2021-22 Investment Call – NABRC Producer identified RD&A priorities

SEQBRC	South-east Queensland Beef Research Committee	**CQBRC**	Central Queensland Beef Research Committee	**NQBRC**	North Queensland Beef Research Committee
SQBRC	South Queensland Beef Research Committee	**WQBRC**	Western Queensland Beef Research Committee	**NWQBRC**	North-west Queensland Beef Research Committee
BRAC	Barkly Regional Advisory Committee	**KPIAC**	Katherine Pastoral Industry Advisory Committee	**ASPIAC**	Alice Springs Pastoral Industry Advisory Committee
KIM	Kimberley Beef Research Committee	**PIL**	Pilbara Beef Research Committee		

Table 1: Identify new research, development or adoption gaps, activities and strategies to achieve the desired outcome/s.

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Grassfed Beef	Develop whole systems for managing breeder productivity	**RDE&A** • Develop and demonstrate breeder management systems that maximise productivity and profitability for specific business enterprise goals and production environments	SEQBRC, WQBRC, BRAC, KPIAC	This priority is covered under the new Northern Breeding Business (NB2) consortia and as such will be directly addressed under the NB2 Terms of Reference: "Breeder herd efficiency and managing calf wastage for northern production systems". Proposals will be managed under this program and supported by a mixed funding model (levy, industry and matched MLA Donor Company funds). NB2 acknowledges the importance of key pillars/activities to address targets for improved profitability, sustainability and productivity of breeder operations. These include a focus on: herd, environment and feedbase. Each pillar will have outcomes aligned to improving northern breeding efficiency and have integrated extension and adoption activities under the overarching "Pathway to practice" pillar. More info: https://www.mla.com.au/research-and-development/livestock-production/reproductive-efficiency/northern-breeding-business-nb2/

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	Driving productivity through genomics	**R&D** • Research to increase productivity in all areas	KIM, SEQBRC	To assist in achieving this priority, MLA has tools available for industry including BreedObject and the individual Estimated Breeding Value (EBV), along with Mature Cow Weight (MCW). The impact of utilising indexes on MCW has been addressed in the more recent version of BreedObject and will positively affect selection decisions. The tools align with both the industry Strategic Plans and the National Livestock Genetics Consortium (NLGC) priority of improving Sustainability and Welfare traits. The outcomes provide confidence to industry that producers concerns have been considered heavily within the genetics program over the last 20 years. It is a promising time where we have a better version of BreedObject available to industry as well as the technology to establish improved efficiency.
Sustainable Feedbase Resources	Practical pathways to sustainable pasture	**R&D** • Enhanced ability to manage native pastures • Improved strategies for selection and establishment of sown pastures • Managing the pasture woody vegetation balance	CQBRC	There are a number of projects underway addressing sustainable pastures. Current projects include: • 'Indian Couch invasion: scope, production' (B.ERM.1105) • 'Wambiana – Grazing strategies and tools to improve profitability and land condition' (B.ERM.0108) • 'Legume best management practice in the Brigalow belt bio-region' (B.PAS.0354) • 'Progressing superior tropical grasses and legumes in seasonally-dry Queensland' (B.NBP.0812)

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				• 'Phosphorus management and requirements of tropical legume pasture swards' (P.PSH.1050). Adoption resources/projects: • The Leucaena Handbook • 'PDS: Sustainable Longer Term Leucaena Grass Production' (L.PDS.1909) • 'PDS: Value chain economics of Leucaena' (P.PSH.2006) – to be completed in 2023. • 'Supporting the Leucaena Network; national research and the regional adoption outcomes for a highly productive beef industry' (P.PSH.1226). - To be completed 2022. Following completion of the above projects, the following are areas of extended opportunity: • Expanding a pasture trial network (from southern Australia). • Other vegetation types to be investigated.
	Rotational grazing, wet season spelling and stocking rate management to improve land condition	**RDE&A** • Better use of rotational grazing techniques. (Note from NABRC: Wambiana grazing trial doesn't address rotational systems)	NQBRC, NWQBRC	Existing work is underway addressing rotational grazing, wet season spelling and stocking rate management to improve land condition: • 'Wambiana - Grazing strategies and tools to improve profitability and land condition' (B.ERM.0108- scheduled for completion 2021) (Note: Wambiana grazing trial includes rotational grazing and spelling). • The Feedbase and adoption team working group has been convened to better coordinate plans and delivery of outcomes. There is discussion on networks of "mini-

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				Wambiana" Producer Demonstration Sites's-project in development • On wet season spelling there is a project 'Boosting natural regeneration of the nitrogen capital in grazing lands' (B.PAS.0502) looking at the role of biocrusts in providing Nitrogen and Carbon into native/managed landscapes. It includes research sites at Wambiana , looking at the impact of grazing/wet season spelling on biocrust and plant available Nitrogen for pasture production. Initial project results showing the benefits of moderate stock rate/spelling on allowing biocrusts to recover and contribute Nitrogen/Carbon into soil. Opportunity exists to look at how research outcomes can be better utilised by producers. Delivery of existing knowledge is extended utilising: EDGEnetwork and Grazing Land Management workshops and programs.
	Optimisation of On-Farm vegetation (pastures, forage, trees) for productivity, profitability & sustainability)	**R&D** • How can a farm utilise a pasture mix and stocking rate to avoid a drought related sell down and maintain consistent profitability throughout the enterprise?	SQBRC	This priority is being addressed in two ways: 1. The 2021–22 Terms of Reference 'Matching feed supply in a variable landscape to a changing climate' calls for projects to address this priority, specifically in the areas of: - Pasture composition and multi-species mixes, forages and vegetation; - developing and demonstrating improvements from regionally specific new forage options for related pasture/animal/natural resource management outcomes;

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				- approaches to cost effectively map, measure and monitor soil condition and constraints to a productive, persistent feedbase at paddock and regional scales. 2. 'Tree-Grass balance' research area. MLA is addressing this partnerships via the MLA Donor Company (with the likes of QDAF). For information on the research area see: https://www.mla.com.au/research-and-development/Grazing-pasture-management/native-pasture/tree-grass-balance/
	Developing and trialling alternative grass/legume species to extend protein-digestibility and animal performance into the dry season	**R&D** • Alternative grass and legume species adapted to diverse soil types and climate zones	NQBRC	Existing work is ongoing in the area of developing and trialling alternative grass/legume species to extend protein-digestibility and animal performance into the dry season: • 'Progressing superior tropical grasses and legumes in seasonally-dry Queensland' (B.NBP.0812). • 'Legume best management practice in the Brigalow belt bio-region (Stage 2)' (B.PAS.0354). • 'Progressing superior tropical grasses and legumes in seasonally-dry Queensland' (B.NBP.0812). • 'Phosphorus management and requirements of tropical legume pasture swards' (P.PSH.1050). Completed projects: • 'Assessment of promising pasture legumes and grasses' (B.NBP.0766).

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				• 'Evaluating promising stylo lines for southern Queensland' (B.NBP.0749) (report not yet published). While a northern priority, there is also work being carried out in the south: • 'RRDfP Novel Pasture Legumes in Dry Areas' (P.PSH.1136). • 'P Efficient Pastures (B.PSP.0018). • 'Increasing livestock production by integrating tropical pastures into farming systems' (P.PSH.1029). • 'Extending the boundaries of legume adaptation through better soil management' (P.PSH.1030). • 'Dual purpose crops for lamb production in southern QLD and northern NSW' (P.PSH.1045). • 'Perennial pasture & forage combinations to extend summer feed for southern NSW' (P.PSH.1048).
	Grazing management strategies for improved pasture recovery after drought	**RDE&A** • Identify management options to 'prime' the pasture to maximise the response to rain • Build on previous research and: a) review existing information in combination with b) determine current management practices for drought management and interaction with land condition and financial results; c) scale up examples of effective management within on-ground	WQBRC	It is assumed that grazing management strategies are commonly known and therefore this priority will be addressed by: • Increasing delivery of past work and extension products (eg Wambiana grazing trial; EDGEnetworks Grazing Land Management, Legume pastures management, EDGE business management). • Targeted Profitable Grazing Systems activity including developing a framework for decision making and associated costing. • Wambiana - Grazing strategies and tools to improve profitability and land condition

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		research complemented by modelling of longer-term outcomes		(B.ERM.0108) (Note: Wambiana grazing trial includes rotational grazing and spelling).
Animal Wellbeing	Seek alternatives for painful husbandry practices	**R&D** • Multiple projects required to deliver at least one commercially viable alternative • Research into pain relief vs techniques differ - both needed • High priority need for an alternative to spaying: faster, easier to use, safer	PIL	Cattle castration/spaying: A contraceptive vaccine for female cattle is under investigation in the project 'Development of a single shot immune-contraceptive vaccine for cattle' (B.AWW.0260, utilising ZP as an antigen). A gender non-specific vaccine for cattle targeting GnRH is currently being contracted. Regarding dehorning, the poll gene test is commercially available and requires additional adoption promotion to translate into practice change on-farm. The recently completed project 'Improving the Australian Poll Gene Marker Test' (L.GEN.1713) will form the basis of what is included in the new BredWell FedWell program (which will be rolled out to northern Australia). MLA has a three-year project underway investigating the use of pain relief/analgesics at the time of castration and/or dehorning 'Managing Welfare and Production at Weaning (Northern Beef Pain Relief Project)' (B.PRS.2001), with work largely being conducted in the Northern Territory. As part of Livestock Advisor Updates, MLA are delivering a session on pain mitigation use. This will be delivered in September 2021 and include fact sheets and e-learning modules created in line with the information presented. These will be available for producers and consultants.

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				Sheep Tail docking/marking is being amended with the roll-out of the commercially available NumNuts® system. Projects include: • NumNuts® phase 2: Humane, Low Pain Method for 'marking' Young Ruminants (B.AWW.0239). • NumNuts® marking field studies 2017 (B.AWW.0256). • NumNuts®: Design and proof of concept of a dual function device for delivery of analgesic drug(s) and a castration or tail docking ligature to lambs and calves (B.AWW.0220). • NumNuts® phase 3: Completing the design and production engineering of the Numnuts disposable fluid handling element (B.AWW.0251). • Extended commercial trials of NumNuts® (B.AWW.0263) – currently underway.
Sustainability and CN30	Causes, consequences and management of woodland thickening	**RDE&A** • Data required to inform incoming vegetation laws (Qld) • Includes management of thickening: which species - e.g., eucalypts and carissa • Potential sleeper issue • Potential tree density link to rainfall.	NQBRC	This priority is being address through the 'Tree-Grass balance' research area. MLA is addressing this partnership via the MLA Donor Company (with the likes of QDAF). For information on the research area see: https://www.mla.com.au/research-and-development/Grazing-pasture-management/native-pasture/tree-grass-balance/
	Understanding the importance of plant and animal biodiversity to enhance grazing land management and profitability	**R&D** • Important social licence issue • Ongoing support for JCU biodiversity work at Wambiana	NQBRC, NWQBRC	This priority is being addressed via the 'NRM in a Changing Climate' project submitted in the 2020–21 Investment call which was endorsed for funding by the Red Meat Panel.

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	Carbon footprint/energy audit measurement methodologies and tools	**RDE&A** • Demonstrate to government what is occurring in the north - investment in southern rangelands carbon • Demonstrate the meaning of' carbon neutral'	KIM, PIL	This priority is being addressed via the 'NRM in a Changing Climate' project submitted in the 2020–21 Investment call which was endorsed for funding by the Red Meat Panel.
	Understanding soil health and its impact on rejuvenating degraded rangelands	**R&D** • Particularly in relation to degraded soil around water points in north Australian rangelands	NWQBRC	There are a number of projects underway addressing soil health and improving degraded rangelands including: • 'Boosting natural regeneration of the nitrogen capital in grazing lands' (B.PAS.0502). • 'Rural R&D for Profit- Dung beetle ecosystem engineers – enduring benefits for livestock producers via science and a new community partnership model' (P.PSH.1134).
	Biological control of Navua Sedge	**R&D** • Effective management and control of Navua sedge	NQBRC	The priority is acknowledged, however as a single focus area it has not recieved funding. • MDC applications are welcomed. • MLA invest in the Centre for Invasive Species Solutions (CISS).

	Fall army worm surveillance / management / research / quantify impact	**R&D**
		• A better understanding of:
		  ○ Distribution
		  ○ Pattern and rate of spread
		  ○ Management
		  ○ Impact
			KIM, PIL	Vegetation management relates to this priority – integrated pest management is key here and is a candidate for commencing under other initiatives. Preliminary monitoring is being progressed by Queensland Department of Agriculture and Fisheries (QDAF).

Other	Identify and mitigate barriers to adoption of best knowledge practices	**RDE&A** • A better understanding of how to achieve more effective practice change	SQBRC	MLA has invested significantly in understanding barriers to adoption, which has influenced the new Producer Demonstration Sites (PDS) strategy, increased investment in the Adoption program, the

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				expansion of the Profitable Grazing Systems (PGS) program and the accelerated adoption program. A new tender has been released for investigation into novel adoption programs across industries and how to potentially implement them into agriculture. As part of the NB2 program, a survey will also be conducted to identify barriers to adoption in northern Australia.

Table 2: Identify ongoing research, development or adoption priorities that remain a priority from previous investment calls:

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Grassfed Beef	Improving the rumen function through strategies and/or products to increase productivity (particularly on low quality diet) and decrease methane production	**R&D** • Proven and cost-effective technologies to enhance rumen efficiency • Proven, deliverable and cost-effective rumen technologies that decrease net methane production in ruminants	WQBRC, CQBRC, BRAC	Methane reduction is a key part of the MLA Carbon Neutral 2030 program (CN2030). MLA also coordinates the National Livestock Methane Program (NLMP). There is a project related to reducing methane emissions currently going through internal approvals from the 2020–21 Investment Call. Titled 'Use of 3-NOP for methane mitigation by programming rumen microbiome development in calves', it is researching the use of 3-NOP for methane mitigation in calves. In the feedlot industry, the priority is being investigated in the project (B.FLT.5010) 'Methane emissions of Australian feedlot cattle as influenced by 3-Nitrooxypropanol and diet composition'. A project was completed in March 2020, 'Asparagopsis feedlot feeding trial' (B.FLT.0394) and there are three projects in development on the role of Asparagopsis (red algae) as a feed supplement to reduce methane emissions. Research is also being undertaken investigating how Leucaena call be used as a source of nutrition, as well as the role in methane emissions 'Feeding Leucaena to manage the rumen for maximum beef profit' (B.GBP.0026). As well as a project 'Fit for

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				purpose biochar to improve efficiency in ruminants' (B.GBP.0032).
Sustainable Feedbase Resources	Managing Climate Variability & Drought Preparedness	**RDE&A** • Better preparation and strategies: use past learnings. • Amount of fodder on hand per breeder. • Modelling past rainfall as indication of future. Linked to priority 8 - Short/Long term weather forecasts - accuracy	SQBRC, WQBRC	This priority is being addressed through the climate change and variability area of work with latest information available on the MLA website - https://www.mla.com.au/research-and-development/Environment-sustainability/climate-change-and-variability/ and Managing Climate Variability Program http://www.climatekelpie.com.au/index.php/mcvproject/ For northern producers seeking more information, the Northern Australia Climate Program (NACP) (https://www.nacp.org.au/) is the best resource. NACP is a partnership between the Queensland Government, MDC and University of Southern Queensland, targeted at helping the grazing industry better manage drought and climate risks through a range of RD&E activities. NACP is funded by the Drought and Climate Adaptation Program. A similar effort is required for southern and western Australia and the Managing Climate Variability Program will soon release a Terms of Reference to address this gap (for all Agricultural sectors).
	Optimising supplementation including effectiveness of	**E&A**	KIM	Current projects in this area include:

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	supplementing different animal classes (e.g., weaners vs breeders)	• Cost effective supplementation programs that support early weaning • Cost-effective supplementation programs for different classes of livestock e.g., weaners vs breeders • Cost/benefit analysis • PGS opportunity?		• 'Fit for purpose biochar to improve efficiency in ruminants' (B.GBP.0032). • 'Supplementation to reduce the impact of mycotoxins and insufficient magnesium' (B.GBP.0012). • 'Phosphorus Map of Queensland Grazing Lands' (B.GBP.0043). • 'The gateway to selecting for nutrient efficient livestock – "Better Doers" '(B.GBP.0024). • 'Optimising supplement use in Australia's northern beef industry' (P.PSH.0857). • 'Nitrogen recycling as determinant for feed efficiency of Bos indicus cattle' (P.PSH.1016).
	Regenerative grazing to improve land condition and increase production	**R&D** An understanding of how managing graze periods and rest periods with *grazing* animals might optimise plant *growth* and plant health	ASPIAC	Grazing management strategies are known and this priority will be addressed by: • Increasing delivery of past work and extension products (ie Wambiana grazing trial, EDGE Grazing Land Management (GLM), Legume pastures management, EDGE business management). • Targeted Profitable Grazing Systems (PGS) activity including developing a framework for decision making and associated costing.

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				• 'Wambiana - Grazing strategies and tools to improve profitability and land condition' (B.ERM.0108). • Link to wet season spelling and grazing planning, manage graze and rest period to benefit plant growth (eg spelling at establishment and reproduction).
Other	Short/Long term weather forecasts - accuracy	**DE&A** Continue to encourage the Bureau of Meteorology (BOM) to enhance the accuracy of their forecasts and provide appropriate support BOM where and when required.	SEQBRC	This priority will be covered through investments in the Managing Climate Variability Program (which MLA invests into and is the managing partner), an assessment of the accuracy of various weather forecast tools.