Terms of Reference

Matching feed supply in a variable landscape to a changing climate

Program of Work

Meat & Livestock Australia (MLA) are investing in research, development & adoption (RD&A) initiatives that contribute to MLA programs of work to increase the productivity, profitability and sustainability of the grassfed beef and sheepmeat sectors. Proposals are sought for developing and executing collaborative and participative research to fit within this program of work.

The focus of this terms of reference (ToR) is to address improved management of spatial and temporal variability on-farm in order to meet the short and longer-term needs around feedbase production (including ongoing supply of new plant materials) and the utilisation of the research by industry for improved outcomes.

Climate science research and modelling of future climates reveal the need for agricultural production systems to adapt to greater seasonal variability, with a higher frequency of extreme events. The livestock industry is very exposed to changes in climate, resulting in reduced productivity and profitability.

This ToR contributes an overarching industry research question of:
"What combinations of pastures, crops, vegetation and livestock, and their optimised placement and management will deliver a resilient and sustainable livestock production system adapted to variable seasonal conditions"?

Two underpinning elements are identified to address this question:
1. Understanding spatial and temporal variability of the landscape and how zonal management could be utilised to optimise sustainable pasture and livestock production.
2. Coordinated farm planning using zonal management and interventions that use Best plants, and **Best management** to optimise the production system (within and across years).

Summary

This call is seeking national research, addressing an overarching regional question that will use a design-led planning approach, with R&D linked to supported delivery of regional solutions and adoption.

Across northern and southern Australia, feedbase research and delivery activities have progressed. Research in this area has been focused on addressing feed gaps, maintaining pasture production and stability to meet the requirements of animal production, and management of the natural resource base. This has been across plant breeding, evaluation, underpinning agronomy and management areas.

Over time the priority actions are to develop a cohesive systemic program structure addressing elements contributing to short and long-term productivity and resilience of livestock businesses. This

requires components that support an understanding and managing temporal and spatial variability in feed supply and animal production needs.

Livestock production are a dynamic mosaic comprising the land resource, pastures, cropping, animals, health and welfare factors, and climate variability, which impact livestock and pasture production. These factors drive "zonal management" decisions to optimise the composition and layout of the feedbase and to accommodate short and long-term production goals. Whole property planning can help address complex and chronic problems potentially delivering multiple benefits – production, profitability, environmental and sustainability outcomes. Such optimisation may also yield unplanned synergies; e.g. increased biodiversity to facilitate pest management strategies reducing production costs; feed to finish animals and improve soil condition; woody vegetation providing forage, shade, hydrological benefits, opportunity for carbon based income; crop- pasture transitions; high performance pastures – finishing animals while allowing spelling elsewhere etc. The aim is to support farm management planning and transition to an improved "design" – optimising the integration of the resources and utilisation across variable seasons. Towards supporting adoption of an "action" (e.g. species and combinations, agronomy and grazing approaches) it will be critical to understand trade-offs, synergies, antagonisms and opportunities arising from such actions.

Supporting the above and the use / placement of existing pasture species in 'new' areas as regional climates change, future production systems will require new plants. Development of pasture species is included in this ToR.

Impacts

Applications to these terms of reference must contribute to development and demonstrated adoption of technologies and associated knowledge products that will improve the uptake of existing feedbase research, measured as increased production or decreased cost of production. Specifically, applications must demonstrably contribute to at least two of the following KPIs:

1) Deliver a demonstrable outcome towards the industry initiative of Carbon Neutral by 2030 and the Beef/Sheep Sustainability Framework
2) Increased value of meat sales
3) Improve business performance by ≥ 5%
4) Alignment of production practices with community expectations on management of the environment (soil, water, biodiversity) and animals (health and welfare).

Priorities to be addressed and associated deliverables

MLA is seeking preliminary RD&A proposals to conduct research, development and demonstration of activities that improves profitability in beef and sheepmeat production by addressing the following areas. Researchers are encouraged to address more than one of the following focus areas in a preliminary application. Preference will be given towards more systemic approaches around a production system.

1. Develop a business plan for pasture breeding *(MDC applications only)*

Provide recommendations to MLA on future pasture breeding via development of a business case, investors and investment plan to 2030. The plan would enable breeding of legumes (annual and perennial), temperate and tropical pastures and shrub species that:

- Improve animal production (via quality and quantity available)
- Are persistent (under dry and variable climates)
- Optimise year-round dry matter production, reducing variability in the feedbase
- Contribute to greenhouse gas mitigation

- Enhance grazing / farming enterprises.

Deliverables

- Business case and investment plan for breeding of targeted legumes (annual and perennial), temperate and tropical pastures and shrub species
- Funding partners and research providers confirmed
- Only proposals seeking funding via MDC should be submitted.

2. Pasture composition and multi-species mixes, forages and vegetation *(Levy funded and MDC applications will be considered, however MDC applications will be viewed favourably)*

Research and demonstration that utilises existing knowledge about the agronomic, physiological and nutritional value of pastures forages and woody species to determine best bet multi species combinations and mixes. The hypothesis that multi species fodder crops, pastures and woody species improve livestock performance, can reduce cost of production and provide additional benefits (environment (carbon sequestration, biodiversity), manage pest diseases, animal welfare) should be tested.

- Applied R&D in association with producer groups to address regionally defined feed gaps, extending the growing season and availability of required pasture quality and quantity
- In scope - temperate, Mediterranean & tropical pasture species, crops, woody species
- Seeking 'additivity' across plants and animals - enhancing the benefit above just 'better plants' is desired by inclusion of 'better animals' (genetics – targeting the most appropriate markets for the biophysical production context), and 'better management' (eg rotational grazing to maximise intake, spelling pastures)
- A priority is the low and medium rainfall (mixed farming) zones due to increased climate variability and associated business risk
- Projects proposed for funding via the MDC will be given preference.

Deliverables

- Pasture composition/mixtures with a logical (demonstrable) rationale that confers a stable production base across seasons, with efficient use of soil moisture and nutrients
- Articulated value proposition from (multiple) benefits to support a case for adoption
- Deliver multiple, additive benefits, incorporating variation of animal genetics, and enterprise type in defining an optimised (future) system
- A network of regional demonstration sites to drive adoption of existing lines that could link multiple locations and regions. Optimally these programs would run for at least four years
- Working with producer groups, demonstrations are to effectively demonstrate pasture / shrub / animal production in a commercial context – benchmarked with a realistic control.
- Zonal management planning tools/platforms to facilitate the integration and optimisation of pastures, forages, woody vegetation for multiple production and environmental benefits.

3. Approaches to cost effectively map, measure and monitor soil condition and constraints to a productive, persistent feedbase at paddock and regional scales *(MDC applications only)*

Feedbase production is reliant on productive soils (chemical, physical and biological- capability and condition) in both the shorter and longer term. This priority is to support a sustainable soil resource investigating identification and improvements to chemical, physical, biological constraints including:

- Measuring, mapping and understanding spatial variability in soil condition and identification of constraints where a deficiency in current knowledge in pasture systems is documented
- Understand how grazing management, other agronomic practices and pasture composition influence soil condition
- Soil management strategies that influence and improve the soil condition

- Identification of cost-effective practice and ameliorants to improve soil condition
- Delivery platforms to import and integrate data layers to facilitate farm planning, zonal management and predictive modelling
- Only proposals seeking funding via MDC should be submitted.

Deliverables

- Tools, technologies, delivery platforms or protocols for mapping, measuring and monitoring soil properties and its condition at a paddock, property scale
- A suite of practical indicators that describe soil condition and would reflect changes to the production system
- Agronomic and management practices and ameliorants that alleviate underlying causes of constraints
- Field tools (modified or requiring development) for producer and advisor use to measure, monitor and foster understanding of soil capability and condition, and cost benefit of corrective actions.

Applicants to the terms of reference must clearly identify which of the priorities and any gaps in R&D / demonstration their application seeks to address. It is an expectation that prior to submission of a preliminary proposal applicant/s have engaged with producers through regionally relevant advisory council i.e. NABRC, SALRC or WALRC and other industry stakeholders (consultants, merchants, service providers) to also identify extension and adoption pathways. Applicants must consider how any funded work will translate into practice change on farm.

In addition to the deliverables the proposal should include:

- A clearly articulated value proposition;
- Where applicable, the net benefit (per head, per hectare, per year, per kg LW gain or product) of the research output if adopted;
- An adoption method and predicted adoption rate including time to peak adoption. Where outputs are earlier stage applied research, the applicant should demonstrate that they have considered potential adoption pathways.

Scope

The work is national in scope although the applications and solutions within each project may be regional and focused bioclimatic zones and on enterprises growing grassfed cattle and sheepmeat.

Collaborative teams across institutions are encouraged to apply to take advantage of complementary skills including research, development, adoption and expertise in the use of products/technologies.

Participation of producers and formal producer networks is encouraged, especially in setting and reviewing the direction of research, development and adoption of practical, on-farm practices.

Proposals should not commence before 1 October 2022. For proposals that are seeking levy funding, preference will be given to those commencing after 1 October 2023.

MLA Donor Company applications will be only considered for **priority 1** (*Develop a business plan for pasture breeding*) and **priority 3** (*Approaches to cost effectively map, measure and monitor soil condition and constraints to a productive, persistent feedbase at paddock and regional scales)* (https://www.mla.com.au/about-mla/what-we-do/mla-donor-company/).

Successful projects will be funded with sheepmeat and/or grassfed beef levies for **priority 2** (Pasture composition and multi-species mixes, forages and vegetation). MLA Donor Company applications will be favourably considered (https://www.mla.com.au/about-mla/what-we-do/mla-donor-company/).

Confidentiality and intellectual property

Applicants must identify any background intellectual property (IP) they bring to the project.

All data and cited references must be acknowledged appropriately in the final publication and it is the sole responsibility of the applicant to ensure copyright laws are not breached.

Where further information is available which may assist the successful applicant in meeting the requirements of the project, MLA will provide such information to the successful applicant.

The successful applicant will be required to enter into a standard agreement with MLA.

MLA will share and discuss this proposal with producers, technical experts, other research organisations and research and development corporations. Please acknowledge this freedom to operate.

Deadline for submissions

Preliminary proposals must be received by MLA before 11.59pm (NSW time) Friday, 2 October 2020. Late proposals will not be accepted.

Use the preliminary proposal template to submit proposals electronically to MLA at:
projectcall@mla.com.au

Preliminary Proposals will be acknowledged and recorded on the MLA project information system.

Applicants will be advised in writing of the success or failure of their Preliminary Proposal in January 2021.

Further information

If you have questions regarding these terms of reference, contact:

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