

KIT 3.8

Identify engineering and novel business model solutions to reduce capital costs and running costs



Impact	Growers are able to sustainably optimise their return-on-investment (ROI) through better management of capital and running costs
Summary	<ul style="list-style-type: none">• Grain growers are optimising profits through efficient use of current capital expenditure and running costs.• Grain growers are applying new and novel engineering solutions in finance, technology, labour management, automation and machinery to deliver efficient cost management.• Grain growers are developing novel business model opportunities to enable efficient cost management and deliver operational improvements (where technology is rapidly evolving, climate variability is ongoing, and sustainability credentials are increasingly relevant).

OVERVIEW

Capital and running costs are significant for Australian grain growers. Over time, the cost of inputs into the farming system are rising faster than the price of the commodities produced. Engineering and novel business model solutions are an area where growers can effectively reduce costs, improve operating efficiency and deliver improved farm profitability.

Engineering solutions have the potential to reduce costs and increase production efficiencies for grain growers. Engineering improvements to the farming system can include improved crop types, cultivar options and herbicide options, through to adjusted or different farming system activities (no-till, disc seeding, harvest weed seed control and automation) and alternative post-harvest channels (e.g. grain handling and logistics). Key Investment target (KIT) 3.8 engineering solutions include mechanical, structural, software/hardware and data options. Other KITs include biological, genetic and chemical solutions that also can deliver cost optimisation.

Business model solutions can enable Australian grain growers to build more efficient farming practices and deliver productivity gains. Key emerging issues that will continue to impact productivity and profitability are customer expectations (e.g. food safety, origin and social good), capital and land access, climate adaptation and financial risk, digitisation and automation, and continual improvement in on-farm business standards. In response, grain farmers will increasingly adopt business models that reduce capital and running costs relative to productivity and revenue. KIT 3.8 focusses on exploring potential business model opportunities via the financial, social and environmental benefit levers where these could reduce capital and/or running costs or provide alternate revenue generation.

KIT 3.8 is divided into three scope areas. The first area of scope addresses opportunities to increase cost efficiencies from current operations. Scope areas 2 and 3 each focus on identifying and testing new engineering and business model solutions to improve profits by reducing costs relative to revenue.

The focus of KIT 3.8 is 'whole farm profit' and GRDC intends to deliver impact by (1) enabling gains in current farm business efficiency into the future and (2) ensuring that growers are ready for the opportunities and challenges of the future. The strategy also recognises that novel engineering and business model solutions can originate through targeted R&D, in consultation with growers and agricultural industry stakeholders, and through other pathways including engagement with the domestic and international communities. The strategy does not directly include crop nutrition and development, or integrated pest, weed and/or disease management. These are addressed in other KIT strategies.



FUTURE RD&E FOCUS

SCOPE – Increased current on-farm cost efficiency

Current capital (fixed) and running (variable) costs are optimised, based on business structures, business life cycle stages and agroecological zones, to improve grain grower profitability.

When running their grain businesses, either at the cropping (operational) level or when making capital investment decisions, growers are seeking accurate information about: (1) how to make more efficient capital cost decisions (finance, land, machines and other infrastructure, business structure, insurance and compliance); and (2) how to make more efficient running cost decisions (labour, fuel and machine time, repairs and maintenance).

In this context, GRDC recognise that traditional farming structures are and need to continually become more efficient through appropriate capacity development in business management capabilities. This means understanding the operational context of individual farming businesses – business life cycle stages (e.g. expansion, consolidation or retracting phases), evolution in farm size and scale, specialisation in the skillsets required to run modern farms, and associated decisions about risk, asset ownership or access.

GRDC also recognise that there are a number of industry challenges impacting current on-farm cost efficiencies. The key issues are (1) increasing management and compliance costs (e.g. time requirement, scale and complexity of farming businesses); (2) understanding farm performance and opportunities at multiple levels (paddock to whole farm business scale); (3) continual integration of technology driven data streams as privacy and other operational challenges are addressed; and (4) rising land values that dictate access (e.g. leasing value) and business strategy (e.g. risk management and the need to increase efficiency from existing land assets).

Investment Outcome 3.8.1 – Growers understand their farm business performance across financial, operational and social metrics, and the grains industry invests in RD&E to support on-farm resource optimisation.

Grain growers need to understand farm business performance across financial, operation and social metrics, and within the context of industry performance. They also need to better understand capital and operational risks, and how these impact production decisions, costs and profit. While the industry has a broad knowledge of these challenges, a granular understanding of cost segmentation (by business size, business structure, business lifecycle stages and agroecological zone) is limited. By identifying actionable opportunities for individual growers, GRDC will be able to identify trends and work with partners across the industry to lift overall cost efficiencies.

GRDC will continue to invest to understand farm business performance and on-farm cost structures, and to understand the factors impacting production decisions, costs and profit. This information is critical to the delivery of future RD&E investments that reduce capital costs and running costs through engineering and business model solutions. These outcomes include active investment directed at halving the on-farm cost of compliance. This is likely to include activities aimed at influencing technology adoption; contributing to debate on data access and use; and building trust and informing policy to enable technology adoption.

Investment Outcome 3.8.2 – Growers are more efficient or have improved approaches to the management of on-farm and post-farm gate costs.

Data and records are difficult to use on-farm and few farm service providers are using this information to efficiently reduce on-farm and post farm gate costs. The gaps are in managing, interpreting and using grower data and records to effectively, efficiently and repeatedly improve profitability. These gaps include problems in cross-platform data access and use as well as the convergence of traditional record keeping with rapidly evolving technology approaches. This is confounded by on-farm capability gaps that are not being adequately addressed because of the complexity of businesses and the current speed of technology evolution.

Information reporting and data utilisation are known challenges. Agribusiness and technology providers are investing to solve some of these issues. GRDC will invest alone or in partnership to improve reporting and utilisation of current farm information where clear evidence of market failure exists. GRDC will also invest to optimise current costs and logistics processes across input management, production and grain sale. This does not include investment to improve the reliability and cost effectiveness of on-farm grain storage to reduce handling costs and capture market opportunities (see KIT 4.3).



SCOPE – New engineering solutions for more efficient cost management

New engineering solutions enable cost management efficiencies through data and digital technologies, automation and/or robotics and labour optimisation.

Growers are looking for new and improved engineering solutions that improve efficient cost management. GRDC recognise that performance efficiencies can be obtained through the development of new or improved engineering solutions and that these solutions might be adapted from other industries. New solutions could include traditional engineering approaches and novel ideas from grain growers (e.g. the Harrington Seed Destructor was developed to overcome weed seed resistance). Opportunities are also expected to emerge through Ag-Technology investment with non-traditional industry partners.

The challenge for GRDC is to identify and invest in viable engineering solutions that deliver more efficient cost management on-farm and result in better grower profitability (e.g. data and digital technologies to improve efficiencies, improve labour efficiency, operational fit of automation and/or robotics, or other novel options). This includes managing intellectual property to enable commercialisation of R&D investments. In this context, GRDC will invest in RD&E that delivers new technologies to save on current costs or open up new opportunities for efficient allocation of resources. This might include digital (hardware and software), biological or genetic, chemical or other engineering solutions where the projected business case or ROI meets GRDC expectations and where the risk profile is acceptable.

New engineering technologies are a key enabler of future efficiency and profit gains. GRDC will focus on enabling growers to understand the suitability of different engineering technology groups within their systems. Digital engineering solutions are a major opportunity to increase farm business performance, but adoption is limited due to functional challenges that include the robustness of technologies, network connectivity, training, relative size of the Australian grain's industry on a global scale, product support and cost:benefit uncertainty. GRDC will co-invest in opportunities that provide technical rigour and an accessible user experience.

Investment Outcome 3.8.3 – Growers understand and increasingly adopt digital technology to increase efficiency and decision-making adaptation across their businesses.

Digital engineering solutions are a major opportunity to increase farm business performance agility, resilience and decision making. However, adoption of digital engineering solutions is sometimes slow due to functional challenges including the robustness of the technologies, costs, risks of use, technical support to implement, network connectivity and inadequate local product support.

GRDC may invest in demonstrating to growers and advisors the advantages of new digital technologies that improve management efficiency by informing precise actionable decision. GRDC will consider investments that enable new or improved digital technologies so that these technologies can be rapidly adapted to Australian conditions. GRDC may also invest to support technical development that underpins some key products (including economic analysis and support material that will assist in accessible user experience).

Investment Outcome 3.8.4 – The grains industry has access to new validated (or updated) engineering options that reduce fixed and variable costs.

Agriculture and, more specifically the grains industry, is currently faced with complex and rapid change. Technology is critical to adapting to this change while driving future cost efficiencies and on-farm profitability. For example, on-farm automation is likely to improve safety, reduce human resource costs and precision. Examples of autonomous heavy farming machinery already exist, and this is an area of significant ongoing development globally. Autonomous small machines are rapidly emerging for different agricultural or horticultural purposes. While the technology is already available the major challenge is how best to implement the technology within the grains industry.

This KIT strategy will focus on enabling growers to understand the suitability of different types of engineering technology solutions within their systems (including but not limited to automation). GRDC will invest to validate technologies and to support adaptations (where appropriate) that drive cost efficiency improvements. GRDC will look to partner with traditional engineering service suppliers, ag-tech companies and the Grains Innovate fund. GRDC will not be involved in making comparisons of new technology products per se but may co-invest in developing tools or data for growers to more rapidly access and adopt new technologies. This may include data generation that enables rapid uptake of new technologies by Australian grain growers (e.g. green on green optical weed recognition databases).



SCOPE – New novel business model opportunities for more efficient cost management

Current capital (fixed) and running (variable) costs are optimised, based on business structures, business lifecycle stages and agroecological zones to improve grain grower profitability.

Grain growers are looking for new business model opportunities to improve efficient cost management when allocating and using business resources. The focus of this strategy scope area is on cost efficiencies that deliver value (grain yield, quality and profit) for their business. Understanding the costs within each business and how costs contribute to profitability is critical to the creation of enduring profitability.

GRDC have identified three (3) major challenges to the development and uptake of new and novel business model opportunities across the Australian grains industry:

1. Access to and efficient use of land for grain production is an ongoing challenge (e.g. rising land prices are dictating farm business models, strategy and tactical decision making). Grain growers with access to relatively large areas of cropping land are now looking for other options to grow their business. Options considered focus on complimentary revenues that do not impede the grain production business (e.g. carbon credits). Other options, for example, could include lifting the productivity of low productive soils or improving productivity on current soils.
2. The issues of climate variability, greenhouse gas emissions, traceability and social expectations are likely to be both constraints and opportunities to enhanced grain grower profitability. These factors will become increasingly more relevant to performance and decision making across the grains industry (including maintaining or increasing, access to markets, capital and investment readiness, and insurance).
3. The integration of digital technologies across on-farm and supply chain operations will continue to be an important enabler for grain growers who optimise their business. The digital opportunities include technologies that are likely to reduce costs by enabling improved allocation of variable inputs, business bookkeeping and compliance, commodity/ food traceability that delivers market assurance, and the potential for new payment management mechanisms. In-depth business case analysis is required to understand ROI in these digital technologies, the potential broader impact on business capability.

GRDC will invest in RD&E that facilitates the development and uptake of new and novel business model opportunities where these opportunities are likely to deliver financial, social and environmental benefit across the Australian grains industry.

Investment Outcome 3.8.5 – The grains industry has new business model opportunities to increase on-farm resource use efficiency and value capture.

Growers are looking for new options to increase resource use efficiency by identifying aligned business model opportunities (e.g. carbon sequestration, Greenhouse gas emissions offsets and/or sustainability credentials). This includes a desire to identify novel value capture opportunities across the production and supply chain; to improve capabilities in business model design and management; and to facilitate access to inputs through local production or engineering advances. GRDC will consider investing to:

- Enable growers to obtain future focused business development capabilities and to identify and facilitate exploration of promising ideas.
- Explore opportunities for value capture from current production (including sustainability models and looking for ways to deliver on these opportunities in a cost-efficient manner).
- Identify new and novel grain production opportunities to value-add to current farming systems.

GRDC will also consider business model opportunities that lift profitability on lower productivity soils and that enable growers to maximise profitability in low yielding environmental conditions.

Investment Outcome 3.8.6 – Growers have profitable alternative or re-engineered capital and operational asset models that underpin farm businesses and annual operations.

Cost of capital is a major constraint to growing farm businesses (including land access, machinery and annual operations). As a result, the grains industry needs to identify alternative capital investment models that support the enduring profitability of grain growers. This is a complex problem underpinned by an individual's risk appetite (investor) and their financial exposure (farm business).



GRDC will work with partners to explore and understand novel options that enable new capital access. These may include different approaches to partnerships, corporate farming or joint ventures, as well as other financial access models (including land and machinery acquisition). They may also include the uptake of formal and sometime complex governance arrangements within family or business consolidations, as well as the use of independent non-executive directors or chairpersons within a governance structure. GRDC recognises that a range of approaches should be tailored to the needs of specific farm business segments. This includes working to identify alternative approaches to the use of existing capital and operational assets (including land and machinery leasing, cost sharing or other approaches).