



GRDC™

GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

**RESEARCH,
DEVELOPMENT
& EXTENSION**

PLAN
2023-28



Believe Big.

The size of your success is determined by the size of your belief.
Think little goals and expect little achievements.

David J. Schwartz¹

In the spirit of reconciliation GRDC acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respects to their Elders past, present and emerging and extend that respect to all Aboriginal and Torres Strait Islander peoples today.



Australian grain growers seek out and adopt new technology and have an appetite for change. Science and technological innovation are progressing at a rapid pace.

The world needs affordable, safe, sustainably produced food, feed and energy – and lots of it.

Whilst change is inevitable and challenges lie ahead, the Australian grains industry is well placed to build on our efficiency, reputation and location to capitalise on strong global demand opportunities.

This is our time to invest to deliver the next agricultural revolution.

SUMMARY

Over the next five years, the Grains Research & Development Corporation (GRDC) will invest more than a billion dollars in research development and extension (RD&E) to deliver significant gains for Australian grain growers.

The GRDC RD&E Plan 2023-28 is a plan for the grains industry's future. A plan that will drive impact well beyond its five-year timeframe. It builds on the significant investment made by GRDC in the past and has been informed by extensive consultation with growers and industry. It signals a new level of ambition and sets the challenge to move thinking beyond what is holding the industry back, to what is possible. From why things may not work, to what if they could? It will ensure RD&E investment continues to support growers to address the here and now, whilst seeking to create the step-change they are after.

The plan will see continued investment focused on increasing yield and yield stability and optimising costs, improving technical efficiency and helping manage risk to reach existing potential.

But importantly, in response to industry calls for bolder and more ambitious RD&E, this plan also seeks to deliver the next big breakthrough – the next no-till practice, auto-steer technology, semi-dwarf wheat or profitable break crop – by doubling investment in the discovery of new practices or technologies to reach new production frontiers. Getting the balance of investments right is no easy task, requiring GRDC to make numerous trade-offs and take calculated risks on behalf of growers – recognising that the success of investments may vary in the quest for big, long-term gains.

This is a plan to propel growers and industry forward through four strategic pillars:

HARNESS EXISTING POTENTIAL

Growers hit yield and profit targets, across every paddock and every season.

REACH NEW FRONTIERS

Productivity of crops exceeds what we thought possible.

GROW MARKETS AND CAPTURE VALUE

Growers have access to a diversity of markets and get more for the crop.

THRIVE FOR FUTURE GENERATIONS

Australia's grains industry remains a global leader in sustainability, for people, the planet and our long-term ability to farm.

The plan aspires to increase grower returns in a way that is repeatable and sustainable – to realise market growth opportunities whilst caring for people and the planet. GRDC is ready to partner with the best in the world to deliver world-class innovation. Will you join us in meeting this challenge?

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OUR OPPORTUNITIES & CHALLENGES

The Australian grains industry is facing both significant opportunities and major challenges, but with three decades of RD&E investment behind us GRDC is well positioned to play our part in what is next.

It is critical that GRDC know what grain growers need and expect from us – to understand the problems to be solved or opportunities that may be realised through RD&E investment. We have searched far and wide in developing this plan, to gather insight around the trends and drivers expected to influence the future of the grains industry.

What you told us has shaped this plan and where GRDC will focus investment over the next five years.

Significant gains continue to be delivered through ongoing investment in grains RD&E in Australia – much of this being co-ordinated by GRDC aligned to our purpose to create enduring profitability for Australian grain growers. This commitment continues to help growers tackle the challenges of today, while preparing for the future. When reflecting on the RD&E Plan 2018-23, it is easy to see the significant progress that has been made over that period. Some highlights of impact include:

- A comprehensive review of plant breeding programs has seen the deployment of advanced genomic techniques into mainstream crop breeding to deliver higher yielding, more broadly adapted varieties to growers faster.

- Fusion of novel analytics with genomic analysis has assisted to identify new genetic potential and traits to support continued productivity under a changing climate.
- Accelerated integration of data and analytics and machine learning has assisted to support prediction models, decision making and agronomic management.
- Transformation of soils through amelioration practices has become mainstream.
- Establishment of GrainInnovate, a venture capital fund investing in start-ups developing software, hardware or new business models to drive the profitability and sustainability of growers.
- Our responsiveness to local seasonal issues has improved through the introduction of the National Grower Network.
- The ambitious, but successful task of consolidating industry good functions through the creation of Grains Australia Limited.

However, we know that more work is critical to ensure the long-term growth, sustainability and profitability of our industry.

In response we want a plan that guides investment in an R&D pipeline aimed to create solutions that deliver impact now and into the future. A plan that seizes opportunities as they arise, while addressing the challenges we know are coming.

Representing approximately 1.3 per cent of the gross value of grains production* and an estimated 54 per cent of total grains RD&E investment in Australia², during the next five years GRDC plans to invest more than one billion dollars in impactful RD&E on behalf of Australian grain growers to future-proof our industry.

GRDC also aim to attract more than \$750 million in co-investment over the life of the plan, through private and public partnerships to make every dollar committed work even harder. With investment targeted to deliver genuine grower benefit, the scale of impact that can be delivered through this investment is immense.

But we cannot solve these problems alone. To move beyond the status quo, together we must be ambitious and courageous in trying new approaches, taking calculated risks to make progress or learn from our failures. Einstein famously once said ‘insanity is doing the same thing over and over and expecting different results’. We must collectively think and act differently if we are to harness our existing potential, reach new frontiers, grow markets, capture or create more value and do so in a way that allows future generations to thrive.

This plan sees GRDC introduce our new vision; world-class innovation, creating solutions for Australian grain growers for a better tomorrow.

GRDC is committed to doing business in a respectful, transparent manner that builds strong relationships, drives innovation and has a positive impact on the communities we live and work in. This is why we

have reflected our corporate values in this plan and have committed to development of a Reconciliation Action Plan that will help GRDC to support an inclusive Australian grains sector.

A successful plan is one that will deliver on Australian grain growers’ priorities and requires input and ownership from across the grains industry.

Investing aligned to where the value lies and how we approach and solve problems differently together will make the difference and ensure our success.

This plan signals determined emphasis on positioning us for the future and will see an additional \$250M invested in growth opportunities and new areas. It provides a roadmap for how we will balance the need for responsive investments to address the priorities of today, and strategic investment to ensure growers stay ahead of the game. We look forward to working in partnership with you to meet our shared level of ambition, vision and expectation for GRDC, growers and industry.



Nigel Hart, Managing Director

John Woods, Chairman



* Forecast GRDC 2023-28 RD&E investment, based on 7 year rolling average GVP (2015/16-2021/22).



RD&E PLAN
2023-28
OVERVIEW

PURPOSE

To invest in RD&E to create enduring profitability for Australian grain growers.

VISION

World-class innovation, creating solutions for Australian grain growers for a better tomorrow.

VALUES

We are committed and passionate about the Australian grains industry.

We value creativity and innovation.

We build strong relationships and partnerships based on mutual trust and respect.

We act ethically and with integrity.

We are transparent and accountable to our stakeholders.



PILLARS



FOCUS AREAS

HARNESS EXISTING POTENTIAL



Growers hit yield & profit targets, across every paddock, every season.

- ▶ Right crop & cultivar.
- ▶ Biosecurity, weed, pest & disease control.
- ▶ Optimise crop nutrition & improve soils.
- ▶ Systems integration for reliable profit.

REACH NEW FRONTIERS



Productivity of crops exceeds what we thought possible.

- ▶ Step-changes in water & soil productivity.
- ▶ Unlock plant potential.
- ▶ Transform efficiency of input use.

GROW MARKETS & CAPTURE VALUE



Growers have access to a diversity of markets & get more for the crop.

- ▶ Enduring access to a diversity of markets.
- ▶ Add value to the crop to increase margins.
- ▶ Lower post-farm gate costs.

THRIVE FOR FUTURE GENERATIONS



Australia's grains industry remains a global leader in sustainability, for people, the planet & our long-term ability to farm.

- ▶ Sustainable, responsible production systems.
- ▶ Support communities & social licence.

FOUNDATIONAL ENABLERS

Knowledge transfer & adoption

Capacity & ability

Data & insights

Innovative partnerships

ABOUT US

GRDC exists to support the enduring profitability of Australian grain growers, investing in RD&E to respond and adapt to a world that continues to change.

GRDC aspires to be recognised globally as leaders in innovation, driving the success of the Australian grains industry – investing to create solutions for growers and industry to adopt to support the sustainable production of safe and healthy food, animal feed and energy.

GRDC has a diverse portfolio of investments and while not all growers will directly benefit from every investment that we make, every Australian grower will continue to derive benefit from GRDC investment.

GRDC is primarily funded through the partnership between Australian grain growers and the Australian government.

To maximise impact from every dollar invested on behalf of growers and the Australian people, GRDC will partner with the brightest and most creative minds to drive the delivery of world-class innovation.

But innovation is not just about intent and aspiration. It is an attitude and culture that is embodied by GRDC's people and values – driving the organisation's approach to business, and inspiring the collective action needed to move the industry forward.

>50% GRDC staff based regionally

1500+ Projects 2018-23

>\$1B forecast RD&E investment 2023-28

GROWER LEVIES ARE COLLECTED AT THE FIRST POINT OF SALE, BASED ON A PERCENTAGE OF THE NET FARM GATE VALUE OF 25 CROPS:

- **Wheat**
- **Coarse grains** – barley, oats, sorghum, maize, triticale, millets/panicums, cereal rye and canary seed
- **Pulses** – lupins, field peas, chickpeas, faba beans, vetch, peanuts, mungbeans, navy beans, pigeon peas, soybeans, cowpeas and lentils
- **Oilseeds** – canola, sunflower, safflower and linseed.

The Australian Government matches grower levy contributions up to a limit of 0.5 per cent of the three-year rolling average of the gross value of production.

Under the *Primary Industries Research and Development (PIRD) Act 1989*, GRDC is accountable to grain growers and the Australian Federal Government through the Minister for Agriculture, Fisheries and Forestry and the industry's representative organisations, Grain Growers Limited and Grain Producers Australia.

Three regional panels, comprised of growers, advisers and researchers provide advice to GRDC to ensure investments are aligned to grower need to deliver maximum impact.

BUILDING ON STRONG FOUNDATIONS

This plan builds on 30 years of investment in RD&E by GRDC on behalf of Australian grain growers.

The objectives and key investment targets in GRDC's previous RD&E plan remain relevant: improving yield, maintaining or improving price, optimising costs, and managing risk – the 'profit equation'. While GRDC's commitment to purpose remains and the profit equation continues to be a core focus, the 2023-28 plan aims to simplify the complexity, addressing the fact that yield, price, cost and risk are not considered in isolation.

The GRDC RD&E Plan 2023-28 signals even greater ambition and focus on what research could achieve, where growers want to be, and the outcomes the grains industry seeks.

While the world is rapidly changing, and technology gathering pace, many of the constraints and opportunities growers face – and broad areas GRDC needs to invest in – are enduring.

It is how much GRDC invests in each area and our collective ability to work together, think and solve problems differently that will help us reach our ambition.

ENDURING PROFITABILITY: THE PROFIT EQUATION

The key drivers of seasonal grain grower profitability are Yield, Price and Costs (on farm and post farm gate). These drivers can be expressed as follows:

$$\text{Profit} = (\text{Yield} \times \text{Price}) - \text{Costs}$$

Risk, sustainability and enduring profit:

Business resilience and sustainability are important to profit delivery across seasons. Management of production, market and institutional risk are key to ensuring enduring profitability.

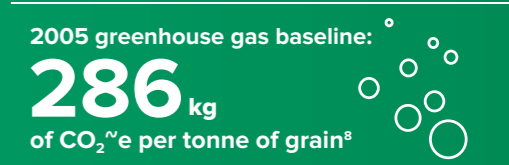
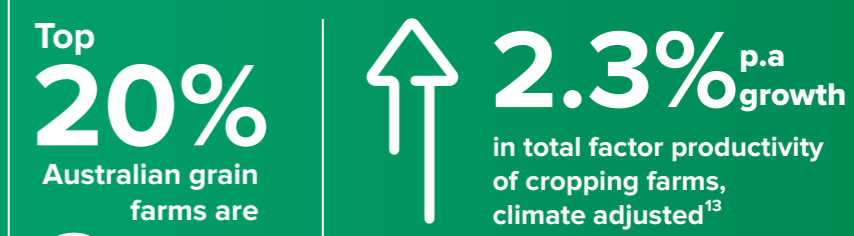




GRAINS INDUSTRY

SNAPSHOT

2021/22 Harvest



CURRENT STATE OF THE INDUSTRY

It is an exciting time for the Australian grains industry. The long-term demand outlook for grain is strong, with much of this coming from population growth and rising wealth here in Australia and from markets on our doorstep – with South-East Asia and South Asia presenting key export growth opportunities.

Globally recognised for its efficiency, with strong safety and quality credentials, and close proximity to expanding markets, the Australian grains industry is well placed to realise market growth opportunities over the coming decades.

Grain growers are the foundation of the industry, both its historic and future success. They are innovative, efficient and readily embrace new practices, tools and technologies made possible through RD&E investment by GRDC and others. Farming practices continue to evolve and Australian growers have demonstrated a proven ability to adapt.

Despite farming in one of the world's driest, most variable climates, on some of the most ancient soils on the planet, the water-use efficiency and yield of Australia's major crops continues to improve. Transpiration efficiency of plants has been improved and proportion of rainfall transpired increased¹⁴, meaning growers make better use of the rainfall they receive.

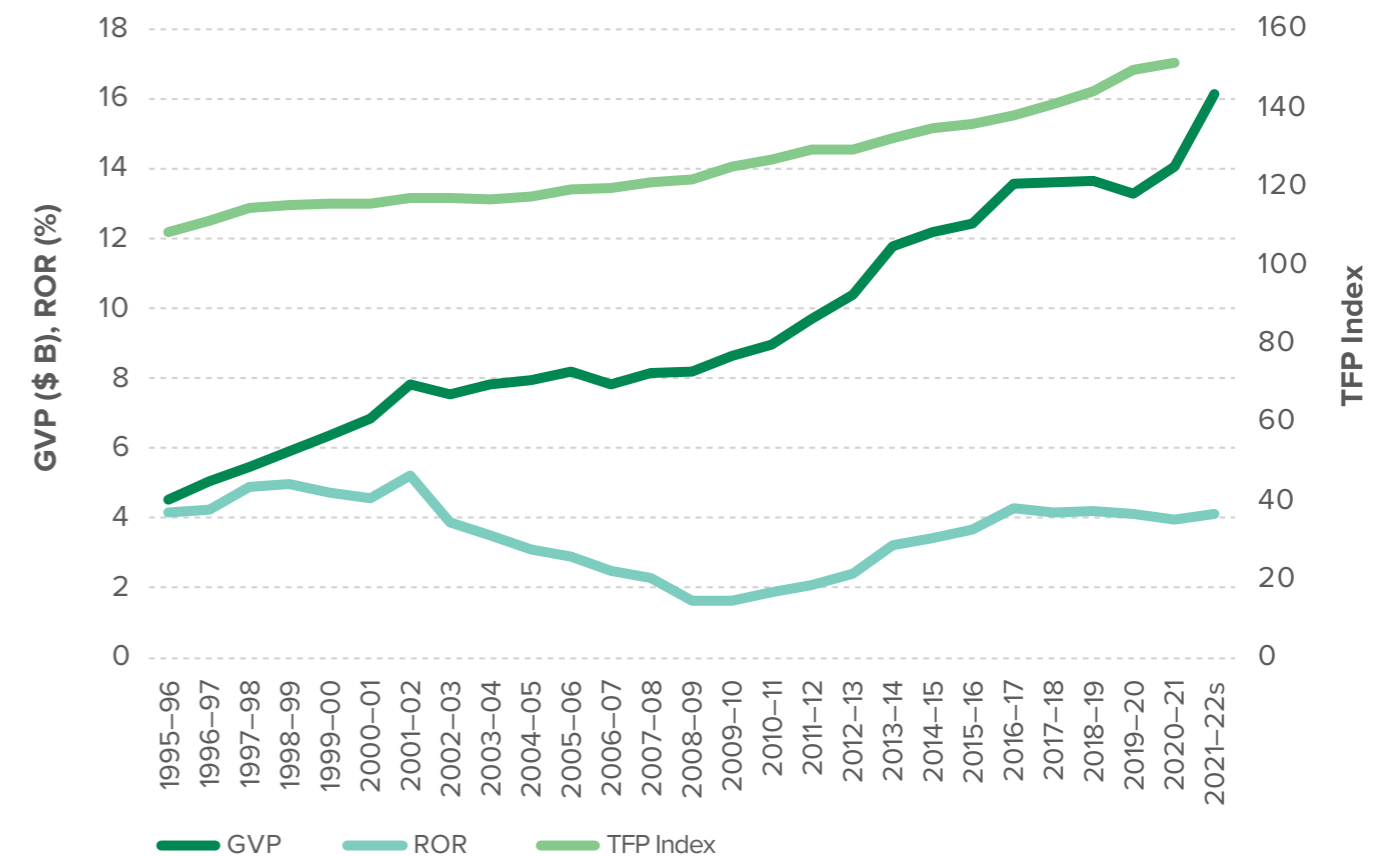
While subject to fluctuating world grain markets and variable seasons, both the gross value of production and climate adjusted total factor productivity of grain farms continue to trend upwards.

'Farmers are often the best placed to develop the innovations. Early innovations have stood the test of time.'

Industry feedback from consultation.

Australian grains industry long-term performance

Data presented as 7-year rolling average gross value of production (GVP)⁵, total factor productivity (TFP)¹⁵ and rate of return (ROR)¹⁵ for cropping farms.



s – ABARES estimate. Notes - latest TFP data available to 2020-21 and is climate adjusted, ROR excludes capital appreciation.

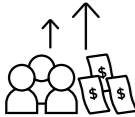
Despite the gains delivered through historic RD&E, the grains industry continues to face challenges, perhaps the greatest being risks posed by weather, markets and ongoing access to talent. The seven-year rolling average rate of return for all grain farms, excluding capital appreciation, sits at around 4 per cent, continually challenged by increasing costs of production. Climate change presents a strong headwind to higher, more consistent crop yields. Natural disasters and extreme weather events will continue to test Australian agriculture and communities. Environmental, social and governance (ESG) investment criteria and decarbonisation of the global economy is leading to changes in energy markets, effecting access to capital and markets and influencing farm practices. Variable seasonal conditions and tight profit margins require effective cost management and business models that

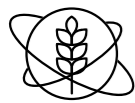
enable profit opportunities to be realised in the good years, while minimising financial loss in less favourable seasons. These factors, along with changing diets, consumer preferences and community expectations will increasingly impact how growers farm in the future.


But with challenge comes opportunity. New science and technologies can enable the discovery and deployment of new solutions for Australian grain growers. Biotech, fintech and agtech are advancing rapidly and have capability to deliver the next agricultural revolution. The opportunities are endless but to prioritise RD&E investment it is critical GRDC understands the challenges and opportunities facing growers today and anticipate those of the future, through consideration of the trends and drivers expected to shape the grains industry.


TRENDS & DRIVERS


WE MUST ADDRESS


 **More mouths, wealth & health** **Opportunity** Long-term grain demand outlook is strong over coming decades – driven by a growing global population and a rise in wealth. Dietary health-related issues will drive opportunity for healthy, nutritious grains. With a clean green reputation and proximity to Asian markets, we are well placed to capitalise on these opportunities.


 **The next agricultural revolution** **Opportunity** From gene editing to blockchain, new biotech, agtech and fintech solutions can transform the grains industry. With a proven hunger for technology, grain growers are poised to gain from data and new technologies if adopted. Bringing these together can accelerate genetic gain, drive efficiency and precision, improve traceability, support decision-making and management of risk.


 **Larger farms** **Opportunity & Threat** Increased scale of family farms and expansion of corporate investment provide opportunities to leverage economies of scale. But – coupled with increased land values – farm aggregation has working capital implications and threatens the ongoing sustainability of regional communities.


 **Australia's growing appetite for grain** **Opportunity & Threat** With the Australian population tipped to hit 30 million by 2040, domestic grain demand will proportionately increase, especially on the east coast for livestock feed. Seasonal variability and drought will see fluctuating domestic production and present supply chain efficiency challenges.


 **Sustainable & ethical production** **Opportunity & Threat** Increasing consumer demand for foods that are safe, sustainable and ethically produced provides opportunities for growers to leverage our clean green reputation. On the other hand, industries who cannot substantiate their green credentials may suffer reduced access to markets or capital.

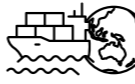
 **Energy, feed or food?** **Threat & Opportunity** The shift to renewable technologies will impact global grains markets, with maize, soybean and canola currently destined for biofuels potentially diverted to alternative markets. Impacts on the global crop mix may see new competition emerge around Australia's key crops. The growth in demand for plant proteins presents market opportunities for Australian pulses.


 **Action on climate** **Threat & Opportunity** Consumers and governments are demanding all sectors do their bit to reduce global warming. Failure to do so represents a threat to ongoing market access and the sustainability of grain farms. Industry has an opportunity to ramp up efforts to demonstrate its carbon credentials and further reduce greenhouse gas emissions intensity on-farm and across the supply-chain.

 **Yield gains are getting harder to find** **Threat** With much of the low hanging fruit already picked for major crops such as wheat, further yield gains through RD&E are becoming increasingly harder to find. While Australian grain growers are technically advanced and crop water use efficiency continues to improve, climate change poses a strong headwind to crop yield potential.

 **More cost, same profit** **Threat** Increasing input costs continue to squeeze growers' profit margins. With input prices largely driven by international supply/ demand and exchange rates, the pressure will be on growers to make informed purchasing and cost management decisions.

 **Seasonal variability & production risk** **Threat & Opportunity** The impacts of a changing climate are expected to increase seasonal variability and exposure to risk. Increases in temperature and changes in rainfall patterns will present both challenges and opportunities depending upon when and where these changes occur. Biosecurity incursions and more extreme weather events will present ongoing challenges to grains production.

 **Price & market volatility** **Threat** Geopolitics and international trade policy, including tariff and non-tariff measures, biosecurity breaches and supply chain disruption can impact import of crop inputs, market access and export of Australian grain.

 **Competition for the talent to innovate** **Threat** People are needed to discover and drive adoption of new innovations and competition for the best talent remains strong. People want job security, change careers more regularly and what they expect from employers is changing. It is getting more expensive and difficult to attract and retain people to small, more remote regional communities.

SHAPING THE PLAN

GRDC prioritises engagement and consultation across industry through our Regional Panels and National Grower Network, at events and forums, and out in the paddock.

This plan is no exception – the result of both a dedicated consultation process and ongoing conversations between GRDC’s passionate team and growers, advisers, researchers and other grains industry stakeholders on the ground across Australia.

To capture the breadth and diversity of views, the consultation process to develop the RD&E Plan 2023-28 was the most extensive ever. A deliberative engagement strategy was implemented aligned to the Australian Government Department of Agriculture, Water and the Environment Best Practice Guide to Stakeholder Consultation and in accordance with the PIRD Act. Key insight and feedback was collected and considered over 10 months, including over 120 hours of grower

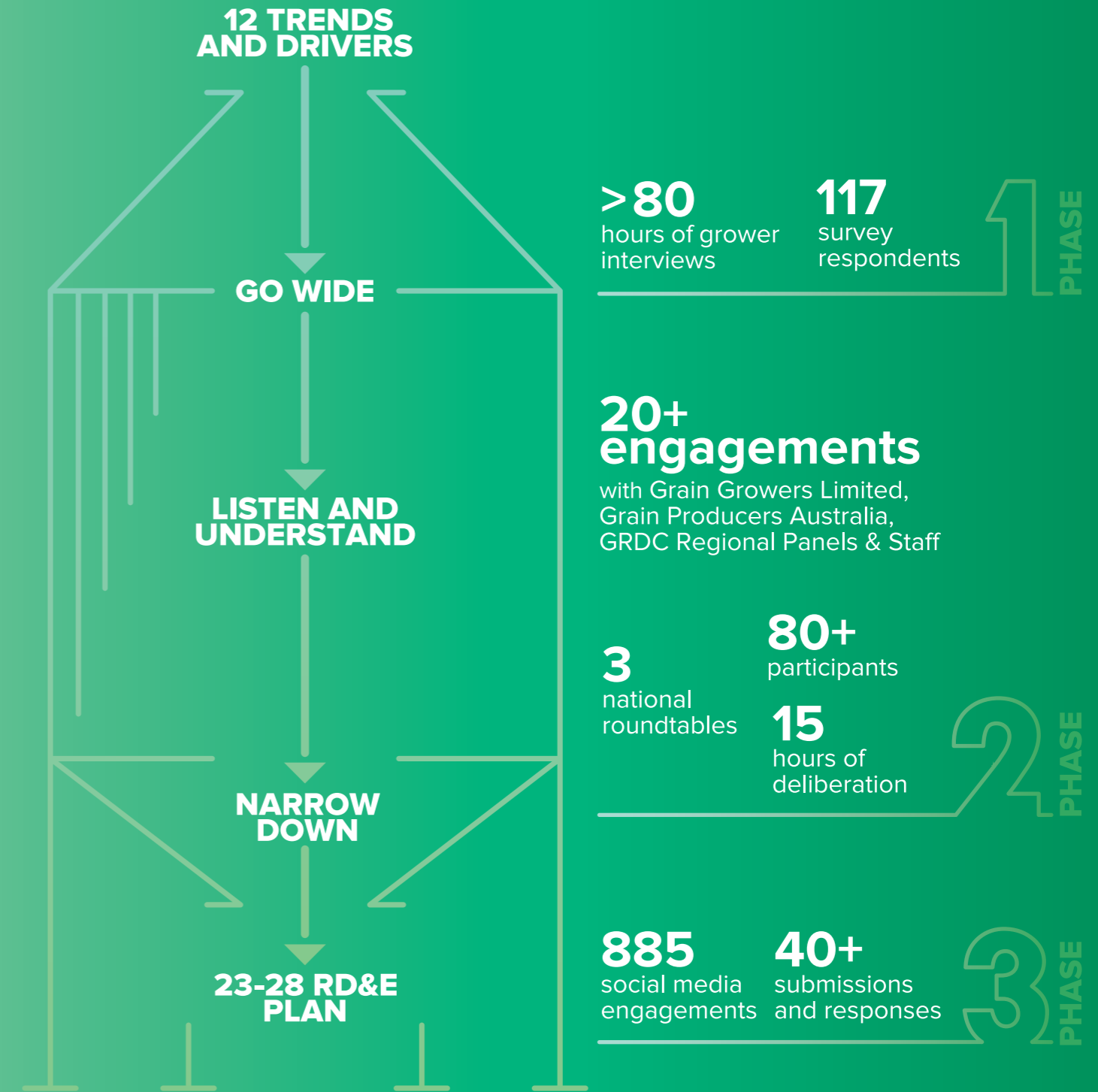
interviews, roundtable discussions, workshops, online surveys, social media campaigns and email feedback – enabling everyone the chance to be heard.

Starting with the current state of the industry, further in-depth analysis was undertaken to identify 12 trends and drivers expected to shape the industry’s future. Through conversation, feedback and discussion across industry, the consultation process informed what the plan should aspire to achieve, established strategic pillars and identified areas of research focus.

The result is a plan which is 100 per cent driven to address the opportunities and challenges facing Australian grain growers today and tomorrow.

‘It is evident in the plan that GRDC has taken on broad stakeholder input to get to this point... This speaks to GRDC’s achievement here in an inclusive and considered process.’

CSIRO



SHAPING THE PLAN

GRDC HEARD

Yield is king and GRDC's core business. We need to keep working on nutrition, weed, pest and disease controls. Farming systems are complex, and decisions not made in isolation. Help us better understand and manage risk from costs, seasons, biosecurity, markets.

WHAT GRDC WILL DO Harness existing potential

HOW IT WILL HELP

Crops are adapted to our soils and environment to deliver high, stable yields across paddocks and seasons.

Increased confidence and ability to make informed production decisions through use of data, improved forecasting and trusted information.

Access to new knowledge and tools to protect crops from weeds, pests, and diseases.

Our industry understands and is proactively prepared for biosecurity threats.

Growers are equipped to optimise crop nutrition, manage and improve soils.

Different innovations are integrated into farming systems matched to grower need to accelerate adoption.

Better understand trade offs and risks to the farm business to appropriately manage.

GRDC HEARD

The next agricultural revolution is within our grasp. Business as usual won't cut it as we move into a future of tighter margins and uncertain climate.

WHAT GRDC WILL DO Reach new frontiers Data & insights as enablers

HOW IT WILL HELP

Reduce water losses to evaporation, run-off and deep drainage to transform yield and utilise a finite resource.

Plants utilise resources more efficiently than ever before to improve margins and protect the environment.

Mitigate the devastating effects of drought, heat and frost. Increase grower returns.

Mitigate risk through allocation of fixed and variable costs to production and profit potential.

Accelerating the deployment of digital agriculture, automation and robotics to make better decisions, drive precision and efficiency.

Data is captured and analysed to deliver insights that ensure RD&E is targeted where the value lies, and moves forward with efficiency and speed.

GRDC HEARD

Support market access and help us better understand market, price and post-farm costs to grow and capture value. Post-farmgate costs are an area where potential value could be clawed back.

WHAT GRDC WILL DO Grow markets & capture value

HOW IT WILL HELP

Strategic understanding of emerging markets & opportunities will inform and support market access and future growth.

Knowing what end users want enables us to breed, classify, grow and supply grain that markets prefer.

Market signals enable growers to understand what crops to grow, what quality to target, and how to manage and market them in order to capitalise on opportunities.

New opportunities to add-value or differentiate Australian grain and grain products can provide competitive advantage or increase grower margins.

Improved understanding of post-farm gate issues will help inform research and support industry to address supply-chain challenges.

GRDC HEARD

Act now on climate and the sustainability challenge. We need to secure our ability to farm into the future – from both a profit and social acceptance perspective.

WHAT GRDC WILL DO Thrive for future generations

HOW IT WILL HELP

Increased collaboration and understanding of sustainability and environmental performance across the entire Australian grain supply chain to profitably respond to challenges and opportunities.

Build grower confidence and ability to baseline the greenhouse gas emissions intensity of their enterprise and understand the practical things that can be done to further reduce.

Support growers' transition to alternative energy on-farm.

Securing growers' ability to continue to farm into the future, through maintaining community trust and science-based policy frameworks.

Understanding the risks and impacts of automation and other technologies to regional communities.

Supporting sustainable and resilient grain growing communities through collaborative approaches to workforce, farm safety and skills development.

GRDC HEARD

The extension and commercialisation landscape has changed – and so must the way we all approach it. So many solutions already exist but they get lost in the noise of everything else we have to deal with as growers.

WHAT GRDC WILL DO Knowledge transfer & adoption as enablers

HOW IT WILL HELP

Tailor and deliver key messages to the needs of the next user and key influencers of adoption.

Make the value proposition of new solutions clear, considering barriers and drivers to adoption or use.

Ensure relevance and accelerate the scale and speed of RD&E impact through working together and embracing new approaches.

GRDC HEARD

People & partnerships are critical to move us forward. There is often a limited, and in many cases aging, pool of industry talent.

WHAT GRDC WILL DO Capacity & ability as enablers Innovative partnerships as enablers

HOW IT WILL HELP

Attract and nurture the talent required to conduct and deliver world-class grains RD&E.

Support leadership and pathways to innovate, translate and adopt.

Facilitate access to critical infrastructure and technologies required to deliver grains R&D.

Develop novel and readily adoptable solutions to Australian growers first through collaborating and partnering in different ways.

Facilitate opportunities for people to come together to encourage new thinking and increase the efficiency and effectiveness of RD&E.



OUR VISION

WORLD-CLASS INNOVATION, CREATING SOLUTIONS FOR AUSTRALIAN GRAIN GROWERS FOR A BETTER TOMORROW.

Building on three decades of investment in grains RD&E, GRDC will work with partners in Australia and across the globe to turn research into solutions that are readily adopted by growers and industry to deliver enduring profitability.

GRDC's plan aspires to a future where:

- **Growers hit yield and profit targets, across every paddock and every season.**
- **Productivity of crops exceeds what we thought possible.**
- **Growers have access to a diversity of markets and get more value for the crop.**
- **Australia's grains industry remains a global leader in sustainability, for people, the planet and our long-term ability to farm.**

By working together with research partners and industry to address the trends and drivers shaping the grains industry's future, GRDC aspire to make this vision a reality.



OUR STRATEGY

GRDC's RD&E Plan 2023-28 outlines areas of investment focus, building on the momentum of our previous RD&E plan.

Like farming, investment in RD&E is a long game and while GRDC has many short-term projects that will result in immediate benefit to growers, other investments will not deliver impact for another ten to fifteen years beyond the period of this plan.

This plan clearly articulates GRDC's five-year strategy to continue to invest to realise benefit from our current RD&E pipeline whilst increasing investment in innovative, new, boundary pushing RD&E aimed to deliver growth and position growers and industry for the future.

GRDC will do this through investment in four strategic pillars:

- Harness existing potential
- Reach new frontiers
- Grow markets & capture value
- Thrive for future generations

GRDC will invest in RD&E to realise and protect what is possible today through core investment to remove inefficiencies, deliver

incremental gain, manage risk and maintain grower profitability – to harness existing potential.

GRDC will continue to invest in RD&E aimed to deliver important, incremental improvements – the 'one-percenters' - that enable growers to better utilise the knowledge, information, technology and practices that we have today.

GRDC will continue to proactively invest to mitigate current and emerging threats in areas such as, biosecurity preparedness, weed, pest and disease control, resistance management, and sustainable use of resources.

GRDC is more determined than ever to position growers and the grain's industry for future growth. GRDC will do this by doubling our current level of investment into the discovery of breakthrough practices or technologies to deliver step-changes in yield and input use efficiency to enable growers to reach new frontiers. GRDC will increase investment to grow markets and capture value by two and a half times, ensuring critical RD&E that supports ongoing access to markets, adds value to the crop to increase margins, and helps to reduce post-farm gate costs.

'[Growers] welcome the retention of GRDC's purpose to invest in RD&E to create enduring profitability for Australian grain growers, with that ambition captured through a new vision and four strategic pillars... feedback was positive in support of the plan's four pillars and focus on delivering genuine outcomes for growers.' Grain Producers Australia

Recognising the ongoing contribution and focus on sustainability across the entire RD&E portfolio, GRDC's commitment to sustainability will continue with a greater focus on environmental and social aspects – investing an additional 46 million dollars across the life of the plan in these areas to help future generations thrive.

But a plan is about more than just intent, it requires us to rethink how we will effectively implement. Collectively, the grains industry must do things differently to accelerate the discovery and application of technological gains faster than our global competitors to deliver on the ambition this plan sets.

GRDC will transition its current investment portfolio, increasing investment in identified growth opportunities and new areas of focus aligned to portfolio balance principles and the ambition set out in this plan. Investment under the four strategic pillars will be aligned to 12 new focus areas (programs of work) and a portfolio of investments actively monitored throughout the life of the plan by portfolio teams within GRDC.

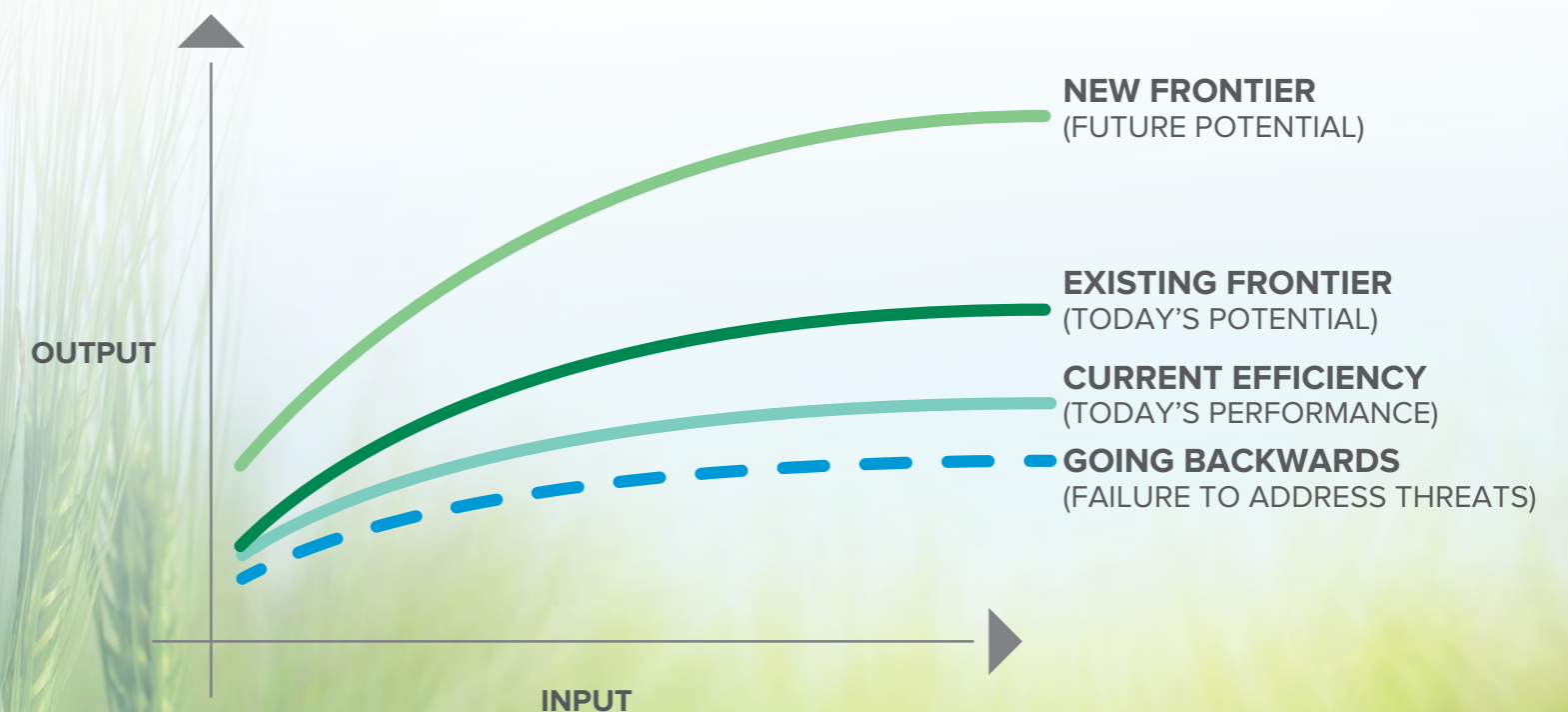
Investment opportunities will be continually captured and prioritised to deliver on outcomes identified using Program Logic

and reported through the GRDC Annual Operating Plan and Annual Report. GRDC will continue to actively manage projects, being prepared to fail fast, stop things when they are not working, or accelerate investment when opportunities present – moving investment dollars to where they deliver more value.

Realising these opportunities will require a problem focus – as opposed to a technology push – new partnerships and collaboration across organisations, disciplines and sectors will be required. GRDC will connect globally across the public and private sectors to ensure GRDC are working with the best in the world to efficiently deliver the outcomes growers seek. GRDC will actively explore new partnerships and investment models, seeking collaboration on cross-sectoral issues and leverage where there is mutual benefit.

This plan will explore the latest science and innovation, facilitating accelerated deployment of new technologies, knowledge and approaches in Australia. It will require a willingness to push the boundaries and take calculated risks, knowing that success rates will vary in the quest for major gains.

GRDC will invest to harness existing potential and reach new frontiers.



OUR FOCUS

HARNESS EXISTING POTENTIAL

Aspiration: Hitting yield & profit targets, across every paddock, every season.

To profitably realise existing production potential across paddocks, farms and seasons, we need to integrate, deploy and adopt what we know or have in the pipeline.

Investment against this strategic pillar will aim to build and protect yield in a way that maximises profitability, assisting growers to adopt solutions considerate of the complex nature of farming systems. An improved understanding of grower behaviours and drivers of adoption will support effective implementation to consistently reach yield targets and manage production risk. Investment should help inform key profit driving decisions, enable growers to respond to seasonal conditions and overcome system inefficiencies to improve average gross margins and manage downside risk. The focus areas under this strategic pillar include:



Right crop & cultivar

Informed sowing decisions are critical to bridging the gap between actual and potential grain yield. Growers require access to fit-for-purpose crops and varieties that are adapted to environment and situation. Information and knowledge of crop and varietal performance and phenology are critical in understanding variety and crop selection trade-offs to inform grower decision making. Pre-breeding and breeding investment that complements private sector activity will continue to be a major focus to address constraints to high value crop area expansion and support incremental yield improvements.



Biosecurity, weed, pest and disease control

Weeds, pests and diseases continue to impact yield, restrict crop choice and inhibit growers' ability to meet grain receival requirements. Sustainable and integrated management and biosecurity preparedness will continue to be required to manage endemic and exotic threats. Over the past six decades, grain production has advanced rapidly through the adoption and safe use of synthetic chemistry. But increased regulatory costs, resistance, changing social and market acceptance and challenges in discovery are driving an increased need for new non-chemical approaches to weed, pest and disease control – hailing a new era in plant protection. Investment aimed to accelerate the discovery of new and novel control options and reduce dependence on traditional crop protection chemistries will be important. Recognising the individual responsibility of every grower regarding biosecurity, rapid, accurate and costs-effective detection tools and knowledge to bridge critical gaps will be required to help prepare for and protect the grains industry from current and emerging threats.

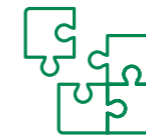


Optimise crop nutrition & improve soils

Nutrition is critical in building crop yield and remains one of the highest variable costs for growers, so optimising crop nutrition and efficiency of nutrient use is critical for profitability. Responsible nutrient management also has important implications for sustainability and the environment through nitrous oxide emissions and potential for nutrient movement into water. While much previous research has been undertaken

in the area of nutrient management, strategies that increase confidence in fertiliser decision making, optimise return on nutrient spend and minimise losses to the environment will continue to be important as growers incorporate other innovations into their systems.

A focus of the plan will be investment to rapidly deploy solutions that optimise the efficiency of nitrogen use in modern farming systems, including opportunities to further improve biological fixation and opportunities to better match nutrient supply to soil type. Accelerating the adoption of existing amelioration, mitigation or tolerance solutions to overcome the impact of soil constraints on plant water uptake, including soil salinity, sodicity, low pH, aluminium and other nutrient toxicities, will also be a major focus. This includes sharing of knowledge and best practice across the country as well as RD&E to overcome the unintended consequences of amelioration and support adoption.



Systems integration for reliable profit

Greater focus on understanding how innovations may be brought together into the farming system is critical to fast-track development and adoption of applied solutions that meet growers' needs. Recognising that all growers and farms are unique, and a one-size-fits all approach is not appropriate, investment will focus upon quantifying the value proposition of a range of possible solutions. This work will highlight important considerations and trade-offs to help growers make better decisions, manage risk and have the confidence to adopt and profitably implement practice changes and technologies.

Investment will be targeted at informing key profit driving decisions and practices identified through benchmarking, considerate of whole of business implications and trade-offs in mixed farming systems. An improved understanding of grower behaviours, drivers and barriers to adoption will be applied to tailor farming system investment and extension activities that accelerate the speed and area of adoption of practice changes and technologies.



OUR FOCUS

REACH NEW FRONTIERS

Aspiration: Productivity of crops exceeds what we thought possible.

By re-imagining what is possible – focusing on what we want to achieve rather than being restricted by how to achieve it – we will intensify our focus on the discovery of novel approaches to deliver step-changes in soil and water productivity, yield improvement and input-use efficiency.

Growers and the industry seek step-change innovation to accelerate the industry towards a new production frontier. A more ambitious strategy aimed at discovering new breakthroughs in yield and input-use efficiency of major crops will be implemented over the life of the plan. While investment in this area invariably has a higher level of risk and potential failure rate, collectively a diverse portfolio of investments aims to deliver game-changing solutions whilst mitigating risk. Investment should accelerate the delivery of efficiency gains at a scale never before realised, with a focus upon unlocking plant potential, the capture and storage of water in soils and more effective allocation of key farm inputs to land capability and production potential.



Step-changes in soil & water productivity

Water is a finite resource and widely accepted as the most universally limiting determinant of crop yield in Australia. In the face of climate change, and in one of the driest and most variable environments on the planet, unproductive water use through evaporation, run-off and deep drainage frequently present an opportunity lost. New approaches to transform the capture, storage and availability of water for crops have the potential to deliver step-change yield improvement and sustainability benefit. Increased investment to dramatically reduce unproductive water losses and unlock the chemical, biological and physical productivity of soils will be a focus. This could include discoveries that overcome constraints currently beyond our control, unlock soil nutrient reserves, reduce or eliminate nutrient losses to the environment or enhance beneficial biological activity in our soils.



Unlock plant potential

Investment in this area will aim to increase the water-limited yield potential and input use efficiency of crops beyond what is currently possible. Global effort will be leveraged to unlock crop potential through changes to fundamental crop architecture, physiology and/or biochemistry. A major effort will be made to explore new and speculative approaches to deal with climate change and extreme weather events, including elevated temperatures and threats posed by drought, heat and frost.



Transform efficiency of input use

While efficiency of input use will be continually tweaked, a wealth of data and new technologies have the potential to drive cost efficiency to completely new levels. RD&E to help optimise fixed and variable costs will improve grower returns and reduce risk. Investment in this area will aim to match costs to yield and profit potential, with a focus on the big opportunities to improve margins and move growers to the next frontier. Major areas of focus will include opportunities to improve decision making and increase precision to support input allocation at sub-paddock scale, as well as accelerate the application and deployment of automation and robotics to reduce labour and/or efficiency of repetitive tasks.

‘GRDC should be willing to try things growers will not necessarily do with their own money [alone] – and this can cover the span of every farm activity’.

Industry feedback from consultation.

OUR FOCUS

GROW MARKETS & CAPTURE VALUE

Aspiration: Growers have access to a diversity of markets and get more for the crop.

Seizing new and existing market opportunities and reducing post-farm gate costs provides growers with choice, opportunities to capture more value and help manage price risk.

The Australian grains industry is well placed to meet market need and capitalise upon strong demand from a growing, increasingly affluent population. Our industry has a successful track record of establishing new markets, maintaining or growing existing ones, supported through RD&E investment. Gaining access for Australian canola into China or maintaining access into the European market are just two examples that have helped provide market choice and put more dollars in growers' pockets. The provision of high-quality grain functionality data, breeding to end-use requirements, and robust classification systems are other examples of this.

Recognising grain prices, markets and supply chains are volatile and driven by factors largely beyond our direct control, RD&E plays a critical role in helping growers and industry to remain cost competitive, support reliability of supply, and capture value through differentiation. Intensified RD&E effort will be made over the next five years to support the identification and capture of market, price and post-farm gate cost opportunities. Collaboration and alignment across the grains industry will be critical to make choices that focus our effort on realising the most important and profitable opportunities.



Enduring access to a diversity of markets

In a deregulated environment, keeping abreast of the big picture and market signals is critical.

Investment in this area aims to understand domestic and global grain markets to support ongoing access to a range of existing and new markets to mitigate risk. GRDC cannot directly undertake marketing or advocacy, however we can invest in RD&E that supports market growth or creates competitive advantage. Understanding what end users want now, and in the future enables us to focus R&D effort and inform decisions to ensure we breed, classify, grow and supply grain that markets prefer.



Add value to the crop to increase margins

Knowing what markets want allows us to explore opportunities to enhance or differentiate Australian grain to get more for the crop. Opportunities exist to be the first mover into new and emerging high value markets and grow existing markets. Value-add or differentiation opportunities in areas such as grain functionality, food safety, human health and sustainability should be driven by market demand. Investment can help ensure our varieties, agronomy, grading, classification, segregation and systems are fit-for-purpose to meet market requirements.



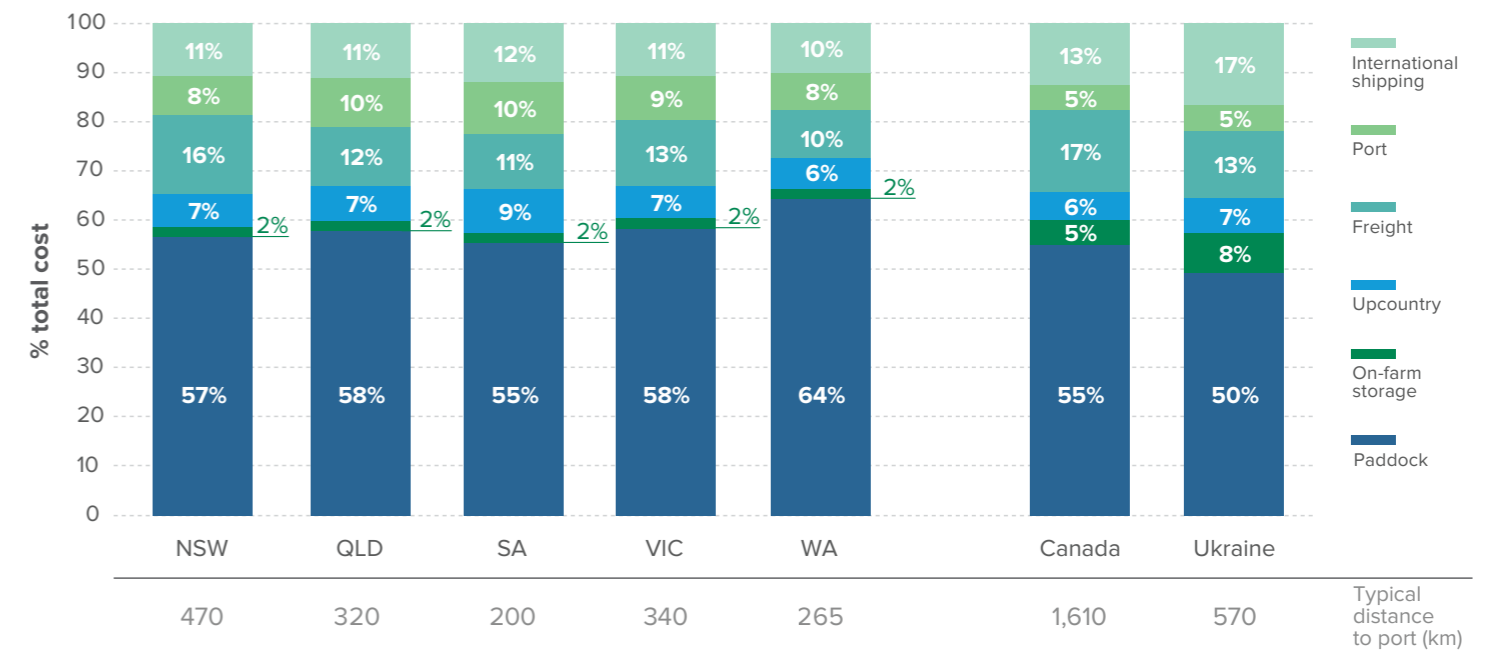
Lower post-farm gate costs

Post-farm gate costs represent a significant proportion of the total cost of grain delivered to market. A range of factors influence the efficiency and competitiveness of Australia's grain supply chain. Whilst estimates vary and depend on a range of factors, supply chain costs represent around 30-35 per cent of the total free on board cost of grain (excluding international shipping)¹⁶, starting at around \$60-70/t for wheat¹⁷. Seasonal variability in the size of the crop poses major challenges to logistics, segregation and Australia's ongoing ability to handle the crop. RD&E that supports reductions in post-farm gate costs provides opportunity to improve the long-term competitive position of the Australian grains industry and put more dollars in growers' pockets. This area of focus may include RD&E to help co-ordinate infrastructure investment, transport, handling and storage innovations.

Real breakthroughs (to reduce post-farm gate costs) are needed. There are opportunities that have not been tried.

Industry feedback from consultation.

Supply chain components as a proportion of the total delivered cost of wheat into Indonesia for Australia, Canada and the Ukraine (2019/20), excluding levies and check-offs.¹⁶



Note: Adapted from L.E.K. report on international comparison of Australia's freight and supply chain performance. Refer to context and disclaimer when interpreting, including consideration of differences in transport distance. Included as an example only, recognising costs are a snapshot in time, are influenced by numerous variables and have not been updated to consider global events and circumstances having occurred since.

OUR FOCUS

THRIVE FOR FUTURE GENERATIONS

Aspiration: Australia’s grains industry remains a global leader in sustainability, for people, the planet and our long-term ability to farm.

Growers care deeply about the environment and are already leaders in efficiency of resource use. However, community expectations and our climate are changing. The grains industry must keep ahead of these changes and use science to progress our ability to accurately measure the sustainability and environmental performance of our industry and support responsible stewardship.

Sustainability encapsulates the enduring legacy of GRDC’s purpose: farming for our people and our planet into the future.

Often referred to as the ‘triple bottom line’, sustainability encompasses the environment, people and their businesses*. It expands thinking to consider the long-term repeatability

of results across seasons and the impacts we have on the environment and others. Society reasonably expects safe, sustainable and responsible agricultural production. RD&E should support resilient and profitable farming systems and communities which value and preserve natural resources, ensure access to capital and markets and uphold the industry’s reputation and trust within the wider community.

Sustainability investment by GRDC extends beyond this pillar, with direct sustainability benefits delivered through numerous projects across the broader portfolio. Development of new, non-chemical pest control options or more efficient use of water, energy, and nutrient inputs as examples of long-term GRDC investment in this area.

“A comprehensive portfolio of research related to sustainability and environmental performance [is required] that can underpin and drive improvements to the sustainability and environmental performance of the industry and deliver against a range of sustainability outcomes that link to market and consumer expectations”.

Grain Growers Limited National Policy Group, Aug 2022.

* The portfolio of investments against this strategic pillar is focused upon impacts on planet and people. The economic element of sustainability is captured primarily through investment against other strategic pillars. GRDC’s investment in sustainability will be captured through impact reporting at a whole of portfolio level.

Sustainability is quickly becoming the new normal, underpinned by four drivers:

Source: Four key drivers of sustainability[®]

EXAMPLES

ACCESS TO CAPITAL

In 2019, funds based on ESG-themes pulled in a **record-breaking US \$20.6bn**

REGULATION

Mandatory disclosure of climate risk by publicly listed entities in NZ, UK and Hong Kong

MARKET ACCESS

Canola growers selling into the EU must meet **sustainability requirements** for market access

CONSUMER DEMAND

6 in 10 consumers are willing to change shopping habits **to reduce environmental impact**



Sustainable, responsible production systems

Knowing the true environmental footprint of Australian grain supply chains can help to identify what more can be done to protect nature, air, soil and water. Progressing the ability to report sustainability and environmental performance of farm businesses and the broader grains industry easily and accurately should be accelerated. Underpinning science is required to better define and quantify the impact of different farming systems or practices on both financial and non-financial performance measures, including natural capital and biodiversity.

RD&E should help growers, advisers and industry sort through the complexity of carbon accounting, sequestration and the myriad of different tools available to inform what growers can practically do to profitably build soil organic carbon and reduce green-house gas emissions intensity. Opportunities also exist to improve growers’ understanding of the market drivers and emerging opportunities in ecosystem services and support a shift to renewable technologies.



Support communities and social licence

People are at the heart of sustainability, from their role in the paddock through to being consumers. Addressing the changing needs and expectations of society requires a co-ordinated effort by many to help support the resilience, adaptability and health of communities and the industry’s future.

Regional communities and farm business are changing as a result of increased scale, adoption of technology and centralisation of populations. The decisions growers make on-farm have increasingly greater consequences for their business. Working with others, targeted RD&E can help to better understand and manage workforce challenges, improve farm safety and build the skill of growers to manage complex businesses.

Investment across the agricultural sector to support social licence will be critical to ongoing access to technologies and long-term ability to farm. Understanding and engaging more effectively with consumers around shared values and concerns will be important to continue to build and maintain trust.

FOUNDATIONAL ENABLERS

Just as a house requires solid foundations, this plan has ‘foundational enablers’ that support GRDC to deliver on purpose. While difficult to quantify impact in their own right, without them GRDC cannot achieve the ambitious research outcomes that growers and industry seek through the broader RD&E investment portfolio.

These four enablers support the effective delivery of RD&E and outline our intent and principles for investment in each area. Recognising their critical importance to the plan’s success and a need to continually evolve, GRDC will engage across industry to develop an implementation plan for investment in these enablers that will capture existing and new approaches required across the life of the RD&E plan.

CAPACITY & ABILITY

The grains industry needs access to highly capable people and critical research infrastructure when and where required. While core capability will always reside in Australia, GRDC aims to access the best, people and technologies from across the globe, including from other industries, such as space, mining and medicine. Collectively, the grains industry requires an efficient workforce that can adapt to changing priorities and a pipeline of talent to address generational change.

GRDC will develop and implement a life-of-plan strategy aimed to support partners to attract and nurture the talent required to deliver world-class grains RD&E; support leadership and pathways to innovate, translate and adopt; and facilitate access to critical infrastructure and technologies.

GRDC aims to foster an environment that supports diversity and innovation, connecting people and providing time and space to be creative. This includes partnering with First Nations peoples together with other RDCs to conduct RD&E on issues that are important to all Australians with a deep connection to country.

But this is not GRDC’s responsibility alone. Ensuring the sector has the required science, extension and commercialisation expertise is a responsibility that GRDC shares with our research partners and industry stakeholders across the grains RD&E landscape. It requires foresight around the capacity and ability available now and what the sector will need in the future to meet the immediate and long-term RD&E needs of the grains industry.

Emerging industry professionals should want to enter and stay in the grains industry. Together with research partners, GRDC is committed to exploring new approaches to better connect the RD&E community to ensure leadership and pathways to inform RD&E priorities, identify innovative solutions, and support the efficient and effective translation of grains research.

DATA & INSIGHTS

Data-driven agriculture is set to deliver transformational change across the grains industry and grains RD&E is no exception. GRDC and our research partners collect and store significant amounts of data as part of research projects. Combining rapidly expanding data resources with state-of-the-art analytics and the power of artificial intelligence could deliver significant gains for the grains industry.

GRDC’s investment in this area aims to maximise the use of data to create valuable insights that inform growers and industry; improve the speed, accuracy and efficiency of RD&E; and track and measure the impact of investment.

Investment by GRDC is guided by the FAIR principles, to ensure data is Findable, Accessible, Interoperable and Re-usable. GRDC aims to ensure that valuable data assets, and data important to industry is identified and made findable, its meaning understood, and it can be reused, shared and integrated. GRDC also aims to work with partners to couple data with analytics to improve the quality and accuracy of research and reveal insights not previously possible.



FOUNDATIONAL ENABLERS

KNOWLEDGE TRANSFER & ADOPTION

Someone must ultimately do something new or different to realise the impact from grains RD&E investment. This requires an awareness, motivation and ability to implement new knowledge, technology or practices to overcome the problems we face or take advantage of the opportunities that arise. New tools and technologies must be developed into practical products or solutions and adopted by growers and industry to generate a return on investment.

The Australian extension and commercialisation landscape continues to evolve and GRDC's approach must do the same. The ways in which growers engage with and consume information have changed significantly over the past decade. In today's world, the private sector plays a critical role in the realisation of benefit from research outcomes through both the provision of advice to growers and the development and supply of products and services.

GRDC plays a part in facilitating adoption through the communication and extension of research and development outcomes, with the aim of ensuring growers and industry are aware of and have ready access to the information they need.

Under this plan, GRDC will review existing communication and extension approaches to develop a life-of plan strategy for investment in this enabler.

Global best practice methods, new approaches and cross sectoral initiatives that support development of required capacity and ability will be deployed to increase awareness of R&D outputs, and speed and scale of knowledge transfer and adoption.

GRDC will continue to work with public and private partners to ensure the most efficient and appropriate pathways are used to bring new expertise and solutions into the hands of growers.

Wherever possible, RD&E investment design and implementation will involve participatory principles to accelerate the speed and extent of adoption and ensure solutions meet the needs of those who will use them. Channels for delivery and key messages need to be strategically matched to the needs of the next user as well as key influencers of adoption. The value proposition of adopting research outcomes must be clearly articulated and consider both financial and non-financial barriers and drivers.

* Procurement of RD&E aligned to the Commonwealth procurement rules and always considers value for money.

INNOVATIVE PARTNERSHIPS

GRDC is reliant upon strong partnerships to deliver the innovation Australian grain growers expect as part of the RD&E plan. Collaborating, partnering, and working together effectively with private and public sector organisations is critical to the plan's success.

In implementing this plan, GRDC will actively seek out novel ways to identify and partner with the best to help foster innovation, push the boundaries of science, and develop novel solutions faster.

Where previous approaches have failed or the specific solution unknown, a challenge focus that articulates the problem or opportunity and targeted outcomes may encourage new thinking and investment to solve some of our most intractable problems.

Open and challenge-based innovation programs, cross-sectoral initiatives, accelerator programs, as well as equity investment vehicles and strategic partnerships will continue to complement more traditional procurement* approaches used by GRDC over the life of the plan. Longer-term partnerships and collaborations involving diverse participants and facilitating co-design principles will also be explored as catalysts for innovation.



MEASURES OF SUCCESS

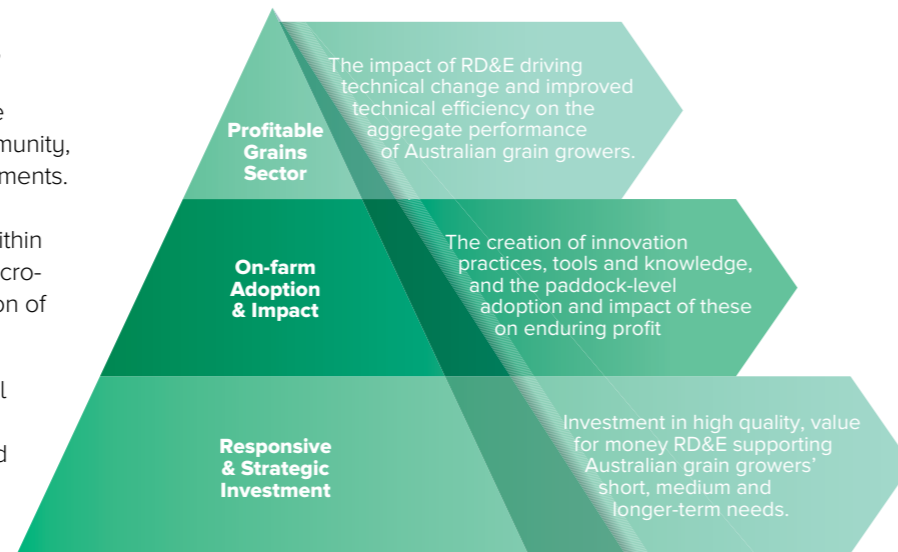
GRDC invests on behalf of Australian grain growers to improve the profitability and sustainability of the Australian grains industry across a diverse portfolio that spans regions, farming systems, timeframes and crop types. Aligned to values of transparency and accountability, measuring GRDC's performance and impact allows for ongoing assessment of the benefit and value of grains RD&E investment to growers, the Australian grains industry, communities and the broader economy.

GRDC's RD&E investment portfolio is complex, with short, medium and long-term investments over many scientific disciplines. GRDC's stakeholders are diverse and include growers, researchers, government and the broader community, who may have differing needs, expectations and requirements. For example, levy payers are generally interested in the impact of RD&E outcomes on their farming business or within their region. Other stakeholders may be interested in macro-economic performance indicators, such as the contribution of RD&E to environmental and social outcomes.

Assessment of GRDC's performance and impact is critical to monitor the execution of the RD&E plan, facilitates planning for future R&D investments, offers insight around return on investment, and demonstrates accountability for grain grower and public money.

GRDC's Performance and Impact Framework is segmented into three broad areas measuring GRDC's investment level impact; the on-farm adoption and impacts of investment outputs; and ultimately, cumulative impacts aggregated at a grains sector level.

GRDC's RD&E Performance & Impact framework



RD&E PLAN 2023-28

KEY PERFORMANCE INDICATORS

Our investment portfolio

Investing to plan & purpose

\$250M
MORE RD&E
invested in new & growth areas^a

\$4+
BENEFIT
per research dollar^b

\$750M+
in partner
co-contributions^c

New innovations & products
CREATED^d

RESPONSIVE, HIGH PERFORMING
investor^e

85% OF GROWERS
believe GRDC has responded to ideas discussed and rate GRDC investor performance highly

Australian grain farms

Facilitating on-farm adoption & impact

New knowledge practices, & products
ADOPTED^f

RESEARCH
outputs commercialised^d

GRDC IMPACT
on farm practice^e

75% OF GROWERS
believe GRDC played a role in benefits realised from RD&E

Grains industry health

Maintaining or exceeding long-term performance

Grower
PROFITABILITY
RATE OF RETURN OF
GRAIN FARMS (%)^g
> long-term trend

Farm
PRODUCTIVITY
TOTAL FACTOR
PRODUCTIVITY^g
≥ long-term trend

Crop
IMPROVEMENT
CEREALS, PULSES & OILSEEDS
YIELD & WATER-USE
EFFICIENCY^g
≥ long-term trend

RETURN
on inputs
COSTS (% INCOME)^g
≤ long-term trend
FERTILISER
CROP PROTECTION
TOTAL PLANT, MACHINERY
& LABOUR (TPML)

INDUSTRY VALUE
& MARKETS
GROSS VALUE OF
GRAINS PRODUCTION (\$B)^g
≥ long-term trend
MARKET DIVERSITY^h
for major grains (HHI)
maintained or improved

a. Comparison to previous plan expenditure. Growth and new areas defined as investment to Reach new frontiers, Grow markets and capture value and Thrive for future generations, with adjustments captured through the Annual Operating Plan.

b. Weighted average estimated return, measured through ex-ante benefit cost analysis for GRDC research investments >250k total contract value where a meaningfully benefit:cost analysis can be generated.

c. Total co-contributions through research partnerships undertaken by GRDC across life of the plan. Includes cash, in-kind and equity. Excludes service agreements.

d. Key research highlights that demonstrate tangible outputs and impact of RDE investment captured through case studies, including new patents, varieties, and technology licenses. Use of ex-post impact analysis where appropriate.

e. Captured through GRDC longitudinal grower surveys across life-of-plan.

f. Transfer of new knowledge and change in adoption of practices and products across life-of-plan, captured through GRDC longitudinal farm practices survey or other methods to quantify.

g. Comparison to long-term national trends using 7-year rolling average (1990-2022). ROR reported as national average and for top 20% (profitability). TFP refers to % change in climate adjusted total factor productivity index. Yield measured through comparison of national yield and water-use efficiency trends for cereals (wheat, barley, oats), legumes (chickpeas, faba beans, lupins, lentils) and canola weighted by crop area planted. Gross value of production adjusted for hectares planted.

h. Herfindal-Hirschman Index (HHI) as indicator of market concentration. Comparison to 10-year average using 7-year rolling average for wheat, barley, sorghum, canola and lentil.



FINANCIAL FORECAST

GRDC is entering this RD&E plan 2023-28 period in a strong financial position. Over the life of this plan, GRDC will continue to make significant investments in RD&E aligned to strategic pillars and focus areas to deliver on its purpose.

Income and expenses

While financial modelling cannot take into consideration any unforeseen environmental or legislative change impacts, GRDC expects to invest more than \$1 billion over the five years of this plan. GRDC will actively monitor and manage budget across

the life of the plan, reporting any variance between forecast and actual income and expenditure through the GRDC Annual Operating Plan and Annual Report.

GRDC budget forecast 2023-24 to 2027-28 (\$'000)

	2023-24	2024-25	2025-26	2026-27	2027-28
INCOME					
Levies	148,548	137,075	139,899	143,575	150,404
Commonwealth matching	91,688	84,344	72,725	73,159	74,981
Other	29,211	28,962	26,369	25,658	25,151
Total Income	269,447	250,381	238,993	242,392	250,536
EXPENSES					
RD&E investments	230,000	230,000	230,000	230,000	240,000
Employees	16,460	16,790	17,132	17,473	17,668
Suppliers	21,059	21,219	22,046	22,366	22,642
Total expenses	267,519	268,009	269,178	269,839	280,310
Operating surplus/deficit	1,928	- 17,628	- 30,185	- 27,447	- 29,774

PORTFOLIO BALANCE

GRDC’s extensive consultation with industry combined with analysis of the trends and drivers helped identify constraints and opportunities that could be addressed through RD&E investment. But determining how much to invest requires consideration of the value proposition of investing in different areas, the risk, return and potential impact to growers and industry.

At any one time, GRDC manages more than 500 RD&E investments. Responsible investment requires GRDC’s portfolio to be segmented in a way that allows the mix of investments to be monitored and managed not in isolation, but rather as part of a balanced portfolio – to ensure equitable benefit for all Australian grain growers.

The Strategic Pillars and Focus Areas in this plan provide a framework for investment that considers the estimated value that could be delivered to growers and logically groups individual projects and programs aligned to related outcomes.

Value may be created through ‘growth’ investments – that deliver improvement beyond current farm productivity levels – or ‘maintenance’ investments - protecting us from value loss if existing productivity levels are not maintained. Value capture considers both financial and non-financial factors – the economic, environmental and social benefits created. Under the RD&E Plan 2023-28 the four enablers are considered ‘foundational’ investments that deliver value through the broader portfolio.

Consideration of the relative economic benefit from addressing different constraints and opportunities enables the development of RD&E ‘value pool’ estimates that help inform proportionate RD&E budget allocation. Recognising the complexity in the assumptions required to develop estimates of future benefit from RD&E investment, considered along with other factors, this helps to inform portfolio balance across the RD&E Plan 2023-28 pillars and focus areas.

Business cases based on informed assumptions drive GRDC investment decisions, with three key areas of risk considered in portfolio assessment:

- Technical risk – is the research investment technically feasible?
- Delivery risk – how will growers access the research outputs?
- Adoption risk – will growers want to adopt the research outputs?

GRDC’s Statutory Funding Agreement with the Commonwealth requires a focus on the delivery of benefit to Australian grain growers and the broader community. In balancing the needs of all stakeholders, GRDC’s investment portfolio aims for a mix of investments that:

- Align to grower priorities
- Addresses government national science and rural R&D priorities
- Delivers on the objectives of the RD&E plan
- Assess and mitigate technical, adoption and commercial risks
- Deliver equitable impact across time, geography and crop
- Align to our agreed investment strategy.

R&D BUDGET ALLOCATION

Articulating what GRDC seeks to achieve through RD&E investment is a key part of the plan. Another equally important part of the investment strategy is how much we invest in each area.

Many factors are considered when determining allocation of RD&E investment, most notably grower priorities, value pool or ‘size of the prize’ estimates, where and when this value will be realised, the likelihood and cost to do so, and who else may invest to deliver the desired outcome.

Consultation to shape the RD&E Plan 2023-28 helped to validate proposed RD&E budget allocation with grain growers, revealing they want around 25-50 per cent of the portfolio invested in new areas plus those expected to deliver high growth (or step-change). What we heard confirmed grower support for GRDC to try new approaches that may come with higher risk but are aimed to deliver higher reward.

The forecast GRDC RD&E budget allocation for the 2023-28 plan period is summarised below. Whilst GRDC will maintain core investment to Harness existing potential, the ambition of this plan will see an additional \$250M invested in growth and new areas; to Reach new frontiers, Grow markets & capture value and Thrive for future generations. Investment in the Reach new frontiers and Grow markets & capture value pillars will be more than double that invested under the previous RD&E plan, with an additional \$46M planned for investment to Thrive for future generations.

It should be recognised that investment under the Thrive for future generations pillar represents only a small part of GRDC’s total investment in sustainability under the 2023-28 plan. Investment will build upon major investment in sustainability through the broader portfolio and leverage cross-sectoral activities.

The budget forecast considers the fact that RD&E is a long game and aims to ensure a responsible transition of the existing portfolio to the new strategy through portfolio re-alignment.

Annual investment planning and budget allocation will be reported through GRDC’s Annual Operating Plan and Annual Report and regularly reviewed and adjusted to reflect changes in assumptions, priorities of growers and other stakeholders.

Often called spill-over benefit, did you know that 29 per cent of GRDC projects deliver direct environmental sustainability outcomes?

This conservative assessment excludes the indirect environmental, social and economic benefits delivered by almost every investment GRDC make, eg. through more efficient use of arable land, water and other finite resources, supporting foundational industry capability and more resilient farm businesses.

Forecast total GRDC RD&E budget allocation, for the RD&E Plan 2023-28 period

Harness existing potential	Reach new frontiers	Grow markets & capture value	Thrive for future generations	Enablers
\$605M	\$220M	\$110M	\$55M	\$110M

ALIGNMENT TO NATIONAL RD&E PRIORITIES

GRDC is required to invest in a manner that is consistent with research priorities of the Australian Government.

This includes the Australian Government's National Science and Research Priorities, the National Agricultural Innovation Priorities contained within the National Agricultural Innovation Policy Statement.

The national Science and Research Priorities were established by the Commonwealth Science Council in 2015, to support research excellence that builds on comparative advantages and maximises the benefits of RD&E to Australia.

The priorities relevant to the grains industry are:

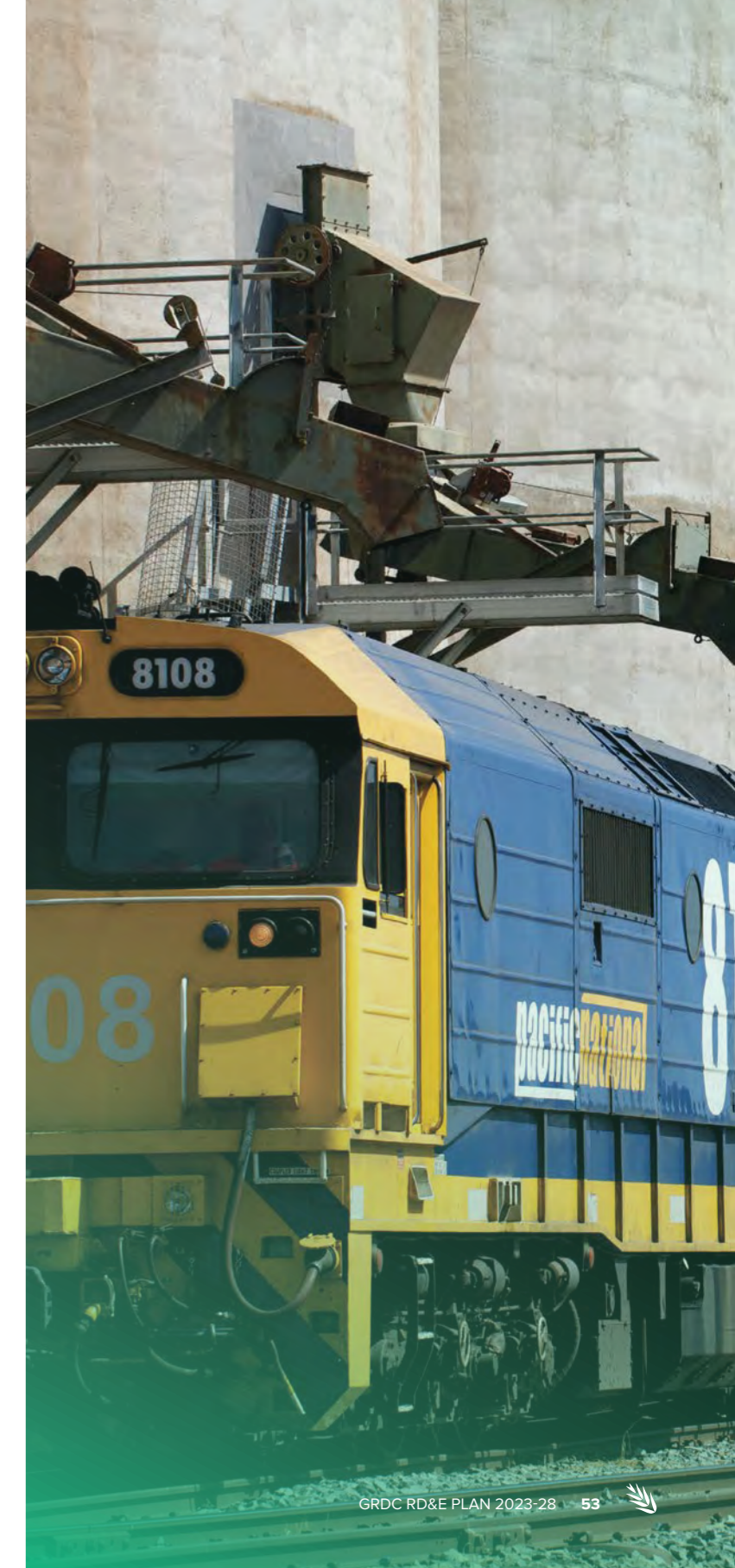
- **Food** – optimising production and processing, enhancing food safety and minimising waste
- **Soil and Water** – making better decisions in the context of potentially conflicting demands between development, the environment and landscape management
- **Transport** – developing low cost, reliable, resilient and efficient transport systems that meet the needs of businesses and enable sustainable mobility, while lowering carbon emissions and other pollution
- **Environmental change** – building Australia's capacity to respond to environmental change.

The National Agricultural Innovation Priorities were established in 2021 as an important component of the National Agricultural Innovation Agenda. The priorities address the key challenges to Australia's Agricultural Innovation system needed to support industries ambitious targets to grow to a \$100 billion industry at farm gate by 2030. The priorities are designed to make Australian agriculture a:

- Trusted exporter of premium food and agricultural products.
- Champion of climate resilience to increase the productivity, profitability and sustainability of the agricultural sector.
- World leader in preventing and responding to significant pests and diseases through future-proofing our biosecurity system.
- Mature adopter, developer and exporter of digital agriculture.

Emerging government priorities for the growth of the Australian grains industry identified during consultation to develop this RD&E plan include:

- Improving the sustainability performance and credentials of Australian agriculture to favourably position exports of agricultural produce into new, discerning markets.
- Securing a long-term workforce for Australia's agricultural value chains through promoting agriculture as a career of choice, addressing skill shortages and improving workplace safety, pay and working conditions.
- Increasing the engagement of Australian agriculture with first nations people through workforce participation and identifying opportunities to learn from first nations land management and agriculture.



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New ideas for investment will occur throughout the life of this plan and GRDC will communicate regularly with growers and industry to ensure these are captured and appropriately addressed.



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