
LUDF	Lincoln University Dairy Farm
R&D	Research and development
RD&E	Research, development and extension
RDC	Research and Development Corporation
TIA	Tasmanian Institute of Agriculture
UTAS	University of Tasmania

Appendix: Value of Tasmanian Agriculture

The Tasmanian economy produces a Gross State Product (GSP) of around \$25 billion annually, which is 1.6 per cent of the Australian GDP of around \$1.6 trillion per annum.

The contribution of agriculture to the Tasmanian economy is indicated by the Gross Value of Agricultural Product (GVAP) produced annually. The GVAP of Tasmania in 2014-15 was \$1.44 billion. This was 2.67% of the Australian GVAP of \$53.6 billion.

Agriculture in Tasmania represents a greater proportion of the GSP than is the case in most of the other States and Territories Australia. In Tasmania, the agricultural share of GSP was 5.6% in 2014-15, higher than for all other States and Territories except South Australia.

The contributions of the major agricultural activities to Tasmania's GVAP in 2014-15 are shown in the Table below.

Table: Gross Value of Agricultural Product (GVAP)

	\$ million	Share of GVAP
Field crops	148.0	10.3%
Beef	235.7	16.4%
Sheepmeat	96.3	6.7%
Wool	91.3	6.4%
Other non-dairy livestock	66.6	4.6%
Dairy	442.4	30.8%
Total Livestock	932.3	64.8%
Apples & Pears	36.4	2.5%
Cherries	31.4	2.2%
Other horticulture	29.6	2.1%
Total horticulture	97.3	6.8%
Wine grapes	20.7	1.4%
Potatoes	160.8	11.2%
Onions	24.7	1.7%
Carrots	15.3	1.1%
Other vegetables	47.0	3.3%
Total Vegetables	247.9	17.2%
Total GVAP*	1437.7	100.0%

* There is a slight discrepancy between the total gross value reported by ABS and the sum of gross values of commodities which incorporates additional information from industry.