

Roadmap for a Regional Agrifood Knowledge Cluster in North West Tasmania: Final Report



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Executive Summary

Family farms and local agrifood enterprises support North West Tasmania's economic and community sustainability. Agriculture and food processing are becoming increasingly knowledge intensive. There are numerous large companies located in the North West with access to the finances and technologies required for participation in this knowledge economy. New technologies can drought-proof agricultural industries and boost community resilience through diversification, post-farm-gate value adding and improved environmental stewardship. Yet local producers without large professional staff or research and development budgets are disadvantaged in understanding and taking advantage of fast-moving technological and other developments. This project lays the foundation for a regional agrifood knowledge cluster to link small and medium agrifood producers with knowledge holders from local service providers to online knowledge repositories to support their participation in the growing agrifood knowledge economy.

This project addresses the research questions: what knowledge is available to assist small/medium North West Tasmanian agrifood producers to be resilient and innovate? In particular, what knowledge and resources are available that allow them to understand and collaborate across the value chain for resilience? These questions are designed to address the following investment objectives and outcomes of the Future Drought Fund:

- Objective 1: Grow the Self-Reliance and Performance (Productivity and Profitability) of the Agricultural Sector - Outcome 1b) Drought resilience strategies and practices
- Objective 3: Strengthen the Wellbeing and Social Capital of Rural, Regional and Remote Agricultural-Dependent Communities - Outcome 3a) Community wellbeing, and
- Objective 4) Cross Cutting: Linking the Economic, Environmental and Social Objectives - Outcome 4a) Understanding interconnections.

In order to understand current and potential linkages between agrifood producers in North West Tasmania we attempt to 'make sense' of the vast, complex array of information and resources available to agrifood producers. This information is complex to organise, and difficult for producers to navigate as they attempt to respond to risks and opportunities. To do this we have developed the *Agrifood Knowledge Matrix* which identifies and arranges (maps) knowledge holder organisations and enterprises according to agrifood business sector, area of food production practice where the knowledge could be applied in making a change and stage(s) of the innovation/change process where the knowledge would be relevant.

(1) Agrifood business sectors where knowledge is relevant:

- Multi-sector (knowledge relevant to all business sectors)
- Horticulture
- Dairy, livestock and wool
- Seafood and aquaculture
- Environment, forestry and wildlife
- Food processing
- Agritourism.

(2) areas of food production practice where knowledge could be applied:

- Production
- Technical
- Natural resource management (NRM)
- Business
- Funding and banking
- Marketing

- People workplace health and safety
- People wellbeing
- Sustainability
- Advocacy

(3) stages of the innovation/change process:

- Awareness
- Decision making
- Implementation
- Monitoring and review.

The full *Agrifood Knowledge Matrix* can be found [here](#).

Due to the complexity and quantity of the knowledge and knowledge holders that has been mapped, the project findings suggest a regional agrifood knowledge cluster would be an appropriate structure to bring together agrifood knowledge users and knowledge enterprises and holders. A regional agrifood knowledge cluster would be a low-cost and locally tailored way to provide strategic support for producers and the region to engage with the opportunities afforded by new technologies across the value chain. This would also support producer access to and use of the vast knowledge that is available but not necessarily accessible.

We also suggest that extension is well placed to provide the intermediary resource needed to make the connections and build the collaborations required across the regional value chain for SME agrifood businesses to learn and innovate together to build prosperity within North West Tasmania.

The *Agrifood Knowledge Matix* and other project findings lay the groundwork and strategic directions for further development of a regional agrifood knowledge cluster.

Introduction

Aim

This project was designed to investigate connections between local producers and knowledge organisations and enterprises both located in North West Tasmania and accessible to those agrifood producers living to North West Tasmanian typically via online connection. As a scoping project, it aims to create new knowledge through the mapping of the agrifood knowledge in the region and identify institutional linkages to be created or strengthened as an initial step to support drought resilience in North West Tasmania.

Background and rationale

Small/medium family farms and entrepreneurial agrifood producers are seeking to create sustainable businesses in North West Tasmania. The region requires a cluster or other collaborative infrastructure to support these local producers to navigate the fast-changing landscape of knowledge-intensive agriculture and food technologies by linking them with regional knowledge enterprises (for example, researchers, consultants, irrigation specialists, digital experts). Support would equip local producers to identify, adopt and adapt relevant new technologies to transform profitability and sustainability, diversify and mitigate against risk, and generate cross-cutting economic, social and environmental benefits for the region.

Agrifood is a pillar of North West Tasmania's regional economy. Family farms and local agrifood enterprises support economic and community sustainability. Yet technological change in agriculture and food industries is moving quickly. Local producers struggle to keep abreast of complex new technologies while facing increasing competition from the growth of corporatized farming in the region. This project will lay the foundations for technology-propelled innovation in the region's agrifood sector.

Future agriculture will be increasingly knowledge intensive. New technologies can drought-proof Australian agricultural industries and boost community resilience through diversification, post-farm-gate value adding and improved environmental stewardship. Yet local producers without large professional staff or research and development budgets are disadvantaged in understanding and taking advantage of fast-moving technological developments.

A low cost, high-value institutional infrastructure, such as a cluster connecting local producers with existing knowledge-economy resources will strengthen the resilience of local agricultural enterprises and communities in North West Tasmania.

While this is the overall aim of an ongoing plan, this project targets a first step in the process by mapping the knowledge that is available for small/medium agrifood producers in and to the region.

Literature review

Tasmania has an internationally competitive and growing agrifood sector, producing 5.5 times as much food as is consumed in the state and supplying a wide variety of fresh produce and award-winning niche products to other Australian states and other countries (State of Tasmania 2023; Natural Resources and Environment Tasmania 2022). The approximately 900 farm businesses in the North West region of Tasmania produce 41% of the value of agricultural production from only 16% of Tasmania's farmland. The region is also home to a number of large food processing companies, for example, Simplot, Fonterra, Saputo, and Greenhams (Department of Natural Resources and Environment Tasmania 2022). There is therefore an accessible pool of expertise in food manufacturing in the region (.id Consulting Pty Ltd 2021).

Agrifood business in the region is dominated by small and medium enterprises (SMEs), which are predominantly family based businesses. There is potential to significantly increase the value of agrifood production in the region, particularly through these family based business' connections to supply chain linkages (.id Consulting Pty Ltd 2021). While family farms and entrepreneurial agrifood producers are seeking to create sustainable businesses in North West Tasmania, small local producers lack easy access to supply chain networks. Nor do they have the professional research, economic backing and development support needed to navigate fast-changing technology (Rotz et al. 2019) and adaptations for climate change. There are similar access barriers to understanding and accessing knowledge about systems and processes that capture and monitor environmental impacts (Jia 2021). A region's future competitiveness, sustainability and resilience is threatened when it is disconnected from its agrifood economy (Stone & Rahimifard 2018).

Agrifood systems sit at the intersection of natural systems and economies, with food production requiring decentralised control because it is reliant on local knowledge and skills (Van der Ploeg 2016). Climate change and fast-changing technologies demand innovation (Rahman 2015). Innovation requires the right knowledge to make decisions, implement change and monitor the effectiveness of that change. Knowledge management and sharing knowledge throughout the supply chain is essential if agrifood businesses are to be sustainable and thrive into the future (Beske et al. 2014; Dung et al. 2020). Stone and Rahimifard (2018) argue that this knowledge management and access to broader relationships across the supply chain sit alongside capacity to learn and adapt as being essential. In practical terms, this means that appropriate knowledge acquisition processes should alert small and medium enterprise (SME) agrifood businesses to changes in end user needs and preferences, new opportunities and risks (Wicaksono & Illés 2022), raise awareness of new ways of doing things and new resources to do them, all of which are especially relevant in the context of fast changing technologies (Rotz et al. 2019). These understandings have implications for producers, and industry and particularly for the social and technological mechanisms that are required in this space to make the necessary links between people and knowledge. It is these stages of innovation that have been used within the matrix worksheets to identify the nature of knowledges that particular knowledge holders have which producers might access in an innovation.

A dynamic capabilities perspective (Teece et al. 1997) can be used to consider how agrifood businesses can act both entrepreneurially and in collaboration in order to make changes, but still be resilient and thrive in the context of ongoing external changes. Knowledge acquisition is an important part of such adaptive processes and value chains (or supply chains) that work collaboratively (Dung et al. 2020). Both horizontal collaboration, for example between agricultural businesses and vertical collaboration, for example between agricultural businesses and food processing businesses, are needed, along with collaboration from others such as food safety, animal welfare and marketing agents; all with the aim to improve supply chain resilience and sustainability (Leat & Revoredo-Giha 2013; Wicaksono & Illés 2022).

The innovation system described above needs more than a linear transfer of knowledge to facilitate cross supply chain knowledge sharing, learning, adaptation and innovation. A co-productive, networked,

collaborative learning pathway (Cliff et al. 2016), via small group processes rather than individual approaches (Klenk et al. 2017) is likely to be effective. Trust and social capital must be built and maintained amongst all stakeholder groups in the supply chain (Paschen et al. 2021). The innovation system needs collaborative structures or vehicles that bring people together and make the most of cross supply chain synergies and manage risks holistically (Jia 2021). Clusters, incubators and accelerators can enable entrepreneurship and creativity, building capacity to respond to external factors, facilitating commercialization and competitiveness. Such an innovation system model is not new, Freeman (1988) and Lundvall (1992) suggested that whole nations access and develop such innovation systems.

Returning to the perspective of SME agrifood businesses, a recent systemic review of factors influencing farmer adoption of sustainable innovations (Rizzo et al., 2023) confirms that farmer decisions to make a change to their practice, or innovative, depend on both characteristics of the new practice, such as its complexity, and farmer social and demographic characteristics. The following section outlines factors to be considered in designing a regional system to support agrifood innovation.

Innovation, adaptation and adoption

Innovation typically attracts a few early adopters initially, then increasing numbers until a small number of 'laggards' finally take up the innovation (Rogers 1995). Over time we have come to understand that learning is a social process influenced not only by science and logic, but by attitudes and values, as explained by theories such as the theory of planned behaviour (Ajzen 1991; Hall et. al 2019) and the perceived usefulness and ease of use of new technology or equipment (Afzal et al. 2022). This basic understanding has been augmented by understandings such as that some people learn best by reading or talking to others, some in groups, others one on one with experts (Kilpatrick et al. 2003). Some have 'boundaries' that limit their capacity to change, lines they are reluctant to cross despite promise of return. Boundary examples are going into debt or employing more staff (Turner et al. 2017). It is useful to have some source of support to check when change doesn't go to plan, examples are experts, other producers and case studies (Kilpatrick & Johns 2003). Producers' perceptions of risk or vulnerability, their perceptions of their own ability to plan, learn and reorganise to cope with the change, and their interest levels, all contribute to change actually occurring on the ground (Marshall & Marshall 2007, Preston & Stafford 2009).

Innovation or adoption or adaption of a new practice is a multistage process. An agrifood producer must first become aware of the new practice, for example prompted by seeing an opportunity or needing to solve a problem; only then is there a decision about whether or not to try the new practice, or to adapt it to suit the context of the agrifood business. The decision stage typically draws on information about both the new practice and the agrifood business. Not all decisions to implement a new practice are successful, missing information or support can halt innovation (Kilpatrick & Johns 2003). Good practice suggests regular monitoring and review of practices across the whole business to ensure business sustainability. Rizzo et al. (2023) point out that different sources of information and support tend to be used at different stages of the innovation process.

Extension is an integral part of a learning ecosystem. Agrifood producers can select among providers and sources of knowledge and learning, including extension when innovating or considering other changes to practice. Farm business have different preferred learning 'patterns' (combinations of sources used), and the combination varies by type of innovation. Kilpatrick and Johns (2003) found, for example, that less progressive farm businesses making a management or marketing practice change relied on a single trusted expert such as an extension officer, while more progressive businesses drew on multiple learning sources including experts, other farmers and print and online media.

A long history of extension research has used the transfer of technology model to explain how farmers learn individually or in groups led by an extension 'expert' with the knowledge that farmers need to make

change through technology transfer (Jia 2021). Group-based extension presents opportunities for interaction with other farmers (who are also 'experts') as well as facilitators in the context of receiving new information (Kilpatrick 2000). Extension has evolved toward more participatory approaches that build rural and food production capacity (Oladele 2020). The impact of COVID too has increased willingness internationally of extension facilitators to try, and farmers to join, online 'e-extension' activities (Afzal et al. 2023). Extension is now regarded as a key part of the agricultural knowledge system and innovation cycle despite changes in how extension is implemented over time. It acts to reduce commercial and safety risks and improve environmental management (Rahman 2015).

Extension can therefore be seen as a key component of not only the adoption of existing innovations; but also co-creation or co-innovation of new knowledge, particularly in the building of a regional cluster. Paschen et al. (2021) investigated the process of co-innovation in the Australian agricultural extension and advisory system. They found it was essential to engage supply chain partners including large food processing companies as well as SMEs and agricultural extension and advisors. However, competition between processing companies, including for SMEs which are produce suppliers, and competition between end products in the marketplace, can act as a barrier to the collaboration necessary to maximise co-innovation benefits. Continuity of collaboration, developing and maintaining shared vision and relationships through the supply chain must be resourced, for example, by an intermediary or broker (Paschen et al. 2021). Intermediaries can promote the social learning that must occur among supply chain participants (Turner et al. 2020). Extension has a key role to play in coordinating such a system (Oladele 2020).

A value chain approach has been used to explore and explain the interconnectedness of the agrifood system and the key role of sharing knowledge and collaborative learning, however extension has tended to be segregated to the operational aspects of production, disrupting the efficient functioning of the value chain (Oladele 2020). Extension that has worked along the value or supply chain in developed economies such as Australia has typically been associated with large food processing companies, such as milk or vegetable processors. Large food processing companies provide extension services to their suppliers, motivated by the processor wanting to standardise produce arriving at the factory, and maximizing commercial return (Paschen et al. 2021). The processing company typically has market intelligence about end user demand, and the resources to develop processes for farmers to implement to minimise variation in quality of produce it purchases. Those working in extension therefore need to recognise and address concerns of large and SME producers.

Extension and North West Tasmania

Traditionally, large food processing companies in North West Tasmania have played a large role in extension for their produce suppliers, linking on-farm and value add agrifood production. This is likely to result in a competitive rather than collaborative supply chain (Paschen et al. 2021). The Tasmanian Institute of Agriculture, a joint venture between the University of Tasmania and Tasmanian Government became responsible for all Government research and development, including group extension activities in 2010, with the State divesting itself of one on one production and technical extension and asking the private sector to pick up this role (Walker 2010). Natural capital extension activities in Tasmania have largely become the responsibility of Natural Resource Management regional bodies, and government funded organisations such as Landcare.

Methodology

This project addresses the research questions: what knowledge is available to assist North West Tasmanian agrifood producers to be resilient and innovate? In particular, what knowledge and resources are available that allow them to understand and collaborate across the value chain for resilience?

In order to address these questions, as a first step, a project advisory group was established with representatives of agrifood producer associations, regional development and natural resource management bodies and the local Drought Resilience Adoption and Innovation Hub that were to be used as expert guides and checks of knowledge and knowledge gathering processes throughout the project. The project then proceeded, adopting a qualitative research approach using thematic reflexive analysis (Braun & Clark 2019). This approach is inductive and iterative. It allows for, and encourages flexibility, collaboration, consultation, discussion and modification of themes over time as data is collected and analysed, with the aim of reaching agreement about themes present in the data. The research team drew on team meetings, the advisory group, individual interviews and group discussions with agrifood industry and knowledge provider representatives in reaching final themes of the types of knowledge available in and to NW Tasmanian agrifood producers. The scope of the funded project meant that individual agrifood producers were not included in data gathering at this point of the project, except incidentally; several interviewees also operated SME agrifood businesses. The focus of further funding will be on SME agrifood businesses and their use of the matrix. The project received ethics approval from the University of Tasmania Human Research Ethics Committee ID27894.

The initial step in the project was identifying an appropriate framework to present and order sources of knowledge. A matrix style layout was chosen in consultation with the advisory group (see below). It reflected the stages in the innovation or adoption process where agrifood producers can use knowledge described above (awareness, decision making, implementation, monitoring and review) and areas where innovation or change might be made (for example, technical production, business management, natural resource management). These areas were modified as the project progressed based on a thematic analysis of the kinds of changes typically made by agrifood businesses, alongside the scope of knowledge enterprises and organisations identified as providing relevant information and resources.

We next located sources of knowledge through a web search, uncovering a mix of service providers who could provide agrifood producers with knowledge or information, sometimes applied to their business context, and sites or tools containing information that agrifood producers could draw on in the innovation or adoption process. These sources of knowledge could be either physically present in the region, and/or available via a website. Websites were scanned to identify the areas of knowledge the organisation could provide to agrifood businesses and the innovation stages for which that knowledge would be useful. Knowledge sources were placed in the matrix and categorised according to the type of organisation, noting that a single organisation could fit more than one category. Categories included industry association, government, research, education and training, industry advisory service, product supplier, processor and purchaser, commercial advisory service and community service.

As a result of the vast quantity of sources found, placing them in a single matrix became difficult. We therefore expanded from a single Excel spreadsheet matrix into similar matrices on multiple spreadsheets in a workbook, one worksheet each for knowledge sources that applied to all or most agrifood business or multiple sectors (for example, knowledge about business practices and individuals' resilience), and other spreadsheets for sources that applied only to a particular agrifood sector, for example, dairy, horticulture, seafood or food processing businesses.

Some online sites included tools into which agrifood businesses could enter their own data to produce information directly relevant to their business. Tools are marked in the Matrix by an asterisk (*). An example of a tool is The List (Land Information System Tasmania) is a whole-of-government online

infrastructure that helps you find and use information about land and property in Tasmania. You can make your own customised maps by combining multiple layers of information.

Co-design process and stakeholder input

We validated both our workbook knowledge matrix layout and the knowledge sources within it through workshops with the advisory group and groups of stakeholders, and through individual interviews, depending on stakeholders' availability and preferences. Workshops were audio recorded and transcribed. Some who provided input were knowledge user stakeholders, such as agrifood membership-based bodies and regional development bodies, and some knowledge enterprises or providers, including agronomists, researchers, agritech businesses, rural business advisors, NRM bodies and Drought Hub staff. A total of 35 people based in or providing services to North West Tasmania gave input about the matrix to the research team. Some individuals were both users and providers of knowledge and around half the knowledge providers could be considered to work in the field of extension. For the purposes of this project an organisation is classed as engaging in extension if it visited agrifood businesses and gave advice pertaining to particular businesses or provided group learning opportunities that included two way communication giving advice pertaining to knowledge application in particular businesses.

As we showed and explained the knowledge matrix excel workbook to stakeholders they suggested additional knowledge sources as well as modifications to the categorisation of areas of innovation where knowledge could be used and the arrangement of the spreadsheets. During the workshops and interviews it became apparent that commercially provided knowledge sources should be separated from government and non profit sources, and future users of the spreadsheet should be alerted to the fact that not all commercial providers might be present and that inclusion in the spreadsheet was not an endorsement of the quality of services or information provided. The knowledge matrix workbook was modified as workshops and interviews were conducted, and transcripts analysed.

What resulted from this exploration was the mapping of a deep dive into the knowledge and knowledge holders that would be of use to Agrifood knowledge consumers in North West Tasmania. The full *Agrifood Knowledge Matrix* can be found [here](#).

What knowledge is available to assist North West Tasmanian agrifood producers to be resilient, and innovate and collaborate across the value chain?

The matrix initially presents the types and areas of knowledge resources that are relevant to agrifood businesses in the region using the *Agrifood Knowledge Matrix* and the nature of knowledge enterprises and organisations available in the region, before discussing resources available to assist SME agrifood businesses collaborate across the value chain.

Agrifood Knowledge Matrix

Figure 1 below is an example of one of the excel worksheets from the Agrifood knowledge matrix. It captures the providers relevant across most production sectors of agrifood business (multiple sector relevant knowledge enterprises and organisations). These provide sector-generic information and services (for example, business management and work health and safety information). This worksheet contains over 40% of knowledge providers identified.

Figure 1. Example of knowledge matrix workbook: Multiple sector-relevant knowledge sources

We provide info/support/ resources for innovation:	Area information and/or support										Innovation stage			
	Production	Technology and equipment	IPM	Business	Handling and handling	Marketing	People, Work Health & Safety	People Wellbeing	Sustainability	Advocacy	Alignment	Decision Making	Implementation	Monitoring, Evaluation, Continuous improvement
*Tasmanian Farmers and Graziers Association														
National Farmers Federation														
*Food and Agribusiness Growth Centre (FIAG)														
Tasmanian Women In Agriculture														
Rural Youth														
Tasmanian Agricultural Productivity Group														
Australian Agritech Association														
BUD Organic Club														
AGFEST														
Irrigation Australia														
*Farmers for Climate Action Tasmania														
Soil First Tasmania														
ABC Radio														
*Bureau of Meteorology (BOM)														
CSIRO														
Department of Natural Resources & Environment (NRE)														
*Farm Point (NRE)														
Department of Agriculture, Fisheries and Forestry														
Cradle Coast Authority														
Cradle Coast NRM														
Local Government Association Tasmania														
Tas Water														
Tas Networks														
*The List (Land Information System Tasmania) NRE														
Food agility (CRC)														
AgTech Finder														
Migration Tasmania														
Safe Farming Tasmania NRE														
Indigenous Land and Sea corporation														
Rural Business Tasmania														
Braddon Business Centre														
Rural Financial Counselling														
Regional Investment Corporation														
Regional Development Australia, Tasmania														
Department of State Growth														
Department of Premier and Cabinet														
*Business Tasmania														
Skills Tasmania														
Libraries Tasmania														
*Digital Ready (Department of State Growth)														
Fair Work														
Adult Mental Health Service														
Legal Aid														
Tasmanian Fire Service														
Tasmanian Irrigation														
Agrifutures														
TIA														
TasTAFE														
University of Tasmania														
Sprout Tasmania														
RESEED														
Tasmanian Agricultural Education Network														
Agritas Trade College														
DESTEN														
Agricultural Advisors and Consultants														
Seedlab Tasmania														
The Van Diemen Project														
Enterprise Tasmania														

To understand the structure of the worksheets available in the matrix, the workbook contains a range of sections:

- Contents and definitions. See Figures 2 and 3.
- Worksheets that are relevant to agrifood businesses within multiple sectors, and others that specifically target single sectors – horticulture, dairy and livestock, seafood and aquaculture, environment, forestry and wildlife, agritourism and food processing businesses. see Figure 4.

- The first column of each matrix sheet lists knowledge provider organisations colour coded according to organisation type (agrifood associations /member-based, government, non profit/government funded program delivered by other organisations, research, education and training, and community organisations).
- Other columns note the areas in which knowledge and resources are provided (production, technology and equipment, natural resource management, business, funding and banking, people – work health and safety, people – wellbeing, marketing, sustainability, advocacy) and the stages of the innovation process for which the available knowledge and resources could be used (awareness, decision making, implementation, monitoring and review).
- Commercial (for profit) knowledge providers are noted in three single rows as agrifood service providers, non-agrifood specific commercial organisations or purchasers of agrifood product. Commercial organisations which were readily located through a web search are listed on a separate sheet.
- All organisations including those on the commercial sheet have embedded web links for ease of locating further information. (On the commercial sheet if there is no weblink then a phone number is given.)
- There are additional spreadsheets for knowledge relevant to agritourism and emergencies. Agritourism was separated out from the multiple sector sheet because the sheet was already large and the knowledge enterprises tended to be specialised to agritourism. A number of stakeholders identified the need to include information and resources relevant to emergencies, and there was a consensus among stakeholders that these sources were best separated from those relevant to proactively making changes to practice to improve sustainability and resilience.

Figure 2. Contents sheet of the matrix

Purpose of the Agrifood Knowledge Matrix:	<i>to develop a framework identifying strengths and gaps in the knowledge/information/support 'ecosystem' available to small and medium agri-food producers (growers and processors) in North West Tasmania.</i>
Contents	
List of sheets	Contains:
Multi Sector	Information and resources that are applicable to all agrifood sectors
Horticulture	
Dairy, Livestock and Wool	
Seafood and Aquaculture	
Environment, Forestry and Wildlife	Includes natural resources and natural capital, wildlife and forestry
Food Processing	Wine, whisky, fermentation, other processed food or drink
Emergencies	Planning for and responding to emergencies (Fire, Flood, Storms, Biosecurity)
Agritourism	
Where to find:	
Traceability	Sustainability or Marketing columns
Succession planning	Business column
Biosecurity	General matters on All Sectors and Farm Business, specific matters on individual sector sheets
Definitions:	
Definitions of organisation type	
Definitions: Areas of information and/or support	
Definitions of Innovation stages	
*Tools	
FAQs	

Figure 3. Definitions sheet of the matrix

Definitions of organisation type	
Non commercial production/NRM advisory services and programs	Extension and related advisory services provided by not for profit organisations or programs funded by government or other not for profit organisations
Commercial production/NRM advisory services. See separate list	Production advice services provided on a for profit basis, e.g. farm consultants
Agrifood industry bodies: member based	Organisations which represent and deliver services to their members. Includes peak and non-peak bodies
Government departments and bodies	Federal, state and local government departments, business enterprises and other bodies funded by government, such as Cradle Coast Authority and RDA Tasmania
Commercial input suppliers and non-production/NRM service providers. See separate list	Suppliers of equipment and inputs such as feed and fertilizer, plus service providers such as software advice, farm business accountants and harvesting contractors.
Educators, trainers	Education and training providers such as UTAS, TasTAFE and other Registered Training Organisations
Research bodies	University and industry research bodies, includes Research and Development Corporations
Processors & purchasers. See separate list	Large businesses which contract or purchase agri-food products
Non-commercial, non agrifood specific community bodies and not for profit services	Includes government funded business advisory services, health and wellbeing services, tourism bodies, member bodies such as chambers of commerce
Definitions: Areas of information and/or support for SME Agri-food producers	
Production:	Growing or processing
Sustainability:	Includes machinery, equipment, digitisation, electronic
NRM:	Natural resource management, environmental, includes soils, water, etc.
Business:	Strategic organisation, recordkeeping, management, succession planning
Funding and banking:	Sources of finance (including grants) and financial services
Marketing:	Promoting and selling produce
People, Work Health & Safety:	Education, training, recruitment and industrial relations, safety at work
People Wellbeing:	Health and wellbeing
Sustainability:	Economic, environment, social (individuals, enterprises and communities). Enacted by being proactive, planning holistically, forward looking, considering longevity and natural resources for future generations. Includes renewable energy
Advocacy:	For agrifood business issues and concerns
Innovation stages	
Awareness	Generic or basic information that may alert an agribusiness to a possible innovation, or provide further information that prompts the business to investigate that innovation for their business
Decision making	Resources that an agrifood business can access as and when needed to inform or support their decision making
Implementation	Resources or support that can be contextualised to an agrifood which assist the business to implement an innovation
Monitoring/ Evaluation, Continuous improvement	Resources or support, contextualised to an agrifood business which assist the business to monitor and/or review an implemented innovation
*Tools	Places where you can enter your own information and get customised responses for your circumstances. May not apply to all areas of information/support provided by the organisation

Figure 4. Food processing sheet of the matrix

We provide info/support/re	Area information and/or support										Innovation stage				Key to colour coding of organisation type
	Production	Technology and equipment	NRM	Business	Funding and labelling	Marketing	People, Work Health & Safety	People, Wellbeing	Sustainability	Advocacy	Awareness	Decision Making	Implementation	Monitoring, Evaluation, Continuous Improvement	
*Food and Agribusiness Growth Centre (FIAG)															Non commercial production/NRM advisory services and programs
Tasmanian Whisky & Spirits Association															Commercial production/NRM advisory services.
Wine Tasmania															Agrifood industry bodies: member based
Tasmanian Dairy Industry Authority															Government departments and bodies
Dairy Tas															Commercial input suppliers and non-production/NRM service providers.
Ferment Tasmania															Educators, trainers
Wine Producers															Research bodies
Cider and Beer Producers															Processors & purchasers
Distillers															Non-commercial, non agrifood specific community bodies & not for profit services
Vegetable processors/fermenters															

What types of organisations provide knowledge and resources to the agrifood industry in North West Tasmania?

This section provides an overview of who provides the knowledge that could be useful for agrifood businesses.

Figures 5 and 6 below summarise the information in these worksheets (example of which is Figure 1 above) by ‘area of information’ (excluding ‘people-work health’ and ‘advocacy’, where extension is unlikely to be represented) and innovation stage. Non-commercial providers are grouped together to provide a high level overview of the nature of knowledge available. Because individual commercial providers are not named on individual sheets, but are grouped together on a separate list, Figures 5 and 6 include all commercial providers, noting that some commercial providers may not have been identified through the web search.

The pattern of information and support areas and innovation stages in the multiple sector worksheet (Figure 1) is typical of single sector worksheets, except that there are fewer business and funding and banking knowledge providers on single sector worksheets. This is not surprising as these tend to provide knowledge and resources that apply to SME businesses regardless of sector. Food processing, typically the second step in the value chain, after agriculture and aquaculture production, has considerably fewer (just ten?) knowledge provider organisations compared to agriculture and aquaculture sectors which each have over 20 sector-specific knowledge providers.

Commercial providers are weighted more heavily toward production, technology and equipment, and marketing knowledge and resources than is the government and non-profit provider grouping, while commercial providers are absent from people-work health and safety (Figure 5). Government and non-profit providers are less likely to provide knowledge in the later implementation and monitoring/improvement innovation stages (Figure 6).

Figure 5. Information and support relevant to multiple sectors of agrifood businesses by area of support

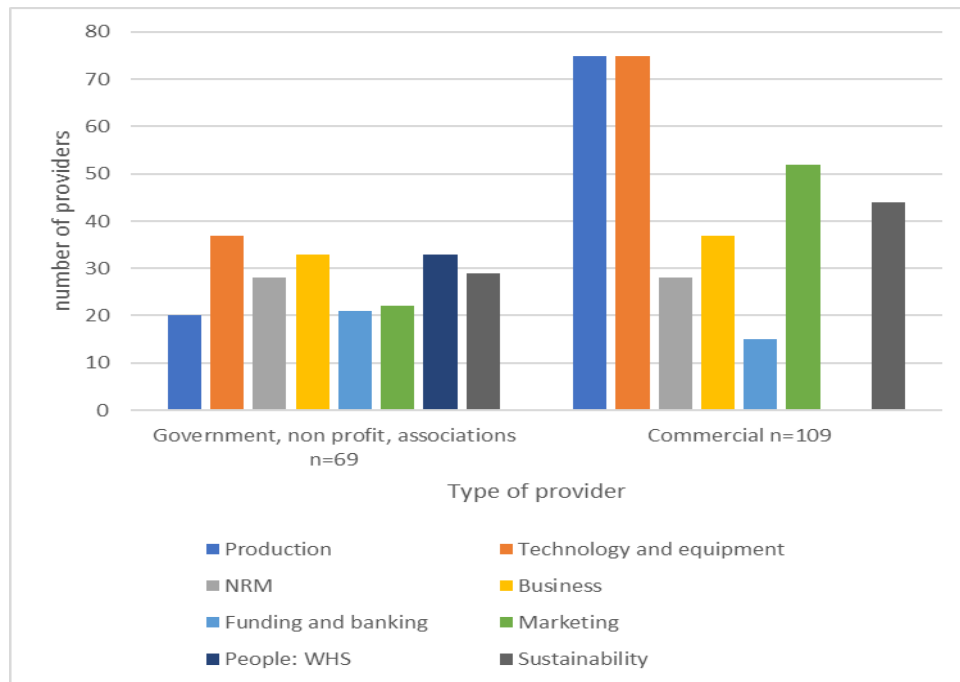
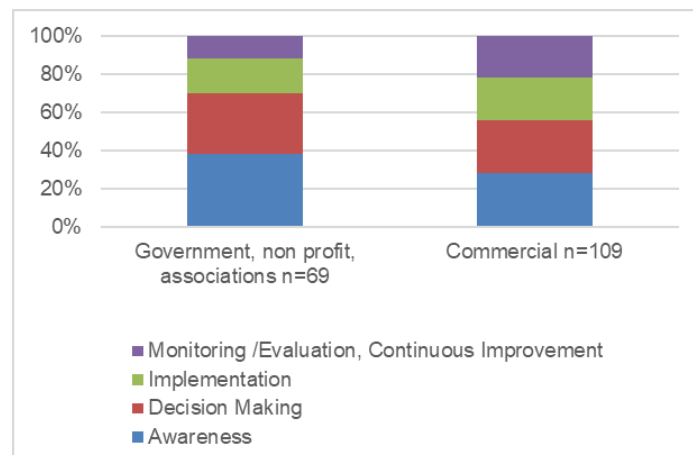
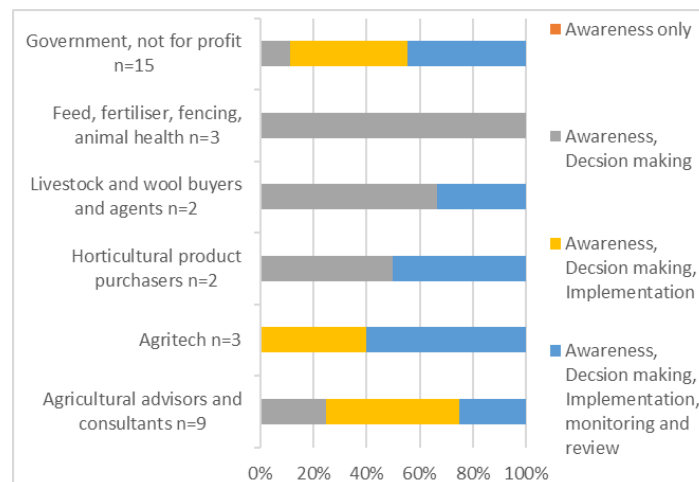


Figure 6. Innovation stage activity by type of knowledge holder organisation



Thirty-four entities provided knowledge through extension, defined as being customised to the individual agrifood business contexts. Figure 7 shows that all identified extension services provide knowledge for more than awareness in progressing innovations and change, with a proportion of all types of extension (except feed, fertilizer, fencing and animal health) providing knowledge for all innovation stages. The majority of extension providers offer knowledge for later innovation stages, defined as being customised to the individual agrifood business contexts. This is mainly in the form of services, although some providers have tools for agrifood businesses to enter their own data.

Figure 7. Extension knowledge across the innovation process



Connecting and co-creating knowledge across the value chain

Is there evidence in North West Tasmania of the collaborative learning or coordination among value chain participants that researchers have suggested is needed to innovate and adapt to be resilient into the future (Pashen et al. 2021, Turner et al. 2020, Oladele 2020)? While the project reported here has only scratched the surface of the data needed to fully address this question, there are some clues from our analysis of knowledge provider websites that some knowledge holders and extension providers do aim to foster such collaboration. Not all provide extension services that actively involve agrifood SMEs. The Tasmanian Agricultural Productivity Group, a North West Tasmanian based advocacy body which also takes a leadership role in selected innovative projects is an example, recognising:

The benefits of broad industry collaboration, both between sectors and between pre and post farm gate interests, is more evident today than ever and critical to providing the optimum policy and priority settings for growth of the Tasmanian economy. (Tasmanian Agricultural Productivity Group n.d.).

Another example, the Tasmanian Seed Industry Group aims to connect across the seed production supply chain, however, the Group's scope does not extend beyond seed production into the regional value chain, to crops:

TSIG encompasses all aspects of the Tasmanian seed production industry, from farmers to agronomists, seed companies, seed testing, government and researchers. (Tasmanian Seed Industry Group 2023)

National sector-specific Research and Development Corporations (RDCs) also aim to collaborate across the value chain. There are extension programs, typically devolved from RDCs to be delivered by regional organisations, that have the potential to connect North West SME businesses into the regional value chain. Examples target dairy, vegetable and meat agrifood businesses. Meat and Livestock Australia (2023) runs carbon neutral and pasture programs. Hort Innovation funds VegNET, an extension program delivered in the region by a local agricultural advisory/consulting company which connects regional vegetable growers with the value chain and facilitates innovation (AUSVEG n.d.). DairyTas, an arm of Dairy Australia, provides extension and training programs for farmers and food processors that facilitate innovation and are connecting with government and organisations from other parts of the value chain:

DairyTas works to deliver both Tasmanian-specific and Australia-wide dairy research, development, extension and education activities that support and develop dairy farmers to build robust and sustainable businesses... cooperates with a range of industry and government stakeholders... works to leverage additional funds... (Dairy Australia 2023)

Many other national bodies aspire to promote cross value chain collaboration, for example, the Australian Agritech Association's mission states:

We're connecting the community of agritech innovators, farmers, investor groups, government regulators, researchers, industry bodies and interested public to catalyse profitable innovation, expand sustainability and environmental awareness.... (Australian Agritech Association n.d.)

While such national associations may be actively working with agrifood producers in the region, our research did not uncover any explicit mention or evidence of cross-value chain collaboration on the ground in the region. Neither was there evidence that commercial extension providers are connecting and facilitating learning and innovation across the regional value chain, apart from extension programs funded to deliver programs developed by RDCs.

DairyTas is the only extension provider working across the value chain in the region, it services both food production (dairy) and the food processing sectors. There is just one other extension provider for food processing SMEs in the region, the Food and Agribusiness Growth Centre (n.d.), which uses clusters to connect to other parts of the value chain.

Discussion and conclusion

The search for knowledge sources and knowledge holders was intensive and not straight forward. While the project team had the targeted resources to throw at the task, SME agrifood businesses are unlikely to have this time or knowledge and skills to be able to do this work alongside running a successful business. So while the knowledge is there we conclude it remains largely inaccessible to those who need it. The SMEs need help to navigate the extensive knowledge resources that could make a difference to their business resilience and sustainability.

This project is just the first step in understanding and strengthening the resilience of the agrifood ecosystem in North West Tasmania. We acknowledge that individual agrifood businesses were not consulted in this scoping project. Identifying and mapping the types of knowledge providers and nature and scope of knowledge they can provide to SME agrifood producers has exposed a diversity of actors and wide scope of knowledge available to the region's agrifood system, though the food processing sector, a key step on the value chain, is not as well served as other sectors.

Better connecting food processing to the system and drawing on the pool of technical food processing expertise in the region (.id Consulting Pty Ltd 2021) through building relationships, drawing on a wider understanding of risks and opportunities and co-learning is a potential cross value chain trial collaboration project that could be coordinated by extension (Stone & Rahimifard 2018, Wicaksono & Illés 2022). Co-learning learning through proven frameworks is required to improve producer responses to vulnerabilities in innovation and change (Cliffe et al. 2016).

Extension is active in the region. Extension workers can be expected to be skilled at understanding individual agrifood businesses, their preferred learning patterns (Kilpatrick & Johns 2003) and how best to engage the SMEs in acquiring and using new knowledge to make changes to practice (Jia 2021, Oladele 2020, Afzal et al. 2023). This places them in a unique position to make connections via the gap that has been uncovered in the coordination and connection needed to create an innovative and connected system. While extension appears to be playing some role in fostering coordination and connection there is scope for a much bigger role, through both horizontal and vertical collaboration (Leat & Revoredo-Giha 2013; Wicaksono & Illés 2022).

There are several opportunities for further research and other work. First, making the Agrifood Knowledge Matrix more user friendly and accessible to agrifood producers. This would require some design input, and most importantly, input from SME agrifood producers themselves. The matrix should then be embedded in an organisation or structure that is able to keep the matrix updated (see suggestions below for a cluster or similar).

Further investigation is needed to confirm the nature of a cluster that would be most effective to make the most of cross value chain synergies and manage risks holistically for a resilient value chain in North West Tasmania (Dung et al. 2020, Jia 2021, Freeman 1988, Lundvall 1992), and to establish a cluster. We note that extension is well placed to build the necessary trust and social capital amongst producers and processors in such a cross value chain project (Paschen et al. 2021). Extension could act as an intermediary to engage and bring the perspectives of the larger agrifood businesses in the region in the project, as recommended by Paschen et al. (2021).

We suggest another action is to contact all the regional, state and national organisations which stated an aim to connect across supply and value chains to explore establishing a dynamic, collaborative regional value chain that provides SME agrifood producers in the region with accessible connections. SMEs must be engaged in value chain innovation; they cannot each be expected to navigate the complex agrifood ecosystem and its value chain independently. They need access to research that is customised for their individual needs and financial backing to support and navigate climate change and fast-changing technology (Rahman 2015, Rotz et al. 2019). Given that SMEs tend to be time poor, regional value chains which collaborate up and down the chain are better placed to be resilient. SMEs tend to find extension approachable, making extension well placed to customise knowledge for individual agrifood businesses and connect the SMEs to a regional value chain collaborative structure.

Once an effective regional cluster has been established and trialled, there is potential to transfer both the matrix and the cluster model to other regional areas of Tasmania and Australia.

The project has addressed Future Drought Fund Investment Outcome 1b) Drought resilience strategies and practices by providing a new tool, *the Agrifood Knowledge Matrix*, that is designed to support the agrifood sector in North West Tasmania (including its supply/value chain) to plan and develop a regional drought resilience strategy. The *Agrifood Knowledge Matrix* is also designed to contribute to Future Drought Fund Investment Outcome 3a) Community wellbeing through analysing and presenting knowledge in a tool to support agricultural-dependent North West region communities develop community-led regional drought resilience strategies and assist individuals' wellbeing and decision making when the affected by stress linked to drought. Finally, and most importantly, the *Agrifood Knowledge Matrix* addresses Outcome 4a) Understanding interconnections, exposing existing interconnections and connection gaps. This new knowledge is intended to be used in further research to improve the interconnections between the economic, environmental and social domains of drought resilience and build a regional agrifood cluster that features collaboration across and within the value chain that will improve the value of sector output and the resilience of the agrifood sector in North West Tasmania.

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