

NRM and industry regional priorities supported by the TNQ Hub.

There are a range of industry identified priorities which align to drought resilience and preparedness. The TNQ Hub supports investment into these priorities from a range of sources and has drawn on these in developing the regional priority list.

Industry	Aligned Industry Priorities
<p>1. <i>Red meat sector (North Australian Beef Research Committee)</i></p>	<p>Carbon and environmental markets</p> <p>R&D gaps</p> <ul style="list-style-type: none"> • <i>Clearly defined carbon accounting and measuring standards.</i> • <i>Cost-effective, certifiable, region appropriate methodology for measuring soil and plant-based carbon and soil health in extensive grazing systems, and changes over time.</i> • <i>Soil carbon baselines and annual variability on major land types.</i> • <i>Long term carbon sequestration responses to key grazing and pasture management strategies on major land types (especially the link between ground cover, soil type and C status), as an input to models of soil carbon dynamics under different grazing systems.</i> <p>Adoption gaps</p> <ul style="list-style-type: none"> • <i>Carbon footprint analysis of businesses to assess their current net carbon balance (negative, neutral or positive) and identify where effort is needed /opportunities are to improve C performance, herd performance and land management.</i> • <i>Basic, practical, unbiased advice on the benefits, costs, challenges and risks of carbon neutrality or farming from independent parties regarding carbon farming and other sustainability schemes now available to producers.</i> • <i>Practical templates for producers to record, understand and meet their obligations and industry's expectations.</i> • <i>Building Carbon into existing extension programs.</i> • <i>Verifiable unbiased advice on increasing biological capital in regions/major land types where C farming has relevance. Overview of short and long-term benefits/rewards and costs in beef enterprises.</i> • <i>Managing landscapes to balance C sequestration through woody thickening and biodiversity loss.</i> • <i>Financial and carbon balance outcomes of key grazing and pasture management strategies in different regions and climates.</i> • <i>Review, verify and promote effective biodiversity planning tools (e.g. LOOC-B) and stewardship programs (e.g. E-Care).</i> <ul style="list-style-type: none"> • <i>Producer knowledge on how to increase biodiversity and what opportunities there will be to trade biodiversity credits into the future, separate from carbon.</i>
	<p>Decision support tools</p> <p>R&D gaps</p> <ul style="list-style-type: none"> • <i>Refinement of new tools (e.g. Cibo Labs) for rapid remote sensing (i.e. measuring & monitoring) of the quality, quantity and composition of pastures, and understorey shrubs in woodland and open forest country.</i>

- Updated prediction equations for applications of NIR and faecal NIR in accurate assessments of diet quality.
- Efficient and effective integration of climate/pasture/animal movements/land condition data sets in decision support tools to predict and forecast the condition and risks to grazing systems and livestock production.
- Understanding the motivations of people who overstock and strategies to reduce the occurrence of this behaviour.
- Identification of forage quality and quantity in different seasons (green vs dry) to match plant species to stage of life to feed quality (protein and energy levels).

Adoption gaps

Note: This priority will require widespread uptake of objective measuring of animal performance.

- Application of tools for remote forage assessment and budgeting, and managing fire risks.

Economic analysis of benefits of using grazing management tools and improved land management.

- Compare and identify the advantages and disadvantages of the technology – Cibo Labs, AgriWeb, Mobble, Maia, etc - that offer satellite imagery to monitor feedbase.
- Support to effectively use Cibo Labs monthly reports (feedbase) that will be available to all MLA members from July 2022.
- Simplified, integrated and more usable software dashboards.
- Lack of an effective Faecal NIRS service.
- Effective in-field estimate of weights and numbers of cows and calves – learning from the limitations of the current WOW systems and trialling alternatives such as machine vision.

Land management

R&D gaps

- Ecology, establishment, optimal balance and management of native 3P grasses, legume, shrub and tree species (incl invasives) in major land types to support long-term rangeland health and production capacity through climatic variations/extremes.
- Effective and economically viable pasture and land restoration methodology for major land types including native rangelands and sown pasture systems, and for accelerating recovery of poor, C condition grazing lands.
- Determination and measurement of the key landscape functions which contribute to resilient and productive native, oversown and sown grasslands. Current land production capacity/condition, compared to historical records, and the likely influence of future changes/extremes in climate on land condition.
- Management strategies for grass+legume pastures to maximise dry season herbage yield and feed quality while maintaining long-term pasture composition and land condition.
- Labour efficient and cost-effective methods of improving the productivity and land condition of areas dominated by invasive weeds (e.g. Grader grass, Giant Rats Tail, Lantana, Love grasses, Asbestos grass).
- Identification of further adapted legumes in the collections to improve seasonal gaps in feed quantity and quality.

Adoption gaps

- Value proposition/economic analysis of the benefits of improving, maintaining and restoring land condition.
- Management strategies to minimise Indian couch spread in native and sown pastures, and improvement of pastures dominated by Indian couch.



- *Strategies to minimize and restore 'pasture dieback' lands.*
- *Identification and testing, if necessary, of strategies for establishment, utilisation and maintenance of currently available introduced species (grasses and legumes) in oversown/augmented pastures.*
- *Clarify role of P and S fertilizers in the establishment and maintenance of sown pastures in northern Australia.*
- *Strategies for whole-of-property contingency plans/option paths to plan for extreme climatic events and fire, including managing regulations, infrastructure and sown pasture development, market (pricing) changes and herd structure.*
- *Region-specific guides to native and introduced pasture species.*
- *Integrated strategies for managing invasive grasses (e.g. grader grass, Giant Rats Tail, Love grasses, etc) and broadleaf (e.g. Pimelea) weeds, including appropriate grazing management that reduces the risk of degradation and weed invasion in the first place.*

Optimizing the tree-grass balance

R&D gaps

- *The magnitude of benefits and impacts of different levels of trees on the productivity of major land/pasture types.*
 - *Identify 'target' tree/grass/shrub percentages to produce optimum economic, environmental & production outputs on major land types under various sustainability/revenue pathways (e.g. Carbon credits, carbon neutrality, biodiversity, etc.).*
 - *Define 'healthy balance'/optimal proportions of tree-grass/shrub-pasture for sustainability that allows for seasonal variation in production systems on major land types and at the property scale.*
 - *Labour efficient and cost-effective biological control strategies, including tools for decisions on introduced woody weed species.*
 - *Tree locations for optimal production and environmental benefits at the property scale.*
 - *Controlling *Carissa ovata* (Currant bush) in woodlands with nonmechanical means*
- Understanding population ecology of problem woody species & competitive interactions with the grass layer to prevent further encroachment(s).*

Adoption gaps

- *Integrated grazing and fire plans on properties that commit to a "program" of management rather than one-off band aids.*
- *Economic analysis of benefits of managing the tree-grass/shrub balance and controlling native and exotic weeds.*
- *Role of grazing management and fire in minimizing native and exotic woody weed invasion/encroachment.*
- *Cost effective and practical management of native woody weeds and poisonous plants (e.g. Pimelea, Heartleaf, Georgina gidgee, gidgee, black wattle, mulga, mimosa, gutta-percha, sandalwood.*
- *Cost effective and practical management of exotic weeds and poisonous plants (e.g. Parkinsonia, Mesquite, Prickly acacia, Calotrope, rubber vine, lantana, Harrisia cactus).*

Building service provider capacity and capability

R&D gaps

- *Current RD&A capacity and trend(s) over time, industry needs and ways of matching future needs to future resources to meet expectations.*
- *Actual value of RD&A to the industry.*



	<ul style="list-style-type: none"> • <i>Current limitations on service delivery, and economically sustainable models for delivering and growing extension services.</i> • <i>Impact of the focus on Adoption on future R&D Capacity and the capabilities of researchers.</i> <p>Adoption gaps</p> <ul style="list-style-type: none"> • <i>Willingness of industry to pay for service.</i> • <i>Addressing the COVID-induced disruption of networking and professional development opportunities.</i> <p><i>Lack of long-term planning and recognition that it takes a couple of decades of training and experience to produce a mature and experienced scientist/advisor.</i></p> <ul style="list-style-type: none"> • <i>Identifiable and sustainable career path(s).</i>
	<p>Mitigating extreme events</p> <p>R&D gaps</p> <ul style="list-style-type: none"> • <i>Understanding the motivation of people to overstock and what can be done to reduce this behaviour to increase landscape and business resilience to market and seasonal shocks.</i> • <i>Models to forecast scenarios/predict outcomes of extreme events.</i> • <i>Economic impact of shade on animal performance. Lessons from the dairy industry.</i> <p>Adoption gaps</p> <ul style="list-style-type: none"> • <i>Breed suitability to region.</i> • <i>Practices and infrastructure to reduce the impact on livestock production, performance, fertility and survivability.</i> • <i>Tools to aid proactive management decisions in extreme events.</i>
<p>2. <i>Sugar cane (Sugar Research Australia)</i></p>	<p>Priorities should be reviewed along with the objectives, activities and measures defined in the SRA Strategic Plan 2021-2026.</p> <p>Mission 1 – Profitable and productive</p> <p>Program – Technology application for a step change in productivity and profitability.</p> <p>Root Problem</p> <p>Growers are diverse, and have different soils, climate and environmental conditions. They also have varying personal motivations and familiarity with technology. Research, products and services need to be tailored to meet their diverse needs.</p> <p>Mission 2 – Resilient and enduring</p> <p>Program – Climate resilience and mitigation</p> <p>Root problem</p> <p>The industry is focused on addressing immediate pressures and has not proactively sought to fully understand the impacts of climate change. As a result, there is inadequate planning and preparation for future needs and opportunities.</p> <p>Mission 3 – Diversified and adaptable</p>

Program – New products and value-chains

Root problem

Current economic activity is not sufficient to maintain the industry in the long-term. Diversification opportunities need individual assessment to understand fit for the district/mill, as well as grower implications.

Mission 4 – Wealth generating through land stewardship

Program – Sustainability – soil carbon, reef and biodiversity

Root problem

Growers have different motivations for increasing environmental stewardship. For those who are financially motivated, technology is needed to reliably create and measure environmental products and services.

Program – Soil health – balanced nutrient management

Program – Irrigation

Program – Integrated farming systems

Root problem

With pressure on inputs, growers are seeking improved resource use efficiency including irrigation systems, labour, energy costs, and time, while at the same time reducing the impact on natural and fragile ecosystems.

Mission 5 – Skilled for the future

Program – Understanding the customer

Program – Collaboration and innovation design

Root problem

Practices, products and services are not typically designed to meet the needs of a broad range of industry end-users. To achieve widespread adoption and impact, innovations need to match user needs and characteristics and be technically robust.

Program – Data driven agronomic decisions

Program – Digital solutions

Root problem

Low technology readiness, infrastructure limitations, and poor integration of digital solutions are impacting the adoption of digital technology that can enable improved efficiency, value, and innovation.

**3. Horticulture
(Growcom
and
Horticulture
Innovation
Australia)**

Relevant horticulture industry drought resilience priorities include:

[Growcom](#) identified priorities

Future Field 3: innovate to access

Action 1: Innovate to Access convention

Convene meeting of key stakeholders in the Innovate to Access field to discuss and explore priority products, markets, and technologies.

Action 2: Product exploration

Desktop research to identify existing shelfstable products and markets overseas, and associated technologies.

Action 3: Product validation

Validate the food industry and consumer demand for shelf-stable products through desktop research.

Action 4: Food accelerator

Automated Accelerator program for new shelfstable foods derived from fresh produce, connecting producers and processors with the right skills and investors.

Action 5: Expert panel

Appoint an expert panel to provide advice, mentorship and support to proponents putting forward concepts and plans for regional food manufacturing projects.

Future Field 4: working smarter together

Action 1: Labour saving opportunity analysis Research to map where greatest savings of unskilled labour exist in industry against mature and commercial labour-saving technologies.

Gaps in the map to form research, investment and adoption priorities.

Action 2: Duplication commitment

A network and community of growers willing to test, review and report on new technology through a web based portal. Global and local users provide feedback or experience ratings.

Portal also includes information on events showcasing technologies and hosting opportunities for growers who are adopting new technologies.

Action 3: Horticulture hackathon

Competitive programming and design event where participants form teams and work intensively over a few days to create a solution to a labour saving challenge or problem identified and sponsored by an industry or business.

Fundamental fields

Action 1: Leadership capacity

Building on the success of the Future Fields Leaders program, establish a sustainable model for developing leadership capacity along the fresh produce supply chain, to further the priorities of this strategic plan.

Action 2: Connectivity

Analysis of likely future connectivity needs and demands of the Queensland fresh produce sector and supply chain. Identify gaps in current and future networks based on this analysis.

Action 3: Horticulture heroes

Promote positive stories about the sector and supply chain that inspire the sector to continue to improve, and attract new entrants to the sector.

Action 4: Modelling sustainability

	<p>Build capability to implement sustainable production systems, including through models of leadership and collaboration.</p> <p><u>Horticulture Innovation Australia identified priorities</u></p> <p><u>Australian-grown Horticulture Sustainability Framework – Horticulture’s sustainability goals:</u></p> <p><u>Pillar 2 - People</u></p> <ul style="list-style-type: none"> • Vibrant, productive, profitable enterprises • World-leading research, technology and innovation improves practices and drives transformational change • Regional, peri-urban and urban communities value the contributions of horticulture • Recognition of horticulture in local government planning in key growing regions <p><u>Pillar 3 – Planet and resources</u></p> <ul style="list-style-type: none"> • Reliable, viable access to sustainable water resources • Responsible and efficient use of allocated water to optimise production per unit of water • Objective measures guide more efficient water use Increased adoption of water recycling and reuse • Soil health and productive capacity is maintained or improved • Australian horticulture understands and manages the risks of climate change and extreme weather variability and builds resilience to natural disasters
<p>4. National Farmers Federation</p>	<p>Relevant farming industry drought resilience priorities include:</p> <p><u>Improving water use efficiency to build drought resilience in irrigated crops</u></p> <ul style="list-style-type: none"> • Develop evidence-based environmental, community and production targets <p><u>Mitigating the removal of land from agricultural production</u></p> <ul style="list-style-type: none"> • Improved the health of our landscapes • Well-resourced science to inform planning decisions <p><u>Translating world-class research into tools and services</u></p> <ul style="list-style-type: none"> • Invest in the capacity of digital and human networks to share and promote new practices and tools • Easy online information access • Improved access to new science <p>Improving farm business governance, planning and risk mitigation leading to more rigorous business decision-making</p>
<p>5. Grain production (Grains Research & Development Corporation)</p>	<p>Relevant grain industry key investment targets include:</p> <p><u>Improve the accuracy of short-range and medium-range weather forecasting</u></p> <ul style="list-style-type: none"> • Improved understanding of weather forecasts • Improved capture of the value of weather forecasts • Improved accuracy of weather forecasts

[Understand grain grower decision-making and the drivers for adoption of new technology](#)

- Understanding of behaviours of growers and their influencers
- Understanding of the drivers of and barriers to adoption
- Acceleration and maximisation of the impact of adoption

[Support grain growers to acquire business management skills](#)



Australian Government
Department of Agriculture,
Fisheries and Forestry



Future
Drought
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This project received funding from the Australian Government's Future Drought Fund.