In the 2020-21 financial year, the Australian export fodder industry supplied more than $500 million of hay and straw to export markets as feed for animal industries, predominantly dairy industries. Over the past 30 years, the industry has established key markets, including Japan, China, Korea and Taiwan.

In early 2021, China did not renew a number of Australian export licences, which resulted in significant changes to the Australian export fodder market. Reflecting this uncertainty, global trade fragility was identified as an immediate and future threat during consultations with the export fodder industry as part of the development of this Strategic RD&E Plan. Increasing resource scarcity was also identified as a major potential challenge for the industry.

With these challenges in mind, and in consultation with industry stakeholders, RD&E priorities have been developed for the AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026. These priorities aim to ensure production of high-quality export-grade fodder, continued access to export markets, innovation across the supply chain and increased adoption of R&D outputs by industry.

Strategic RD&E Plans are a key part of implementing AgriFutures Australia’s RD&E strategies and are the base on which investments are made on behalf of our levied industries. These Plans identify productivity and sustainability RD&E priorities and the planned outcomes for each industry. Each has an appropriate balance of productivity and sustainability RD&E priorities.

The profitability, productivity and sustainability of rural industries is AgriFutures Australia’s core business, and the organisation works with its portfolio industries to invest in their priority RD&E needs.

John Smith
General Manager, Research
AgriFutures Australia

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Our vision
To grow the long-term prosperity of Australian rural industries

1. People and Leadership
   Goal: Support the people driving the future prosperity of Australian rural industries and regional communities by providing them with learning opportunities and experiences.
   Priorities: Attracting capable people into careers in agriculture. Building the capability of future rural leaders.

2. National Challenges and Opportunities
   Goal: To identify and nurture research and innovation opportunities that are synergistic across rural industries.

3. Growing Profitability
   Goal: Sustain the profitability and sustainability of our levied industries. Regional communities and the broader Australian economy depend on profitable farms.
   Priorities: Engaging industry participants in determining RD&E priorities. Investing in innovation that assists levied industries to be more profitable. Delivering outcomes to maximise industry uptake and adoption.

4. Emerging Industries
   Goal: To support new and emerging rural industries.
   Priorities: Supporting the early stage establishment of high potential rural industries.

Outcome
- Rural industries are equipped with skilled people and the leadership to grow and prosper.
- Challenges and opportunities that are common across rural industries are identified and addressed.
- Industry participants are confident that their levy investment is delivering value.
- High-potential emerging rural industries established.

Approach
1. Listening and influencing
2. Delivering results
3. Partnerships and collaborations
4. Performance culture
5. Efficient business practices

Values
Connected / Positive / Real / Future-thinking
Innovative / Quality / Approachable / Networked / Confident
Professional / Commercially savvy

Purpose
Through research and development, increase knowledge and understanding that fosters innovation, adaptive and valuable rural industries.

Executive summary
The AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 has been developed in consultation with industry to outline the Program priorities and objectives for research, development and extension (RD&E) for the next five years.

The Australian export fodder industry has achieved year-on-year growth over the past decade, with the total volume of hay exported in the 2020-2021 financial year valued at more than $500 million. Despite this success, increasing global trade fragility has been identified as an immediate and future threat for the industry, with China not renewing a number of Australian export licences in early 2021. This highlights the need for ongoing development of new and existing export markets, as well as the need for industry adaptability to changing importing country bio-sanitary requirements.

Similar to other agricultural industries, the Australian export fodder industry faces the challenges of increasing resource scarcity and rising input costs. Agtech and big data innovations are potential solutions to some of these challenges. Consultation with industry stakeholders has highlighted the need to ensure that investment through the AgriFutures Export Fodder Program supports innovation and adoption across the supply chain to ensure the ongoing productivity, profitability and sustainability of the industry.

Through both a review of the previous RD&E Plan outcomes and information obtained from consultation with industry stakeholders, the following priorities have been identified for the AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026:

Priority 1
Production of high-quality export-grade fodder

Priority 2
Continued access to export markets

Priority 3
Supporting innovation across the supply chain

Priority 4
Increased adoption of R&D outputs by industry

The AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 further outlines the objectives, strategies, impacts and consequences for each of the Program priorities, and considers the types of activities that will be funded and the associated timing and risks of Program investment.

Implementation of the AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 will be supported by AgriFutures Australia’s well-established frameworks for program management, communication and engagement, and monitoring, evaluation and reporting (MER).
**Plan on a page**

<table>
<thead>
<tr>
<th>Priority</th>
<th>Objective</th>
<th>Strategies</th>
<th>Impacts and consequences</th>
<th>Indicative budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Production of high-quality export-grade fodder</td>
<td>1.1 Continue to develop improvements (i.e., yield, nutrition profile, reduced input costs, etc) in breeding lines compatible with Australian growing regions. 1.2 Support the transition to commercialisation of the National Oat Breeding Program to ensure the industry has access to varieties that meet the needs of key export markets. 1.3 Continue to invest in the understanding and application of agronomy and best management practices that deliver increased yield and/or quality, and reduce input costs in fodder production.</td>
<td>• The National Oat Breeding Program is fully commercialised by 2025. • Agreed performance targets for the National Oat Breeding Program are met. • Industry participants have access to evidence to support best practice fodder production. • There is increased awareness of pest and disease management</td>
<td>50%</td>
</tr>
<tr>
<td>2</td>
<td>Continued access to export markets</td>
<td>2.1 Improve the information available to exporters and producers to understand and influence the minimum requirements of major export markets, such as chemical use and biosecurity. 2.2 Undertake research to support the development of existing and emerging markets for Australian export fodder. 2.3 Undertake research to investigate the benefits of Australian fodder in livestock feed rations. 2.4 Ensure the industry has access to fodder analysis that supports and substantiates the current trade and future development of all Australian export fodder markets. 2.5 Ensure exporters have access to the appropriate information and tools to educate markets on the benefits of Australian export fodder. 2.6 Undertake research to identify opportunities to work towards carbon neutrality in the export fodder industry.</td>
<td>• Zero rejections of Australian export fodder into any market through compliance with importing country bio-sanitary standards. • Increased access to new and existing markets. • Continued growth in the volume of Australian fodder exported.</td>
<td>20%</td>
</tr>
<tr>
<td>3</td>
<td>Supporting innovation across the supply chain</td>
<td>3.1 Investigate new technologies and big data solutions across the supply chain to achieve production efficiencies and reduce input costs. 3.2 Investigate and deliver new and improved tools, systems and strategies for the surveillance, prevention and management of biosecurity threats. 3.3 Facilitate cross-sectoral research partnerships to leverage RD&amp;E investment.</td>
<td>• New technologies and tools are available to support improvements across the supply chain. • Industry participants value the RD&amp;E investment made through the Program. • Evidence of effective collaborative partnerships and projects exists.</td>
<td>15%</td>
</tr>
<tr>
<td>4</td>
<td>Increased adoption of R&amp;D outputs by industry</td>
<td>4.1 Provide dedicated industry-wide extension resources to increase the adoption of best practice research and innovation. 4.2 Understand and make use of a variety of extension and communication platforms to effectively demonstrate the benefits of R&amp;D outputs to industry participants. 4.3 Improve adoption pathways by supporting research partners to innovate and become more commercially focused. 4.4 Support young scientists and emerging industry leaders through targeted activities such as structured courses, scholarships and study tours.</td>
<td>• Industry participants have access to information on producing export quality fodder that is supported by quality research. • Industry participants value the extension support provided by AgriFutures Export Fodder Program. • AgriFutures Export Fodder Program research outputs are adopted. • All recipients of AgriFutures Export Fodder Program funding demonstrate consideration of communication and extension of R&amp;D outputs to end users. • Number of industry participants supported through scholarships, courses and study tours.</td>
<td>15%</td>
</tr>
</tbody>
</table>
Alignment with AgriFutures Australia Strategic R&D Plan

AgriFutures Australia invests in research, innovation and learning initiatives that enhance the profitability and sustainability of the Australian agriculture sector.

The AgriFutures Australia Strategic R&D Plan 2017–20221 established four Arenas, which set out higher-level goals and priorities for investment:

- People and Leadership
- National Challenges and Opportunities
- Growing Profitability
- Emerging Industries

The majority of the priorities and strategies outlined in the AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 link directly to Arena 3, ‘Growing Profitability’, however there is the potential for some strategies related to priorities 3 and 4 to link with RD&E investment under Arenas 1 and 2.

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Industry profile

The Australian export fodder industry is well-established, having supplied fodder to countries across the world for some 30 years. From humble beginnings when a few containers of small bales were manually loaded for export by enterprising farmers, the industry has grown to exporting in the order of 1.2 million tonnes in recent years.

The Australian export fodder industry comprises a wide variety of crop and pasture species in the form of hay and straw for use as animal feed in export markets. Fodder is produced under both irrigated and dryland cropping systems and is often integrated into farming systems. About 38,000 properties are involved in commercial production of fodder crops annually, with an estimated 1500-2000 growers involved in production for export. The production of fodder crops occurs in most Australian states and territories, however the main export production states are Western Australia, South Australia and Victoria, averaging 40%, 31% and 21% of production volume over the past 10 years respectively (ABS, 2020).

The key established export markets for fodder are Japan, China, Korea and Taiwan, with an emerging market in the United Arab Emirates. Over the past five years (2015-2020) Japan and China have remained the top two importers of Australian fodder product (ABS, 2020), however in early 2021 China did not renew a number of Australian export licences. As a result, it is estimated that more than 50% of Australian fodder is now exported to Japan, 35% to Korea, 5% to Taiwan and only 4% to China (D. McGrath, Australian Exporters Company Executive Officer, pers. comm., 10 June 2021).

The Australian export fodder industry comprises a wide variety of crop and pasture species in the form of hay and straw for use as animal feed in export markets.
The value of Australian export fodder supplied to international markets increased from $271.5m in 2010 to $563.4m in 2020.

The top five markets for Australian export fodder are Japan, China, Korea Republic, Taiwan and Indonesia.

The largest producers of export fodder in Australia are Western Australia, Victoria and South Australia.
As a global industry, the export fodder industry has adapted to changes in export market availability and will continue to develop emerging export markets as a result. A key challenge for the industry is adaptability to market changes in import regulations for biosecurity and minimum residue levels. This includes being able to quickly respond to these changes to avoid compliance rejections on exports and to ensure continued access to markets.

Australian oaten hay is a unique offering on the global export fodder market and is viewed as a premium product, especially in the international dairy industry. Feed rations containing oaten hay have been shown to have higher nutrient digestibility and result in higher milk yields (Jiang et al., 2018). This means lactating dairy cows have lower sorting activity with higher production performance when fed high-quality forage in the form of Australian oaten hay. The continued growth of dairy industries in Australia’s key export markets will continue to drive demand internationally in the future.

The export fodder industry has continued to grow from strength to strength over the last decade, with the gross value of production (GVP) increasing year-on-year. The GVP for export fodder in the 2020-21 financial year was more than $506 million.

**Figure 3** GVP of Australian export fodder

**Situational analysis**

Factors influencing the industry’s current operating environment informed the development of a SWOT analysis, which was workshoped with the AgriFutures Export Fodder Advisory Panel.

**Strengths**

- Unique product offering
- Increased production year-on-year
- Premium pricing and product
- Strong industry partnerships
- Dedicated breeding program for oaten hay
- Flexibility for farming systems
- Growing a winter crop

**Weaknesses**

- No dedicated extension programs
- Need to know market throughout production cycle to meet import requirements
- Lack of technical information in overseas dairy industries
- Degree of competition between exporters
- Not all participants are signed up to quality assurance program
- Lack of technical understanding of critical parameters most directly linked to influencing opportunity value of Australian product

**Opportunities**

- The Middle East and other emerging markets
- Growing demand in key markets
- Premium product for dairy production
- Relative value compared with other products

**Threats**

- Geographically restricted key export markets
- Climate change
- Government policy and trade agreements in key markets
- Changing market specifications in destination markets
- Weather-damaged product
- Seasonal conditions affecting yield and supply continuity
- Disrupters to supply chain and markets
- Shipping costs
Export fodder research

Funding
The AgriFutures Export Fodder Program has supported fodder crops R&D since 1985 (previously under the Rural Industries Research and Development Corporations; RIRDC) and in partnership with the Australian Fodder Industry Association (AFIA) since 1996.

Since 2016, the AgriFutures Export Fodder Program has been supported by an R&D levy on all export fodder for ongoing research and development to the benefit of the export fodder industry. The levy is $0.50/tonne of fodder exported, with leviable products including: oaten hay, wheaten hay, barley hay, cereal straw, lucerne, vetch and Rhodes grass. The funds collected by the levy are used for industry RD&E, with a strong focus on exporter needs, however, the benefits extend to the domestic fodder industry, providing benefits to both users and producers of fodder products.

Leviable sector  Export only
Leviable products  oaten hay, wheaten hay, barley hay, cereal straw, lucerne, vetch and Rhodes grass
Levy rate  $0.50/tonne
Levy collection point  Issuance of the export permit, to be paid by the exporter
Levy start date  1 July 2016

AgriFutures Australia receives the R&D levy allocation to invest in line with the objectives of the Program’s Strategic RD&E Plan. AgriFutures Australia also receives matching funding from the Australian Government, which is allocated to the Program at 50c per dollar of eligible research expenditure. The total Program budget comprises the R&D levy allocation, Australian Government matching funding, royalty payments and third-party contributions.

Previous research plans
Prior to the establishment of the Export Fodder R&D Levy, the industry’s research was managed as part of the ‘New and emerging plant industries three-year RD&E plan: January 2015 to June 2018’. The program was supported by voluntary contributions from export fodder companies. The ‘New and emerging plant industries three-year RD&E plan’ identified the following objectives:

• Improved crop and pasture varieties
• Plant diseases, weed and pest control
• Harvesting and processing technologies
• Storage and handling methods
• Developing new markets

Export Fodder Five Year RD&E Plan 2016–2021
Following the introduction of the Export Fodder R&D Levy, the AgriFutures Export Fodder Program was managed under its first RD&E Plan, covering 2016–2021. In developing the Plan, AgriFutures Australia (then operating as RIRDC) and AFIA, in consultation with industry stakeholders, identified seven priority areas for investment over the five-year period:

• Oaten Hay Breeding Program
• Hay agronomy
• Chemical usage integrity
• Fodder analysis
• Animal nutrition research
• Biosecurity research
• Occupational health and safety

During the term of the Export Fodder Five Year RD&E Plan 2016–21, AgriFutures Australia invested $8.35 million (industry levies and Australian Government matching funding) in 17 projects. This included the delivery of a new hay variety ‘Koorabup’ through the Oaten Hay Breeding Program. Other notable achievements were the creation of Fodder Safe, an online chemical reporting system, and the establishment of the National Hay Agronomy project, for research to improve production and fodder quality through improved variety selection, nutrition, and disease management guidelines.

Impact assessment
During 2020, an impact assessment was undertaken to understand the cost-benefit of projects funded as part of the Export Fodder Five Year RD&E Plan 2016–21. The impact assessment aimed to understand the program successes, inform the development of a new Strategic RD&E Plan, and meet the evaluation requirements of the Australian Government and the Council of Rural Research and Development Corporations (CRRDC).

The assessment considered the economic, environmental and social impacts of investment into five projects over the term of the Plan. The assessment included three projects associated with the National Oat Breeding Program; Fodder Safe and Workplace Safety Standards. Investment in the five projects resulted in an aggregate benefit-cost ratio of 1.7 to 1 to the industry. That ratio increased to 2.6 to 1 when assessing the benefit to the Australian community. Overall, the investment of RD&E funding was shown to deliver real value for the industry and the communities it supports.

The recommendations arising from the impact assessment have been taken into account in the development of the AgriFutures Export Fodder Program Strategic RD&E Plan 2021–2026.

Partnerships
AgriFutures Australia fosters a strong culture of collaboration and relies on a number of key partnerships to deliver the AgriFutures Export Fodder Program, including:

• AgriFutures Export Fodder Advisory Panel
• Australian Exporters Company
• Australian Fodder Industry Association
• InterGrain
• Grains Research and Development Corporation (GRDC)

Key research providers for the Program are:

• South Australian Research and Development Institute (SARDI)
• Department of Primary Industries and Regional Development (DPIRD)

The term of the AgriFutures Export Fodder Program Strategic RD&E Plan 2021–2026 will take in the completion of the transition of the National Oat Breeding Program, a joint investment by the AgriFutures Export Fodder Program and the GRDC, to a commercial model under leading cereal breeding business, InterGrain. This transition builds on more than 20 years of research and leadership of the National Oat Breeding Program by SARDI.

Through the AgriFutures Export Fodder Program, AgriFutures Australia will also look to work collaboratively with other Rural RD&Cs such as Dairy Australia and Meat & Livestock Australia to maximise the benefit of investment in cross-sectoral research.

* AgriFutures Australia receives matching funding from the Australian Government, calculated under the Primary Industries Research and Development (PIRD) Act. Subject to some limitations, this Commonwealth matching funding is capped at the lesser of 50% of eligible expenditure or 0.5% of industry GDP. Industry GDP is calculated on the aggregate of all AgriFutures Australia levied industries.

<table>
<thead>
<tr>
<th>Leviable sector</th>
<th>Leviable products</th>
<th>Levy rate</th>
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<td>oaten hay, wheaten hay, barley hay, cereal straw, lucerne, vetch and Rhodes grass</td>
<td>$0.50/tonne</td>
<td>Issuance of the export permit, to be paid by the exporter</td>
<td>1 July 2016</td>
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</table>
Industry consultation

The AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 was developed following extensive consultation with exporters, producers and industry stakeholders to understand the key change drivers and potential responses to these by industry over the next five years. Industry stakeholders were engaged at various stages of Plan development, through participation in surveys, a scenario planning exercise and reviewing the draft Plan. Stakeholders included:

- AgriFutures Export Fodder Advisory Panel
- Exporters (levy payers)
- Australian Exporters Company (AEXCO)
- Australian Fodder Industry Association (AFIA)
- InterGrain
- Agronomy personnel
- Key growers and advisors within each region

Outcomes

The consultation process allowed for detailed consideration of the industry’s current operating environment, as well as identification of trends and drivers likely to affect the industry in the future (Table 1). This initial survey was open to industry participants and distributed via AgriFutures Australia, AEXCO, AFIA and other industry member channels to gain insights on key industry trends and drivers from a wide range of industry participants. A subgroup of 68 industry participants was then asked to rank the 18 trends identified from the initial survey to determine the trends with most uncertainty and likely to have the most impact on the industry. Increasing trade fragility and resource scarcity were rated as those with the most uncertainty and greatest potential impact. This information was used to conduct an in-depth scenario planning exercise with the AgriFutures Export Fodder Advisory Panel to contemplate and identify a variety of plausible futures.

Consideration of potential future scenarios (Figure 5) allowed industry stakeholders to workshop the implications and potential response options for investment through the AgriFutures Export Fodder Program. The robustness of the identified response options was tested against the respective future scenarios, should they eventuate. The outcomes of this work have informed the development of priorities, objectives and strategies for the AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026.

Table 1: Change drivers in the export fodder industry

<table>
<thead>
<tr>
<th>Driver</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Technological advancement</td>
<td>Advancement in precision farming technologies, automation and robotics, and breeding technologies are changing the agricultural landscape. The uptake of these technologies is likely to become the key basis of competition, increasing productivity, distribution efficiency and innovation. Such technologies will make on-farm decisions easier, with access to farm management tools and crop information. Breeding technologies upheld by the National Oat Breeding Program in combination with the National Hay Agronomy project can be used to drive adoption and increased resource efficiency and productivity.</td>
</tr>
<tr>
<td>International trade instability</td>
<td>The export fodder business relies on international trade. Political relationships often impact agricultural export markets through trade agreements and tariffs. Production for export varies with seasonal conditions and export demand. The Australian export fodder industry is exploring new and emerging markets to remain dynamic in the changing landscape and to continue to deliver premium product for export.</td>
</tr>
<tr>
<td>Informed markets</td>
<td>Information-empowered consumers have increased expectations for ethics, health and provenance. Consumer demand for traceability across the supply chain offers opportunities to differentiate products, improve transparency and safeguard brand provenance. By taking control of the traceability and transparency of farming processes, agribusinesses are increasing trust in their products and their industry.</td>
</tr>
<tr>
<td>Sustainability</td>
<td>The effects of climate change are becoming more apparent and are placing greater pressure on the agriculture industry, necessitating a push for sustainable solutions. Climate change adaptation and mitigation will become a significant focus for all agricultural industries and throughout their supply chains.</td>
</tr>
<tr>
<td>Resource use and productivity</td>
<td>Greater demand for product combined with competing uses for arable land are placing pressure on the industry to produce more with less.</td>
</tr>
<tr>
<td>Future workforce</td>
<td>The recruitment and retention of staff by the agriculture industry is becoming increasingly difficult. Succession planning, the industry image, lower margins and the shift to a transient casual workforce have all played a role. Consistent shortages of experienced labour increase costs and reduce efficiency.</td>
</tr>
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</table>

Figure 4: Timeline of key steps in the development of the Strategic RD&E Plan

<table>
<thead>
<tr>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario planning surveys</td>
<td>Scenario planning workshop</td>
<td>Draft Strategic RD&amp;E Plan and test outcomes</td>
<td>AgriFutures Export Fodder Advisory Panel endorses Strategic RD&amp;E Plan</td>
<td>AgriFutures Australia Board approves Strategic RD&amp;E Plan</td>
<td></td>
<td></td>
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</tbody>
</table>
Figure 5 A graphic representation of potential future scenarios for the export fodder industry as identified through industry surveys and described during the scenario planning workshop by industry representatives.
Program goal

To invest in RD&E that improves the productivity, profitability and sustainability of the Australian export fodder industry.
AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026

1. Priority – Production of high-quality export-grade fodder

Objective
To increase the productivity and profitability of high-quality export-grade fodder.

Justification
Investment in the National Oat Breeding Program has been a key component of the AgriFutures Export Fodder Program, providing the Australian industry an edge over other exporting nations. The transition of the National Oat Breeding Program to a commercial model run by InterGrain is considered a necessary evolution of the program, aimed at reducing the variety development time and delivering new technologies that enable low-cost genomic breeding. Investment in the breeding program will be complemented by AgriFutures Export Fodder Program investment in agronomy and crop management RD&E to ensure that fodder production is both profitable and compatible with farming systems, and to supply critical agronomic information on new varieties to producers.

Strategies
1.1 Continue to develop improvements (i.e., yield, nutritional profile, reduced input costs, disease resistance, etc.) in breeding lines compatible with Australian growing regions.
1.2 Support the transition to commercialisation of the National Oat Breeding Program to ensure the industry has access to fodder varieties that meet the needs of key export markets.
1.3 Continue to invest in the understanding and application of agronomy and best management practices that deliver increased yield and/or quality, and reduce input costs in fodder production.

Activities
New and existing investment under this priority may include the following research areas:

• Development of improved fodder varieties for both producers and consumers, for example the National Oat Breeding Program.
• Field testing to determine the best agronomic practices and growing conditions for new and existing fodder varieties, for example the National Hay Agronomy project.
• Understanding and addressing disease and pest pressures in fodder production, such as the “Stem nematode in oats” research project, to assist producers to achieve high-quality production.
• Ensuring there is an understanding of export market specifications to underpin breeding, agronomy and crop management RD&E.
• Research and development that is relevant to a variety of farming systems and helps producers adapt to a changing climate.

Impacts and consequences
• The National Oat Breeding Program is fully commercialised by 2025, providing improved varieties more frequently that are adopted by producers.
• Agreed performance targets for the National Oat Breeding Program are met, ensuring the delivery of improved varieties for adoption by producers.
• Industry participants have access to evidence to support best practice fodder production, leading to an increase in productivity and profitability.
• There is increased awareness of pest and disease management, leading to an increase in productivity and securing the industry’s reputation for high-quality product.

Timing
Investment in the understanding of market specifications and the production of fodder that helps growers and exporters meet these expectations will require ongoing and consistent investment over the five-year term of the Strategic RD&E Plan. Through a commitment to continual improvement, investment will help to ensure that the Australian export fodder industry continues to produce high-quality fodder despite changes in market demand. It is noted that the transition of the National Oat Breeding Program to a fully commercialised model will occur by 2025.

Risk management
There is a risk that the wrong Program parameters are targeted, and that fodder varieties and farming systems do not meet the needs of future growers and/or export markets. This risk will be mitigated through a process of annual monitoring of Program investment and RD&E outputs. The investment in the National Oat Breeding Program and National Hay Agronomy project is a significant component of the Program’s overall investment, and therefore there is a risk that this investment has not been well-spent if RD&E outcomes are not taken up by industry. It will be important to ensure that the National Oat Breeding Program is able to incorporate the results from other projects relating to market specifications, agronomy and pest and disease management to help mitigate this risk and ensure that producers adopt R&D outcomes and that the product is received by the market.

50% Indicative budget allocation

2021-2026
Priority – Continued access to export markets

Objective
To build the adaptive capacity of the export fodder industry to retain and grow Australian export markets.

Justification
Producers of export fodder operate on a global stage and are required to meet import country requirements for maximum residue levels and biosecurity. Increasing global trade fragility will also necessitate research into the development of new and existing export markets. To maintain, influence and grow access to export markets, the industry needs to have the evidence and tools to understand and meet these market requirements.

Research into the biosecurity requirements of export markets will provide protocols for checks to be made in an efficient, cost-effective and timely manner. Funding research and testing resources for growers will allow chemical applications to fodder crops to be made with confidence. Demonstrating the nutritional benefits of Australian export fodder to animal production is considered a key opportunity for market growth.

Strategies
2.1 Improve the information available to exporters and producers to understand and influence the minimum requirements, such as chemical use and biosecurity, of major export markets.
2.2 Undertake research to support the development of existing and emerging markets for Australian export fodder.
2.3 Undertake research to investigate the benefits of Australian cereal hay in livestock feed rations.
2.4 Ensure the industry has access to fodder analysis that supports and substantiates the current trade and future development of all Australian export fodder.
2.5 Ensure exporters have access to the appropriate information and tools to educate markets on the benefits of Australian export fodder.
2.6 Undertake research to identify opportunities to work towards carbon neutrality in the export fodder industry.

Activities
New and existing investment under this priority might include the following projects:

- Investment in online reporting and recording systems that support the integrity of the industry, for example Fodder Safe.
- Investment in systems and tools to support chemical residue monitoring for the fodder industry.
- Demonstration of the nutritional benefits of Australian export fodder to animal production systems in destination markets, such as the use of oaten hay to support sustainable development of dairy production.
- Production of education materials and tools to assist producers and exporters. These will aim to improve understanding of the critical aspects that underpin the value of Australian fodder in individual export markets to ensure the long-term sustainability of existing markets and the development of new markets.
- Investment in research to identify opportunities and strategies to assist the export fodder industry to work towards carbon neutrality.

Impacts and consequences
- Zero rejections of Australian export fodder into any market through compliance with importing countries’ bio-sanitary standards to maintain and improve the reputation of Australian export fodder.
- Increased access to new and existing markets to manage the risk of increasing trade fragility and ensure the long-term sustainability of the industry.
- Continued growth in the volume of Australian fodder exported, leading to a profitable and sustainable industry.

Timing
The recent loss of a number of export licences to the Chinese market has highlighted the need to accelerate investment in research to support the development of new and existing markets. For this reason, it is anticipated that Program investment in this priority will be weighted towards the first few years of the Strategic RD&E Plan. After an initial, larger investment, continual updates are important to ensure that the industry’s understanding of the market and market specifications is maintained.

Risk management
Increasing international trade fragility has been identified as a key risk to the Australian export fodder industry. Program investment targeted at continued access to export markets has been identified as a priority to mitigate this risk. Changing importing country standards and maintaining compliance with these standards may have implications for the other identified priorities within the Strategic RD&E Plan, which will need to be closely monitored.

Indicative budget allocation

20%
AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026

**Priority – Supporting innovation across the supply chain**

### Objective

To increase innovation for improved productivity and profitability across the Australian export fodder supply chain.

### Justification

Similar to other agricultural industries, the Australian export fodder industry faces the challenges of a changing climate, increasing resource scarcity and rising input costs across the supply chain. Consultation with industry stakeholders has highlighted the opportunity to investigate agtech solutions, such as blockchain, artificial intelligence, big data and the Internet of Things, to increase productivity across the supply chain. There is opportunity to leverage investment and unlock new information and knowledge in this area through collaborative partnerships with other RD&E and agricultural industry providers.

### Strategies

1. Investigate new technologies and big data solutions across the supply chain to achieve production efficiencies and reduce input costs.

2. Investigate and deliver new and improved tools, systems and strategies for the surveillance, prevention and management of biosecurity threats.

3. Facilitate cross-sectoral research partnerships to leverage RD&E investment.

### Activities

New and existing investment under this priority might include the following projects:

- Investment in new and emerging technologies to support increased productivity and profitability, e.g., new technologies for assessing oaten hay yield and quality, yield and quality assessment of dual-purpose wheat, and DNA testing for mycotoxin-producing fungi in fodder.

- Working with participants across the supply chain, e.g., equipment manufacturers, to increase identification and understanding of the technological needs and innovations that might exist to provide value for the industry.

- Pursuing collaborative partnerships with other Rural RDCs and agricultural industry participants to unlock relevant R&D, technologies and innovations, and leverage the Program’s investment to enhance return on investment.

### Impacts and consequences

- New technologies and tools are available to support improvements across the supply chain, leading to more efficient production and improved value.

- Industry participants value the RD&E investments made through the Program.

- Evidence of effective collaborative partnerships and projects exists, maximising the impact of the AgriFutures Export Fodder Program investment.

### Timing

Supporting innovation across the supply chain will require ongoing and consistent investment over the five-year term of the Strategic RD&E Plan. Opportunities that arise through collaboration with research partners may influence the timing of Program investment under this priority.

### Risk management

Investment under this priority may allow for a degree of ‘blue-sky’ investment where the resultant innovation may not deliver a direct and immediate benefit for the industry. Risk in this area will be mitigated through consideration of opportunities to collaborate and leverage Program investment with R&D partners, and by working with the different parts of the industry supply chain to better understand their needs.

**Indicative budget allocation**

15%

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FieldExplorer trial - a world-first machine to speed up and improve the way scientists and plant breeders take plant measurements in the field. Pictured at Turretfield, SA. Image supplied by Tim Sutton.
AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026

4 Priority – Increased adoption of R&D outputs by industry

Objective
To facilitate the increased adoption of R&D outputs and innovations to drive profit across the Australian export fodder industry.

Justification
The AgriFutures Export Fodder Program aims to deliver RD&E outcomes that increase the productivity, profitability and sustainability of the Australian export fodder industry. The provision of dedicated extension resources will aid extension of research outputs and innovations, increasing adoption on farm and throughout the supply chain. This priority will work in synergy with the other three priorities to maximise the impact of investment into R&D. The provision of extension resources was identified as a key opportunity for strengthened investment during consultation with industry stakeholders.

Strategies
4.1 Provide dedicated industry-wide extension resources to increase the adoption of best practice research and innovation.
4.2 Understand and make use of a variety of extension and communication platforms to effectively demonstrate the benefits of R&D outputs to industry participants.
4.3 Improve adoption pathways by supporting research partners to innovate and become more commercially focused.
4.4 Support young scientists and emerging industry leaders through targeted activities such as structured courses, scholarships and study tours.

Activities
New and existing investment under this priority might include the following projects:

- Research into the extension and communication needs of industry participants to ensure effective extension of Program outcomes.
- Production of communication materials and educational tools that meet the identified needs of industry.

Impacts and consequences

- Industry participants have access to information on producing export-quality fodder that is supported by quality research.
- Industry participants value the extension support provided by the AgriFutures Export Fodder Program.
- AgriFutures Export Fodder Program research outputs are adopted.
- All recipients of AgriFutures Export Fodder Program funding demonstrate consideration of communication and extension of R&D outputs to end users.
- Industry participants are supported through scholarships, courses and study tours.

Timing
Investment in communication, extension and adoption will require ongoing and consistent investment over the five-year term of the Strategic RD&E Plan. There is likely to be a need to undertake early investigations (i.e., years one or two of the Strategic RD&E Plan) to better understand the communication and extension needs of industry participants to guide investment under this priority.

Risk management
It is important that R&D outputs lead to world’s best practice and improve the productivity and profitability of the Australian export fodder industry. The diversity of the industry may result in resources being too thinly spread and Program investment not leading to clear measurable outcomes. Efforts to minimise this risk will include ensuring that all projects that receive funding through the AgriFutures Export Fodder Program demonstrate consideration of the needs of end users and how R&D outputs will be communicated and extended. There will also be a need for early investigations into the communication and extension needs of industry participants to ensure the greatest impact is achieved from Program resources.

Indicative budget allocation

15%
Communication, extension and adoption of RD&E outcomes

The AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 has been developed in consultation with industry stakeholders to identify the RD&E investment priorities and key outcomes sought by the industry over the period of the Plan. The Plan will be used to guide and balance the AgriFutures Export Fodder Program’s investment in RD&E activities to promote the productivity, profitability and sustainability of the Australian export fodder industry.

Stakeholder engagement is also achieved through direct engagement with researchers and consultants completing projects under the AgriFutures Export Fodder Program. Although the primary audience for this Program is exporters, secondary audiences, including growers, researchers and agronomists, will also be targeted through the channels listed and via social media, media relations and stakeholder engagement through AFIA and its members.

Details of contracted projects, Program updates and the outcomes of projects are published on the AgriFutures Australia website and across a variety of AgriFutures Australia communications channels. Stakeholder engagement is primarily through:

- AgriFutures Export Fodder Advisory Panel
- Industry updates sent via the AgriFutures Export Fodder Program subscription list (opt-in)
- AEXCO Board and its members
- Exporter committee

Program management

AgriFutures Export Fodder Program RD&E investments are guided by the AgriFutures Export Fodder Advisory Panel.

AgriFutures Australia’s Industry Advisory Panels are responsible for developing and ranking research priorities and proposals within the respective Strategic RD&E Plan’s framework, and for providing recommendations regarding the investment of RD&E contributions to the AgriFutures Australia Board. The Advisory Panels also play a key role in facilitating information sharing between industry stakeholders and AgriFutures Australia.

AgriFutures Australia has committed resources to the AgriFutures Export Fodder Program, including a Research Manager and a Research Coordinator. The Research Manager is a member of the AgriFutures Export Fodder Advisory Panel.

Program investments are made annually in activities linked to a combination of short, medium and long-term priorities. AgriFutures Australia will request research project proposals focused on specific programs and research priorities. The Advisory Panel and AgriFutures may also request research proposals outside of the annual investment call in response to industry needs.

Financial position and investment projections

The GVP for the export fodder industry has increased year-on-year over the past 10 years. The GVP for export fodder in the 2020-21 financial year was more than $506 million, a 4% increase from the 2019-20 financial year, despite trade restrictions being imposed by the major destination market, China.

Given the continual and consistent growth experienced by the industry, it is predicted that, if the current level of market access continues, the AgriFutures Export Fodder Program expenditure will increase over the life of the AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026. Total research expenditure for the Program in the 2020-21 financial year was more than $1.84 million.

Plan implementation and governance

Reserves policy

In support of its overarching investment aims, AgriFutures Australia holds financial reserves as a supporting tool within the AgriFutures Australia Investment Framework to manage risk derived from fluctuations in income. All AgriFutures Australia Programs have a reserves policy as agreed by the Program Advisory Panel to ensure the endurance of the Program when faced with adversity, such as a drop in production resulting in less levy funding being available to fund existing research commitments.

The AgriFutures Export Fodder Program reserves policy is managed to about 50% of the RD&E budget. The underlying objective of holding financial reserves is to maximise the Program’s investment in RD&E, consistent with its business objectives, while enabling sufficient funds to be available to cover contracted liabilities and to maintain RD&E capacity. The reserves policy is intended as a guideline only, and is subject to change due to extreme circumstances, which may result in changes to the policy.
Monitoring, evaluation and reporting (MER) plan

Alignment with the AgriFutures Australia MER framework

Monitoring, evaluation and reporting of progress against the AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 will be undertaken in line with AgriFutures Australia’s Evaluation Framework, developed to support AgriFutures Australia’s overarching Strategic RD&E Plan 2017-2022.

Outputs and performance impacts of AgriFutures Australia’s Program investments are systematically evaluated through the Evaluation Framework and summarised in the Annual Report.

Ongoing project evaluation

Projects funded through the AgriFutures Export Fodder Program are evaluated through their life, with milestones being assessed to ensure investment continues to be relevant. This evaluation information is also captured in AgriFutures Australia’s project management system.

Each project has a communication plan to ensure RD&E findings are disseminated effectively and efficiently. Findings are published on AgriFutures Australia’s website, unless there are cogent reasons why publication is not appropriate, such as when a commercialisation opportunity is pursued.

Mid-term evaluation of the Plan

A mid-term evaluation of the AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 will be completed by year three of the Plan. The purpose of the mid-term evaluation is to ensure that satisfactory progress is being made to meet the priorities and objectives of the Plan, and to determine whether these priorities and objectives are still appropriate. The outcomes of the mid-term evaluation will be formally communicated to stakeholders, and an action plan will be developed and implemented by AgriFutures Australia to progress any specific recommendations.

Final evaluation of the Plan

A final evaluation of the AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 will be undertaken in the last year of the Plan. The final evaluation will include a cost-benefit analysis of a selection of projects consistent with the guidelines for the assessment of performance impacts developed by the Council of Rural Research and Development Corporations, and will be published on AgriFutures Australia’s website. AgriFutures Australia also participates in the Council’s process for aggregation of performance impact evaluations undertaken across the Rural RDCs.

The final evaluation will inform the development of the next Strategic RD&E Plan.

Figure 6 AgriFutures Export Fodder Program Strategic RD&E Plan 2021-2026 life cycle

<table>
<thead>
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<th>Year</th>
<th>2021</th>
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<td>Strategic RD&amp;E Plan commences</td>
<td>Year 2 &amp; 3</td>
<td>Mid-term evaluation of Strategic RD&amp;E Plan</td>
<td>Year 3 &amp; 4</td>
<td>Strategic RD&amp;E Plan evaluation and industry consultation for new Strategic RD&amp;E Plan</td>
<td>Year 5</td>
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References

ABS 2020, International Trade in Goods and Services: Australia, cat. no. 5368.0, Australian Bureau of Statistics, Canberra


National Hay Agronomy project trial site at Lameroo, SA. Image supplied by Courtney Peirce.