Machine learning capacity, capability, and use-cases for the grains industry - Grains Research and Development Corporation

The Grains Research and Development Corporation (GRDC) is a statutory corporation established under the Primary Industries Research and Development Act 1989. It is subject to accountability and reporting obligations set out in the Public Governance, Performance and Accountability Act 2013. It is responsible for planning, investing in and overseeing research and development, and delivering improvements in production, sustainability and profitability across the Australian grains industry. Learn more about what GRDC does.

Applying

Applications must address the evaluation criteria, outcomes, and outputs relevant to the specific procurement(s) being applied for.

All tender applications must be submitted electronically via the GRDC Grains Investment Portal prior to the closing date for consideration: https://access.grdc.com.au/

Please read all information on this webpage before lodging an application in the Portal.

For information on applying and how to register refer to the guides in the GRDC help centre:

- To register as a first-time user: Guide: Registering for the Portal
- To submit an application: Guide: Submitting an Application through the Portal

For questions refer to the Portal Online Support Function or contact the Contract Administrator – Enabling Technologies via email southern@grdc.com.au.

Application Evaluation

Applications will be considered by an Evaluation Committee and the successful applicants will be informed within ten weeks of the application closing date.

Proposed Investment

No budget range will be provided for this investment.

The GRDC is focussed on delivering value to Australian grain growers, therefore your application must demonstrate fair market value.

Attachments
Machine learning (ML) is the automated creation of algorithms for pattern-recognition, classification, and prediction from input data. It is a promising ‘big data’ analytical method that enables insight-extraction from large, unstructured, datasets. Deployments of ML in other data-driven industries such as engineering, defence, manufacturing, transport and logistics, and finance have been very successful, with high benefit-to-cost ratios relative to initial investments.

GRDC has identified ML as a foundational technology with the potential to deliver value to Australian grain growers by assisting the Corporation address a broad range of production constraints and opportunities outlined in its current Research, Development and Extension Plan 2018-23.

This pilot investment program aims to improve grower outcomes by engaging the ML community to develop ML-driven solutions to specific grain grower and researcher-facing issues. Through this investment GRDC seeks to deliver the following:

1. Develop ML capacity for the Australian grains industry by facilitating the establishment of research partnerships between ML and grains RD&E expertise and the generation of a pipeline of ML-driven products that address grains industry constraints and opportunities.
2. Determine the value proposition for ML as a tool to address complex grains-related R&D issues through a series of specific ‘use-cases’ which have been prioritised by GRDC (Projects B-F) and proposed by applicants (Project G).
3. Establish a ML Technical Consultation Group (TCG) to advise GRDC regarding ML technical considerations for projects, including use-cases*, identify ML collaboration opportunities within the grains industry, engage ML expertise in other industries, and provide expert advice to GRDC generally regarding ML (Project A). TCG participants will be contracted as part of Project A, and all contracted use-cases will also participate.

As a pilot investment program, GRDC envisages that ML use-case projects presented under this tender will be short-term projects at post-doctoral level or industry equivalent. Use-case projects will operate over financial years 2020 and 2021, with provision for extension into 2022 and 2023 subject to promising R&D leads. This initial investment will assist GRDC and co-investment partners determine the potential for ML R&D to deliver value to growers and will inform future GRDC investment in the development of substantive ML resources for the Australian grains industry.

Use-case investments will be structured around a series of stop/go checkpoints where ongoing project feasibility will be examined (see specific details for Projects B-G: Outputs). This will enable an agile approach to use-case investment.

Given the considerable commercial interest in ML, public/private partnerships and/or commercial companies are encouraged to apply. Measures for IP protection may (pending the tender evaluation process) be negotiated between...
GRDC and preferred applicants. Furthermore, given the opportunities presented by combining datasets from different sources, multi-party consortia with pooled datasets are encouraged to apply. It is anticipated that arrangements will be incorporated within the structures of GRDC’s Standard Two Party Research Agreement or Multi Party Agreement.

*GRDC understands the need for applicants to protect their ML use-case IP. The TCG will operate under contractual terms that protect IP.

**Eligibility criteria**

1. The Applicant must be a single legal entity or recognised firm of partners.
2. The Applicant and any proposed subcontractor must be compliant with the Workplace Gender Equality Act 2012.

**Evaluation Criteria - For Project A only**

Project A PROC-9175954

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Criteria description</th>
<th>Weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A clear and thorough plan for participating on the Technical Consultation Group, including details on:</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>• Staffing (e.g. time allocations and role descriptions), where the applicant wishes to nominate more than one individual to participate on the TCG.</td>
<td></td>
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<tr>
<td></td>
<td>• Budget (defining the funds sought in each year as well as the cash and in-kind co-investment from all parties).</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Demonstrated track record of the individual/team in peer-review, scientific and project management mentorship, advisory group participation, and similar activities.</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>Capability of the individual/team, including details on:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ML expertise</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>• Experience applying ML to solve industry (grains or non-grains) problems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ability to leverage linkages to ML expertise domestically and internationally (including from non-grains industry backgrounds) to help deliver the best-quality ML outputs to the Australian grains industry</td>
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</tbody>
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**Evaluation Criteria - For Projects B to G**
### Evaluation criteria

<table>
<thead>
<tr>
<th>Criteria description</th>
<th>Weighting (%)</th>
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</thead>
<tbody>
<tr>
<td>A rationale document describing how the proposal delivers value to Australian grain growers. The rationale should address the points below separately, accompanied by detailed information and/or quantitative estimates wherever feasible:</td>
<td></td>
</tr>
<tr>
<td>- Overview of the proposal that explains how it aligns with GRDC’s RD&amp;E priorities, (refer to GRDC 5-year RD&amp;E plan Key Investment Targets and Core Frameworks)</td>
<td>20</td>
</tr>
</tbody>
</table>
| - Overall value of the opportunity/constraint to the Australian grains industry. Further details could also be provided, including:  
  - Applicable crop types  
  - Total potential area of impact e.g. regions, hectares  
  - Frequency i.e. how often the constraint or opportunity occurs  
- Overall adoption costs to industry e.g. costs to growers, GRDC etc.  
- Intended path to market (e.g. who will use the project outputs?) with estimates of market adoption rate/extent if feasible  
- Technical and adoption risks  
- Additional investment benefits                                                                                                                                                                                                                                                                                                                                                                                                     |               |
| A clear and thorough plan to achieve the project outputs, including:                                                                                                                                                                                                                                                                                                                                                                                                                          |               |
| - Proposed methodology, timelines, and success metrics (including anticipated dataset-use and analytics approaches). NB: Freedom to operate with datasets must be addressed in Evaluation Criterion 5.  
- Staffing (including time allocations of all key research personnel and their role/s within the project).  
- Budget (defining the funds sought in each year as well as the cash and in-kind co-investment from all parties).  
- Project structure and management arrangements (including commercial partners and/or other sub-contractors).                                                                                                                                                                                                                                                                                               |               |
| As part of this plan applicants must be able to demonstrate the ability to conduct and submit, to the TCG/GRDC, a Feasibility Assessment of their use-case (as per Output 2) by 15 November 2019.                                                                                                                                                                                                                                                                                                                                 |               |
| Applicants must also indicate they are ready and able to participate in initial Technical Consultation Group (TCG) meetings and activities from 30 August 2019 or...                                                                                                                                                                                                                                                                                                                                                                         |               |
upon contracting (see common procurement Background and Output 1 of Projects B-G).

3

Demonstrated track record of the project leader to provide leadership, co-ordination, management, monitoring, and evaluation for the timely delivery of high-quality outputs.

Demonstrated commitment to form a team across ML and the grains RD&E area. Details should be provided regarding:

- The mix and complementarity of ML and grains RD&E expertise amongst key proposed project personnel.
- Commitment to providing leadership and oversight (e.g. in-kind contributions of supervision from senior R&D personnel)
- Ability to leverage research partnerships with other research organisations and/or commercial companies (nationally and internationally) to build on the research already undertaken in the area to deliver high-quality outputs.
- Proven ability to communicate and/or deliver project outputs/IP to diverse stakeholders.
- Understanding of the value of public/private partnerships in supporting a path to market for project outputs.

Demonstrated freedom to operate in providing project outputs to GRDC or a third party (if required) by detailing the following in the GRDC Research Agreement Schedule 2 - IP Register Tender Template provided by GRDC:

A. Any applicant intellectual property (e.g. datasets) required to deliver the project outputs and any restrictions that may impact delivery.
B. Any third-party intellectual property (e.g. datasets) required to deliver project outputs and any restrictions that may impact delivery.
C. Any other intellectual property that may impact upon project output delivery.
D. Approach(es) to be taken to overcome identified restrictions.

The applicant’s ability to leverage linkages to machine learning (ML) expertise domestically and internationally (including from non-grains industry backgrounds) to help deliver the best-quality ML outputs to the Australian grains industry.

Specific details relevant to individual procurements
Project background

Technical guidance is required for GRDC’s initial investment in machine learning (ML) capacity and capability, and regarding ML’s application in the grains industry going forwards. The Technical Consultation Group (TCG) will strengthen GRDC’s capability to be an effective, discerning, investor by:

- Peer-reviewing the overall approach(es) and feasibility of ML use-cases in this investment, whilst not encroaching on use-case IP.

The TCG will also:

- Consult with GRDC regarding use-case opportunities
- Provide a platform for developing linkages to external (domestic and international) ML expertise, including in non-grains areas such as engineering, defence, manufacturing, transport and logistics, and finance
- Serve as a ML knowledge-base

Successful tenderers will interact with one another and the ML use-cases, all of whom will be represented on the TCG. The TCG will be crucial to ensuring Australian grain growers realise timely and robust benefit from investment in ML.

The anticipated workload is 0.1-0.2 FTE per participating entity annually for the duration of this investment.

Outcome

By 30 June 2023, the TCG has provided oversight and guidance to GRDC’s ML use-case investment – and ML investments more broadly – leading to a benefit-cost-ratio greater than 4:1 returned from GRDC investment.

1. By 30 August 2019 or upon contracting, commence full participation within the Technical Consultation Group (TCG). TCG participants will be required to sign a Participation Agreement specifying ongoing duties:

- Four meetings per year, at least two attended in person
- Review Feasibility Assessments for proposed use-cases
- Biannual review of each use-case, advising on technical feasibility and considerations (including data collection/collation considerations)
- Review additional use-case proposals provided by GRDC, making technical recommendations (at least six proposals to be submitted/reviewed by 30 June 2021)
- Engage with mid-term review process (June 2021)
- Provide additional expert ML advice as required
- Each individual or team participating on the TCG will be expected to contribute between 0.1 and 0.2 FTE p.a. toward TCG activities.

2. By 15 December 2019, TCG to peer-review feasibility assessments for at least eight use-cases
3. By 30 June 2021, participate in a mid-term review discussing the activities undertaken so far, which use-cases should be continued, and other opportunities to increase impact of the investment and GRDC's broader ML portfolio.

4. By 20 November 2022, TCG to peer-review feasibility assessments for at least four additional use-cases.

PROJECT B: Machine learning capacity, capability, and use-cases for the grains industry - Identifying genetic contributors to crop stress tolerance in the presence of environmental effects

Grains pre-breeding could be accelerated by unravelling the mechanisms underpinning complex quantitative crop traits e.g. pathogen resistance, yield potential in heat stress/frost-prone environments, and water productivity. Phenomics, genomics, transcriptomics, proteomics, and metabolomics studies of these phenomena are complicated by the dense and disparate nature of ‘omics’ data, rapid flux in observed signals, and environmental factors. Thus, linking complex traits to molecular mechanisms has been difficult – it is hoped machine learning (ML) can go beyond analyses of individual signals to identify systems-level, trait-associated, patterns (e.g. genomic selection markers) that can be used by plant breeders.

Application of ML could help the grains industry more-effectively:

- Understand genetic control of canola blackleg resistance
- Understand genetic and environmental factors leading to necrotrophic fungal pathogen resistance in wheat, barley, and/or canola
- Identify genetic contributors to improved wheat/barley yield under frost-prone conditions
- Identify genetic contributors to disease resistance in pulses

By 30 June 2023, the Australian grains industry has access to ML technology that enhances identification of genetic material that contributes to robust crop stress tolerance. Accelerations in rate of genetic gain from this technology, and consequent improvements in growers’ crop performance, lead to a benefit-cost-ratio of at least 4:1 returned from GRDC investment.

1. By 30 August 2019 or upon contracting, commence full participation within the Technical Consultation Group (TCG). TCG participants will be required to sign a Participation Agreement specifying ongoing duties:

- Four meetings per year, at least two attended in person
- Review Feasibility Assessments submitted by other proposed use-cases
- Biannual review of each use-case, advising on technical feasibility and considerations (including data collection/collation considerations)
- Review additional use-case proposals provided by GRDC, making technical recommendations (at least six proposals to be submitted/reviewed by 30 June 2021)
• Engage with mid-term review process (June 2021)
• Provide additional expert ML advice as required
• Each use-case will be expected to contribute between 0.1 and 0.2 FTE p.a. toward TCG activities.

2. By 15 November 2019, complete use-case Feasibility Assessment and submit to TCG for peer-review*. This is a STOP/GO output determining if the use-case proceeds as is or with revisions, or is terminated. Review by TCG/GRDC and a decision by GRDC whether to continue co-investment will take place within 30 days.

3. By 20 February 2020, pending continuation beyond Output 2, complete use-case Implementation Plan detailing scientific approach, workplan, international collaborations, stakeholder engagement, and path-to-market. Submit to GRDC for review. As part of the Implementation Plan, use-cases will provide biannual reports to GRDC and the TCG for review. In these reports and/or ongoing discussions with GRDC, use-cases will have the opportunity to express interest in extending their use-case work into financial years 2022 and 2023. Expression of interest must be made by December 2020, with GRDC responding by 30 March 2021. GRDC and the use-case organisation will then work towards recontracting and a revised Implementation Plan.

4. By 20 May 2021, consistent with Implementation Plan (unless revised), provide industry with ML approach enabling enhanced identification of molecular mechanisms associated with crop stress tolerance. Submission of final report to TCG and GRDC.

**PROJECT C: Machine learning capacity, capability, and use-cases for the grains industry—Delivering accurate and localised weather forecasts to grain growers**

*Procurement no.* PROC-9175956

Machine learning could potentially improve grower decision-making by helping provide more accurate weather and/or climate forecasts. There is an opportunity to explore the integration of numerical weather prediction models and general circulation models with different dynamic data layers of increasing spatial and temporal resolution. This could potentially improve the key characteristic of forecast quality that enable growers to make more profitable decisions on-farm.

By 30 June 2023, Australian grain growers have access to ML technology that provides weather forecasts with greater long-range skill and localisation. Improved decision-support arising from this technology leads to a benefit-cost-ratio of at least 4:1 returned from GRDC investment.

1. By 30 August 2019 or upon contracting, commence full participation within the Technical Consultation Group (TCG). TCG participants will be required to sign a Participation Agreement specifying ongoing duties:

   • Four meetings per year, at least two attended in person
   • Review Feasibility Assessments submitted by other proposed use-cases
• Biannual review of each use-case, advising on technical feasibility and considerations (including data collection/collation considerations)
• Review additional use-case proposals provided by GRDC, making technical recommendations (at least six proposals to be submitted/reviewed by 30 June 2021)
• Engage with mid-term review process (June 2021)
• Provide additional expert ML advice as required
• Each use-case will be expected to contribute between 0.1 and 0.2 FTE p.a. toward TCG activities.

2. By 15 November 2019, complete use-case Feasibility Assessment and submit to TCG for peer-review*. This is a STOP/GO output determining if the use-case proceeds as is or with revisions, or is terminated. Review by TCG/GRDC and a decision by GRDC whether to continue co-investment will take place within 30 days.

3. By 20 February 2020, pending continuation beyond Output 2, complete use-case Implementation Plan detailing scientific approach, workplan, international collaborations, stakeholder engagement, and path-to-market. Submit to GRDC for review. As part of the Implementation Plan, use-cases will provide biannual reports to GRDC and the TCG for review. In these reports and/or ongoing discussions with GRDC, use-cases will have the opportunity to express interest in extending their use-case work into financial years 2022 and 2023. Expression of interest must be made by December 2020, with GRDC responding by 30 March 2021. GRDC and the use-case organisation will then work towards recontracting and a revised Implementation Plan.

4. By 20 May 2021, consistent with Implementation Plan (unless revised), provide industry with ML technology enabling weather forecasts with improved long-range skill and localisation. Submission of final report to TCG and GRDC.

PROJECT D: Machine learning capacity, capability, and use-cases for the grains industry—Extracting value from crop/soil variability mapping

Procurement no. PROC-9175957

Project background
There is an opportunity to provide growers with enhanced, machine learning (ML)-driven, insights from crop and soil constraint data. A wealth of field-mapped data layers is becoming available: yield, multispectral, topographic, electromagnetic, electroconductive, and weather. Whilst commercial mapping analytics are available, ML models could be developed that are better-able to account for spatial variability. By 30 June 2023, Australian grain growers have access to ML models of crop/soil variability, drawing upon multiple data layers. Improved decision-support arising from this technology leads to a benefit-cost-ratio of at least 4:1 returned from GRDC investment.

Outcome
1. By 30 August 2019 or upon contracting, commence full participation within the Technical Consultation Group (TCG). TCG participants will be required to sign a Participation
Agreement specifying ongoing duties:

- Four meetings per year, at least two attended in person
- Review Feasibility Assessments submitted by other proposed use-cases
- Biannual review of each use-case, advising on technical feasibility and considerations (including data collection/collation considerations)
- Review additional use-case proposals provided by GRDC, making technical recommendations (at least six proposals to be submitted/reviewed by 30 June 2021)
- Engage with mid-term review process (June 2021)
- Provide additional expert ML advice as required
- Each use-case will be expected to contribute between 0.1 and 0.2 FTE p.a. toward TCG activities.

2. By 15 November 2019, complete use-case Feasibility Assessment and submit to TCG for peer-review*. This is a STOP/GO output determining if the use-case proceeds as is or with revisions, or is terminated. Review by TCG/GRDC and a decision by GRDC whether to continue co-investment will take place within 30 days.

3. By 20 February 2020, pending continuation beyond Output 2, complete use-case Implementation Plan detailing scientific approach, workplan, international collaborations, stakeholder engagement, and path-to-market. Submit to GRDC for review. As part of the Implementation Plan, use-cases will provide biannual reports to GRDC and the TCG for review. In these reports and/or ongoing discussions with GRDC, use-cases will have the opportunity to express interest in extending their use-case work into financial years 2022 and 2023. Expression of interest must be made by December 2020, with GRDC responding by 30 March 2021. GRDC and the use-case organisation will then work towards recontracting and a revised Implementation Plan.

4. By 20 May 2021, consistent with Implementation Plan (unless revised), provide industry with ML technology enabling improved analyses of crop/soil variability. Submission of final report to TCG and GRDC.

**PROJECT E: Machine learning capacity, capability, and use-cases for the grains industry-- Extracting value from agronomy and farming systems R&D datasets**

**Procurement no.** PROC-9175958

Machine learning (ML) could improve agronomic and farming systems decision support provided to growers. The grains industry conducts a lot of R&D targeting agronomy and farming systems R&D questions, with prominent R&D projects including: Better Fertiliser Decisions for Cropping, National Paddock Survey, and Grain and Graze. There is great opportunity to apply ML to this agronomy and farming systems R&D data, leading to outputs that can assist growers in making decisions.
Outcome

By June 2023, Australian grain growers have access to ML technology that improves the accuracy and utility of agronomic decision-support. Such improved decision support leads to a benefit-cost-ratio of at least 4:1 returned from GRDC investment.

1. By 30 August 2019 or upon contracting, commence full participation within the Technical Consultation Group (TCG). TCG participants will be required to sign a Participation Agreement specifying ongoing duties:

- Four meetings per year, at least two attended in person
- Review Feasibility Assessments submitted by other proposed use-cases
- Biannual review of each use-case, advising on technical feasibility and considerations (including data collection/collation considerations)
- Review additional use-case proposals provided by GRDC, making technical recommendations (at least six proposals to be submitted/reviewed by 30 June 2021)
- Engage with mid-term review process (June 2021)
- Provide additional expert ML advice as required
- Each use-case will be expected to contribute between 0.1 and 0.2 FTE p.a. toward TCG activities.

2. By 15 November 2019, complete use-case Feasibility Assessment and submit to TCG for peer-review*. This is a STOP/GO output determining if the use-case proceeds as is or with revisions, or is terminated. Review by TCG/GRDC and a decision by GRDC whether to continue co-investment will take place within 30 days.

3. By 20 February 2020, pending continuation beyond Output 2, complete use-case Implementation Plan detailing scientific approach, workplan, international collaborations, stakeholder engagement, and path-to-market. Submit to GRDC for review. As part of the Implementation Plan, use-cases will provide biannual reports to GRDC and the TCG for review. In these reports and/or ongoing discussions with GRDC, use-cases will have the opportunity to express interest in extending their use-case work into financial years 2022 and 2023. Expression of interests must be made by December 2020, with GRDC responding by 30 March 2021. GRDC and the use-case organisation will then work towards recontracting and a revised Implementation Plan.

4. By 20 May 2021, consistent with Implementation Plan, provide industry with ML technology that draws upon agronomy R&D datasets to improve accuracy and utility of tactical/strategic agronomic decision-support. Submission of final report to TCG and GRDC.

Outputs

PROJECT F: Machine learning capacity, capability, and use-cases for the grains industry- Delivering a Natural language Programming-driven Question-Answering research repository

Procurement no. PROC-9175959
There is an opportunity to extract greater value from text-encoded information in resources such as GRDC reports and other publications relevant to Australian grain growers. Much grains R&D output is only accessible in text format. Taking GRDC as an example, much R&D output is only captured in project reports and communications – such information is not always easily discovered or synthesised. Machine learning (ML) could be applied to text, through Natural Language Programming.

Such a ML solution could be packaged into a Question-Answering (QA) tool like those deployed in public and private customer service settings. The QA tool would be able to parse questions posed by growers and then draw upon machine-learnt text to provide suitable responses, improving information-delivery to growers.

By 30 June 2023, Australian grain growers have access to an ML-driven tool that can synthesise textual grains R&D information (from GRDC and potentially other sources) to improve information delivery. Improved adoption of R&D recommendations arising from this technology leads to profitability improvements with benefit-cost-ratio of at least 4:1 from GRDC investment.

1. By 30 August 2019 or upon contracting, commence full participation within the Technical Consultation Group (TCG). TCG participants will be required to sign a Participation Agreement specifying ongoing duties:
   - Four meetings per year, at least two attended in person
   - Review Feasibility Assessments submitted by other proposed use-cases
   - Biannual review of each use-case, advising on technical feasibility and considerations (including data collection/collation considerations)
   - Review additional use-case proposals provided by GRDC, making technical recommendations (at least six proposals to be submitted/reviewed by 30 June 2021)
   - Engage with mid-term review process (June 2021)
   - Provide additional expert ML advice as required
   - Each use-case will be expected to contribute between 0.1 and 0.2 FTE p.a. toward TCG activities.

2. By 15 November 2019, complete use-case Feasibility Assessment and submit to TCG for peer-review*. This is a STOP/GO output determining if the use-case proceeds as is or with revisions, or is terminated. Review by TCG/GRDC and a decision by GRDC whether to continue co-investment will take place within 30 days.

3. By 20 February 2020, pending continuation beyond Output 2, complete use-case Implementation Plan detailing scientific approach, workplan, international collaborations, stakeholder engagement, and path-to-market. Submit to GRDC for review. As part of the Implementation Plan, use-cases will provide biannual reports to GRDC and the TCG for review. In these reports and/or ongoing discussions with GRDC, use-cases will
have the opportunity to express interest in extending their use-case work into financial years 2022 and 2023. Expression of interest must be made by December 2020, with GRDC responding by 30 March 2021. GRDC and the use-case organisation will then work towards recontracting and a revised Implementation Plan.

4. By 20 May 2021, consistent with Implementation Plan (unless revised), provide industry with ML technology enabling synthesis of textual grains R&D information and improved information delivery to growers. Submission of final report to TCG and GRDC.

PROJECT G: Machine learning capacity, capability, and use-cases for the grains industry - Open call for machine learning use-cases delivering value to Australian grain growers

Procurement no. PROC-9175960

Machine learning (ML) has the potential to be a transformational technology across many economic sectors, and GRDC is seeking to invest in ML use-cases that can improve profitability for Australian grain growers. GRDC understands that many industry stakeholders are already pursuing their own use-cases or possess datasets that could be incorporated into ML use-cases. Such stakeholders could include public research organisations, state agricultural departments, universities, and private pre-breeding/breeding, agritech, agribusiness, and agri-input organisations.

In this procurement, GRDC invites prospective partners to propose ML use-cases for co-investment.

Outcome

By 30 June 2023, the Australian grains industry has access to ML tools and techniques that directly or indirectly improve Australian grain grower profitability resulting in a benefit-cost-ratio of at least 4:1 returned from GRDC investment.

1. By 30 August 2019 or upon contracting, commence full participation within the Technical Consultation Group (TCG). TCG participants will be required to sign a Participation Agreement specifying ongoing duties:

- Four meetings per year, at least two attended in person
- Review Feasibility Assessments submitted by other proposed use-cases
- Biannual review of each use-case, advising on technical feasibility and considerations (including data collection/collation considerations)
- Review additional use-case proposals provided by GRDC, making technical recommendations (at least six proposals to be submitted/reviewed by 30 June 2021)
- Engage with mid-term review process (June 2021)
- Provide additional expert ML advice as required
- Each use-case will be expected to contribute between 0.1 and 0.2 FTE p.a. toward TCG activities.

2. By 15 November 2019, complete use-case Feasibility Assessment and submit to TCG for peer-review*. This is a
STOP/GO output determining if the use-case proceeds as is or with revisions, or is terminated. Review by TCG/GRDC and a decision by GRDC whether to continue co-investment will take place within 30 days.

3. By 20 February 2020, pending continuation beyond Output 2, complete use-case Implementation Plan detailing scientific approach, workplan, international collaborations, stakeholder engagement, and path-to-market. Submit to GRDC for review. As part of the Implementation Plan, use-cases will provide biannual reports to GRDC and the TCG for review. In these reports and/or ongoing discussions with GRDC, use-cases will have the opportunity to express interest in extending their use-case work into financial years 2022 and 2023. Expression of interest must be made by December 2020, with GRDC responding by 30 March 2021. GRDC and the use-case organisation will then work towards recontracting and a revised Implementation Plan.

4. By 20 May 2021, consistent with Implementation Plan (unless revised), provide industry with specified ML tools/techniques. Submission of final report to TCG and GRDC.

Questions and Answers