Final report

Scoping analysis of RD&A investment opportunities for the Australian goat industry

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Abstract

As a small and maturing industry, the Australian goat industry has unique requirements for strategic RD&A investments to enhance the productivity, sustainability, and long-term resilience of goat producers and the broader value chain. To support the efficient use of RD&A investment resources, MLA engaged AbacusBio to conduct a scoping analysis to identify investment gaps and opportunities that could guide the prioritisation of future RD&A investment within the Goat Productivity Program. This project mapped historical and existing RD&A investments, gathered stakeholder insights through surveys and workshops, and reviewed the international RD&A landscape to identify potential investment areas. An impact-ease assessment framework was subsequently used to identify priority RD&A investment opportunities. Key results and recommendations included improved extension resources for animal health management, economic benchmarking tools, environmental initiatives and reproductive efficiency strategies. The assessment also identified ongoing need for industry communication, leadership development, and advocacy investments, which will need ongoing support. This project equips MLA and GIRDAC with insights to assist with future investment priorities within the Goat Productivity Program.

Executive summary

Background

The Australian goat industry is a maturing sector within the broader Australian red meat industry, with a primary focus on managed and harvested rangeland goat production. Meat and Livestock Australia (MLA) implemented the Goat Productivity Program (GPP) to provide support to goat producers to improve the productivity, profitability and resilience of their goat enterprises.
To inform the prioritisation of future RD&A investment within the Goat Productivity Program, MLA engaged AbacusBio to undertake a scoping analysis of RD&A investment opportunities.

Objectives

The project was designed and implemented through a structured, multi-phase approach that considered the following components in the identification of subsequent RD&A investment priorities:

1. **Investment mapping and gap analysis** to map historic and current RD&A investment within the GPP against sector and industry strategic plans.
2. **Stakeholder consultation** was undertaken to obtain stakeholder perspectives on priority areas for RD&A investment.
3. **International RD&A Scan** was also undertaken to identify RD&A opportunities based on relevant areas of focus within international domains.

Findings from these phases informed the development of a suite of future RD&A investment opportunities that were subsequently evaluated to identify recommended future RD&A investment priorities.

Methodology

A suite of 35 potential RD&A investment opportunities were identified from a combination of:

- Gap analysis of current and historic GPP investments against the strategic initiatives within the Red Meat 2030 and the Goat Industry Strategic Plan 2023-2027.
- Stakeholder consultation to identify priorities via an online survey and subsequent consultation workshop.
- Review of international goat RD&A via a combination of literature database searches, review of international conference proceedings, and reviewing publications from key international RD&A organisations.

An impact-ease assessment framework was subsequently applied to evaluate each opportunity based on their expected impact on the Australian goat industry, and the ease of delivering adoptable outcomes to industry. The framework subsequently supported the identification of high impact and high ease opportunities that formed the basis of subsequent RD&A investment priority recommendations.

Results

Based on the outcomes of the impact-ease assessment, a subset of high impact and high ease opportunities were identified. These comprised the following RD&A topics:

- Extension information for vets and producers regarding off label parasite treatments options and efficacy.
- Enterprise benchmarking analysis of goat enterprises including comparison to other enterprises.
- Quantify kid losses in rangeland systems to understand full impact on farm system and inform further RD&A interventions.
- Adoption programs focussing on importance of doe BCS and strategies to manage BCS to optimise performance.
- Expand upon current MLA COP/Benchmarking tools to provide additional economic resources for goat producers.
- Evaluate co-grazing benefits of integrating goats alongside other livestock.
- Evaluate drought/climate resilience of goats and impacts on broader production system and business resilience.
- Further investigation of causes and extent of doe/nanny mortality.

Further review of the outcomes of the impact-ease evaluation also identified opportunities for MLA to consider the following additional opportunities as secondary priorities. These comprised opportunities that offered potential easy wins (lower impact but very high ease) or comprised complex, strategic industry challenges (very high impact but lower ease). Additional secondary priorities comprised the following:

- Review DSE ratings applicable to goats to support more accurate assessment of stocking rate across different environments.
- LCA of Australian goat systems to compare GHG emissions and resource efficiency with other livestock.
- Assess the feasibility of integrated parasite management systems to reduce reliance on anthelmintic treatments.
- Work with stakeholders along the value chain to evaluate strategies to better manage market volatility during drought/dry conditions.

Conclusion

This project has undertaken an RD&A gap analysis to inform future investment priorities for the Goat Productivity Program. Outcomes from the project can contribute to improved RD&A investment prioritisation within the Goat Productivity Program based on the identification of recommended investment priorities that consider industry stakeholder needs, alignment with industry strategic plans, and novel opportunities identified through international RD&A scanning.

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1. Background

As the industry has evolved, the Australian goat sector has transitioned from an emerging market to one with several well-established and maturing sub-sectors within the broader red meat industry. Production largely focuses on harvested and managed rangeland goat enterprises, complemented by intensive meat goat production operations. Fibre and dairy goat industries also exist, but these are smaller scale relative to the use of goats for meat production.

Meat goat production in Australia is primarily export-driven, as the country is one of the world's largest exporters of goat meat, with key markets including Asia and the United States. While global demand for goat meat has fuelled sector expansion, the inherent seasonality of rangeland goat production present ongoing challenges to sustainable long-term growth of the industry.

Meat and Livestock Australia (MLA) developed the Goat Productivity Program (GPP) to support goat producers to improve the productivity, profitability and resilience of their goat enterprises (Meat & Livestock Australia, 2025). Historic investment efforts for the Australian goat meat sector have focused on improving reproductive performance, productivity, and profitability, through initiatives like the Kids+ project, animal health resources, and producer tools. Current investments aim to further enhance industry productivity and profitability.

To guide these investments, an independent advisory group, the Goat Industry Research Development and Adoption Committee (GIRDAC), plays an important role in advising MLA on the allocation of goat levy funds designated for Research, Development and Adoption (RD&A) investment. GIRDAC is comprised of commercial goat producers, value chain members, and subject matter experts, which act and operate with a national focus to support the growth and sustainability of the Australian goatmeat industry.

Due to the limited pool of goat industry levies available for RD&A investment within the GPP[1], there is a strong imperative to ensure GPP investments are prioritised to deliver maximum value to the Australian Goat Industry by ensuring levy funds are carefully allocated and strategically aligned to deliver impactful results for the industry.

To support the above, AbacusBio was engaged to undertake an RD&A gap analysis on behalf of MLA and GIRDAC. The gap analysis focussed on the identification of potential RD&A investment priorities for the GPP that could be considered by MLA and GIRDAC as the basis for future investment priorities.

2. Objectives

The project undertook an analysis of RD&A investments applicable to the Australian goat industry to identify gaps and inform future investment priorities within the GPP.

The project was designed and implemented through a structured, multi-phase approach that considered the following components in the identification of subsequent RD&A investment priorities:

[1] Annual Goat industry levies are approximately $700K, of which approximately half is designated for RD&A investment. This contrasts with annual sheep industry levies of approximately $40M (Meat & Livestock Australia, 2025).

1. **Investment mapping and gap analysis** to map historic and current RD&A investment within the GPP against sector and industry strategic plans. This component sought to identify potential gaps that could be targeted to improve alignment to the sector and industry strategic priorities.

2. **Stakeholder consultation** was undertaken to obtain stakeholder perspectives on priority areas for RD&A investment.

3. **International RD&A Scan** was also undertaken to identify RD&A opportunities based on relevant areas of focus within international domains. This component sought to leverage international RD&A activities as a source of more novel opportunities for consideration by MLA and GIRDAC.

Findings from these phases informed the development of a suite of future RD&A investment opportunities that were subsequently evaluated to identify recommended future RD&A investment priorities. The final outcomes provided MLA and GIRDAC with recommended priorities to guide future RD&A investment decisions that ensured alignment with industry priorities and stakeholder needs, whilst considering more novel options.

Figure 1 provides an overview of the components and phasing of the project, and how these were undertaken to achieve project objectives.

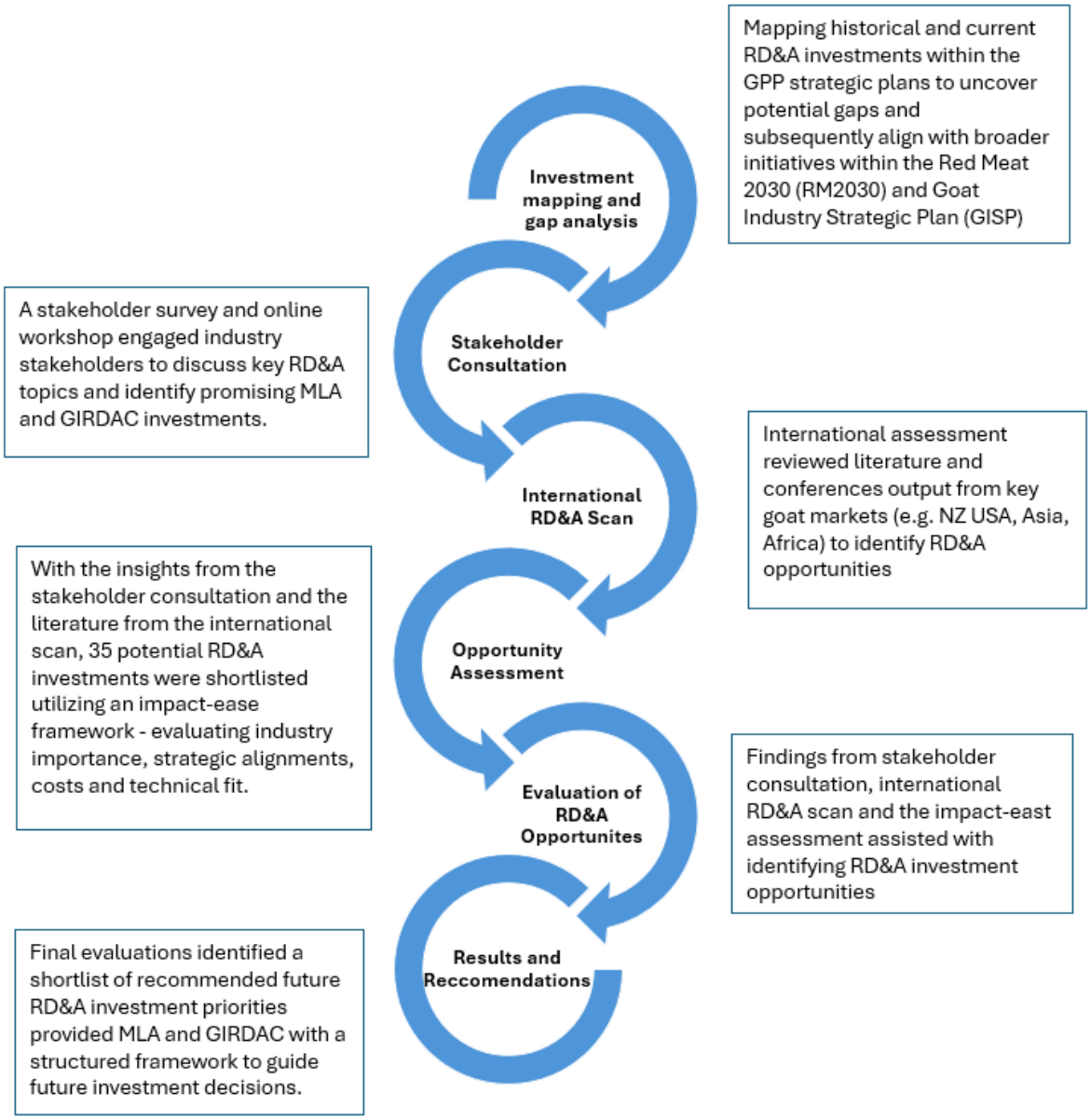

Figure 1: Overview of project phases and methodology

3. Methodology

3.1 RD&A Investment Mapping and Gap Analysis

The first phase of the project incorporated mapping and gap analysis of previous and current RD&A investments applicable to Australian goat producers.

In consultation with MLA, RD&A investments were captured from several key sources:

- All GPP RD&A investments commencing from the initiation of the GPP in 2011.
- AgriFutures investments supporting the development of goat dairy RD&E strategy
- Animal Health Australia investments in RD&A activities supporting on-farm and industry health, biosecurity and traceability activities relevant to the goat industry.
- RD&A activities undertaken by State/Territory agencies and the University sector independently of MLA/GPP and other industry funded initiatives.

Investments from outside the GPP were included within the investment mapping to provide a more holistic view of RD&A investment across the Australian goat industry, and further in recognition that dairy and fibre goat industries do contribute levy funds to the GPP when cull/surplus animals are processed. Investments from outside the GPP were restricted to the same time horizon as the GPP investments (post 2011).

Following collation of the historic and current RD&A investments, these investments were subsequently mapped against the strategic initiatives identified within the Red Meat 2030 (RM 2030) strategic plan for the Australian red meat and livestock industry (Red Meat Advisory Council, 2023), and the subsequent Goat Industry Strategic Plan 2023-2027 (GISP 2023) developed by the Goat Industry Council of Australia (GICA) (Goat Industry Council of Australia, 2023).

This mapping was undertaken to identify potential gap areas within the industry strategies based on the ability to link each strategic initiative within each plan to aligned RD&A investments. The extent to which RD&A investments aligned with each strategic initiative was subsequently categorised along the following scale:

- **Aligned:** multiple RD&A investments that are strongly aligned to all measures of success linked to the relevant strategic initiative.
- **Partially aligned**: multiple RD&A investments that are strongly aligned to most measures of success linked to the relevant strategic initiative.
- **In progress**: Limited suite of RD&A investments that are aligned to some measures of success linked to the relevant strategic initiative.
- **Not started**: no RD&A investments identified that align with the measures of success for the relevant strategic initiative.
- **Not applicable**: the strategic initiative and its measures of success are not relevant to RD&A investment within the GPP, for example market access and trade initiatives.

Following the mapping exercise described above, AbacusBio identified potential RD&A topics that could be considered to improve the alignment between the GPP and the strategic plans. These suggested topics were subsequently integrated into subsequent phases of the project.

3.2 Stakeholder Consultation

3.2.1 Stakeholder Survey

Stakeholder perspectives on potential RD&A investment priorities were obtained through an online survey developed that utilised the Alchemer online survey platform. The survey was conducted between November 7th and 28th, 2024, receiving a total of 228 responses.

The survey was circulated to stakeholders within the goat industry value chain using email/contact lists provided by MLA, social media promotion, and with further assistance from GICA. The targeted respondents included both goat producers and other stakeholders (for example processors, researchers, stock agents and veterinarians) to provide opportunities to contrast views on priorities across respondent types.

A full copy of the survey is provided in Appendix 9.1. The survey comprised of 15 questions that covered a series of topics that included the following:

- Respondent demographics including respondent type (goat producer or industry stakeholder role), age and location.
- Details about the respondent's goat enterprise for example the enterprise type, scale and contribution of the goat enterprise to overall farm income.
- Respondent views on RD&A priorities across a broad range of topics spanning livestock production, feedbase and farm systems, sustainability and general industry topics[2]. Potential RD&A priorities were kept at a relatively high level (e.g. improving parasite management) to ensure a manageable survey length and complexity.

Questions seeking respondent views on RD&A priorities utilised a Likert scale where respondents indicated their level of agreement on the importance of each potential RD&A topic on a six-point scale from strongly disagree to strongly agree.

Priority RD&A topics were subsequently identified based on preference rankings across all respondents. Further analysis was also undertaken to compare priorities across respondent type to understand the influence of demographic factors on topic prioritisation.

3.2.2 Consultation Workshop

An online workshop was undertaken in December 2024 to further understand industry views on priority topics identified within the survey. This consultation was critical to identifying and understanding specific RD&A investments that could be further evaluated for potential consideration by MLA and GIRDAC.

The workshop focussed on a facilitated discussion of the following RD&A topics identified as highest priority within the survey:

- Improved parasite management.
- Improving quality and consistency of supply to processors.

[2] Several topics such as industry and market reporting systems, and carcase quality grading, were included in the survey despite not being within the investment scope of the GPP. These topics were included at MLA request to inform potential investment and goat industry engagement within other MLA programs.

- Improving kid survival.
- Improving nanny/doe fertility and survival.
- Economic analysis and benchmarking of goat enterprises.
- Enterprise benefits of integrating goats into mixed livestock systems.

Selection of these priority topics considered both the overall level of priority, consistency in the level of prioritisation amongst respondent types, and capturing topics across RD&A investment areas.

During the workshop, a structured three-stage approach was used to explore each priority research topic in greater depth:

- Discussion of the relative prioritisation of each RD&A topic and its importance across respondent types.
- Discussion of historic and ongoing RD&A investment related to the topic (where applicable), to understand gaps and opportunities to build on prior investments.
- Discussion of key challenges and opportunities linked to the topic that could form the basis of further RD&A investment.

Outcomes from the above were used to identify discrete RD&A investment opportunities for evaluation during later stages of the project.

3.3 International RD&A Scan

To complement the outcomes of 3.1 and 3.2, a scoping assessment of international RD&A activities within the global goat industry was undertaken to identify opportunities that could inform further RD&A investments for Australian goat producers.

The assessment prioritised key international markets relevant to the Australian goat industry, including New Zealand, USA, Central and South America, and Southern Africa, as well as major goat-producing countries such as China and India.

Potential RD&A opportunities were identified across broad categories spanning genetics, reproduction, animal health and welfare, feedbase and farm systems, and environmental sustainability. These categories aligned with key investment areas within the GPP.

Potential opportunities were identified via a literature scan that incorporated the following key sources of published international RD&A literature relating to the goat industry within the target markets:

- Reviewing public literature databases via key word and topic search primarily across Google Scholar, PubMed and Web of Science to gather relevant journal publications, technical reports, and other literature pertinent to international goat production.
- Review of major international conference proceedings to identify key topics, researchers and emerging trends relevant to the international goat industry.

- Review of websites and published reports produced by key international research organisations that invest in international goat industry RD&A[3].

Literature identified from these key sources was restricted to work undertaken from 2000 onwards. Further screening was also undertaken to ensure topics and research outcomes were applicable to the Australian goat industry and did not duplicate historic or ongoing Australian RD&A.

A series of potential opportunities were identified and integrated with outcomes from 3.1 and 3.2 to produce a list of potential RD&A investment opportunities that were subsequently evaluated to identify priority topics for recommendation to MLA and GIRDAC.

3.4 Opportunity Evaluation

A suite of 35 potential RD&A investment opportunities were identified from the investment mapping, stakeholder consultation and international RD&A scan.

To support the identification of recommended RD&A investment priorities for MLA and GIRDAC consideration, an impact – ease assessment framework was utilised to evaluate and rank the list of potential investment opportunities.

The framework evaluated each opportunity's potential impact on the Australian goat industry while also considering the ease of delivering an adoptable outcome to the industry.

The objective of this approach was to identify and separate out opportunities that have the potential to achieve high industry impact whilst offering a comparatively higher ease of delivering an outcome to industry. These high impact – high ease opportunities formed the basis of subsequent recommendations provided to MLA and GIRDAC.

Ranking of each opportunity across the impact and ease dimensions incorporated the following criteria. Evaluation of each opportunity was undertaken independently by AbacusBio.

Impact was assessed on a 1-10 scale and based on a combined score across the following sub-criteria:

- The **importance of the investment area to industry stakeholders** with reference to outcomes from stakeholder consultation activities.
- The level of **alignment to key industry strategic initiatives** within RM2030 and GISP2023, particularly initiatives identified as key alignment gaps.

These sub-criteria ensured the impact assessment considered both the importance to producers and opportunities to strengthen alignment to key industry strategic initiatives.

Meanwhile, ease of delivery was also assessed on a 1-10 scale and based on a combined score across the following sub-criteria:

- The **expected cost of the RD&A investment** based on AbacusBio's assessment of the scope of the expected RD&A investment.

[3] Key examples included International Livestock Research Institute (ILRI) and International Centre for Agriculture Research in the Dry Areas (ICARDA).

- The **expected timeframe** required to deliver an adoptable outcome to industry.
- The **technical complexity** of the RD&A topic and its expected fit with available technical resources.

Due to the limited goat RD&A levy pool, assessment of ease of delivery was weighted most strongly towards the expected cost criteria.

4. Results

4.1 RD&A Investment Mapping

Table 1 and Table 2 provides a summary of strategic initiatives within the GISP 2023 (Table 1) and RM 2030 (Table 2) strategic plans. The level of alignment between current and historic RD&A is subsequently presented to highlight potential gaps that could be targeted via future RD&A investment within the GPP[4].

A detailed version of the RD&A Investment map is provided in Appendix 9.2.

Table 1: RD&A investment gap analysis against strategic initiatives from the Goat Industry Strategic Plan

No.	Strategic Pillar	Strategic Initiative	Measure of Success	Alignment
L1	Livestock	Welfare & animal health	Support the concept of the 5 domains of animal welfare	Partially Aligned
L2	Livestock	Welfare & animal health	Pursue access to approved animal husbandry products	Aligned
L3	Livestock	Welfare & animal health	Promote and periodically review the Fit to Load Guide for goats	Partially Aligned
L4	Livestock	Sustainable presence in market	Implement programs to ensure continuity of supply under ethical standards	Partially Aligned
L5	Livestock	Actions	Pain relief, Accessibility of Q Fever Vaccine	Partially Aligned
L6	Livestock	Actions	Kid Loss, repro efficiency, predation management, diversity, ethics - social licence	In-progress
P1	People	Careers	Attract, train and retain skilled workers	Partially Aligned
P2	People	Education/Awareness	Encourage goat specific education	Aligned
P3	People	Practice change	Encourage producer involvement	Aligned
P4	People	Practice change	Encourage the adoption of technology and best practice by producers	Partially Aligned
P5	People	Networking	Foster and encourage cross sector collaboration	Aligned
P6	People	Building capacity	Inspire producer involvement in policy making pathways	Partially Aligned
P7	People	Workplace health & safety	Engage with the goat industry to enhance work, health and safety practices	Not Applicable
C1	Customers, Consumers & Community	Producer/Consumer Engagement	Instil a positive perception around goats and goat products	Partially Aligned
C2	Customers, Consumers & Community	Producer/Consumer Engagement	Improve the knowledge of the main consumer drivers and respond accordingly	Not Applicable
C3	Customers, Consumers & Community	Financial Engagement	Increase financial clarity at an industry level to support goat production	In-progress
C4	Customers, Consumers & Community	Industry Engagement & Risk	Be proactive in engaging all goat owners in risk mitigation through best practice	In-progress
C5	Customers, Consumers & Community	Communication	Develop an all-encompassing comms plan	In-progress
C6	Customers, Consumers & Community	RDC Linkages	Strengthen linkages with RDC's	In-progress

[4] Items identified as 'Not Applicable' refer to strategic initiatives that fall outside the scope of the GPP which is focused on investment linked to on-farm outcomes for goat producers (Meat & Livestock Australia, 2025).

No.	Strategic Pillar	Strategic Initiative	Measure of Success	Alignment
E1	Environment	Sustainability	Develop a sustainability framework for the goat industry	In-progress
E2	Environment	Sustainability	Pursue actions consistent with the Carbon Neutral 30 (CN30) policy	Not-started
E3	Environment	Sustainability	Ensure preparedness for natural disasters	Not-started
E4	Environment	Sustainability	Promote environmental stewardship by the goat industry	In-progress
M1	Marketing	Market penetration	Investigate co-branding opportunities	Not Applicable
M2	Marketing	Market penetration	Pursue new markets	Not Applicable
M3	Marketing	Access/Trade Barriers	Develop a pathway for a return to market after a market failure	Not Applicable
M4	Marketing	Access/Trade Barriers	Remain engaged in improving and retaining market access	Not Applicable
M5	Marketing	Live Export	Develop a risk mitigation strategy for access into all markets	Not Applicable
M6	Marketing	Product	Ensure innovation and technology continues to be pursued and implemented in the goat industry	Not Applicable
M7	Marketing	Actions	Violations, FMD (vaccine policy), other EAD's	Not Applicable
M8	Marketing	Actions	Understand National Residue Statement	Not Applicable
S1	Systems	Brand Trust	Engage and enable robust systems to underpin trust in the goat industry	In-progress
S2	Systems	Traceability/Biosecurity	Continue to supply a nationally consistent approach to traceability and biosecurity	In-progress
S3	Systems	Information	Engage with strong partners with all sectors of the supply chain	In-progress
S4	Systems	Levies	Educate producers on the transaction levy system and use of levies, to maximise levy capture	Not Applicable
S5	Systems	Actions	Jurisdictional harmony, stock standstill, EAD plans	In-progress

Table 2: RD&A investment gap analysis against strategic initiatives from the Red Meat 2030 Strategic Plan[5]

No.	Priorities	Initiatives	Status
P1	People	Attracting and retaining good people	Partially Aligned
P2	People	Developing skilled and capable people	Partially Aligned
P3	People	Enabling practice change	Aligned
C1	Customers, Consumers & Community	Educating and advocating for Australian red meat	Not Applicable
C2	Customers, Consumers & Community	Responding to our audience	Not Applicable
C3	Customers, Consumers & Community	Positioning red meat as a protein of choice	Not Applicable
L1	Livestock	Ensuring whole-of-industry animal health and welfare standards and systems	In-progress
L2	Livestock	Adopting animal health, welfare, biosecurity and production best practices	Partially Aligned
L3	Livestock	Optimising animal production for the environment and market	Partially Aligned

[5] Due to the level of detail of the measures of success aligned to each strategic initiative within RM 2030, the measures of success were not able to be included within this summarised version of the investment map.

No.	Priorities	Initiatives	Status
M1	Markets	Reducing tariff and quota barriers to trade	Not Applicable
M2	Markets	Reducing non-tariff barriers to trade	Not Applicable
M3	Markets	Ensuring Australia remains competitive with international red meat markets	Not Applicable
M4	Markets	Identifying high-value opportunities	Not Applicable
E1	Environment	Advancing our sustainability frameworks and supporting their adoption	In-progress
E2	Environment	Moving to a carbon neutral industry by 2030	Not-started
E3	Environment	Expanding our role in environmental stewardship	Not-started
E4	Environment	Building on our proactive approach to climate variability	In-progress
S1	Systems	Ensuring end-to-end integrity, traceability and provenance	In-progress
S2	Systems	Enabling supply chain data integration and efficiency	Not Applicable
S3	Systems	Improving digital connectivity	Not Applicable
S4	Systems	Embracing automation and Agtech	Not-started
S5	Systems	Building on our approach to biosecurity and food safety	Not Applicable

Based on outcomes from the RD&A investment mapping presented in Table 1 and Table 2, several key gaps were identified that could improve alignment between GPP investments and the industry strategic plans. These key gaps comprised the following:

- **Drought and climate resilience**: both industry strategic plans identified the importance of enhancing resilience of farms and supply chains to drought and climate variability, in addition to the development of adaptation strategies for climate change. Review of historic and current RD&A investments did not identify any initiatives directly focused on these topics.
- **Sustainability and strategies to contribute to the CN30 target**: whilst the development of a sustainability framework for the Australian goat industry has recently commenced, there has been limited investment into initiatives focussed on measuring and enhancing the sustainability of Australian goat enterprises.
- **Agtech opportunities for goat enterprises**: limited investment was identified within areas linked to development and evaluation of agtech innovations and digital agriculture opportunities that could enhance the productivity of Australian goat enterprises.

In addition to the key gaps described above, additional opportunities were identified that could enhance alignment between the GPP and the industry strategic plans.

Overall, the results in Table 1 and Table 2 demonstrate that the GPP has achieved good alignment with the key industry strategic plans despite the constraints of its limited investment resources.

4.2 Stakeholder Consultation

4.2.1 Stakeholder Survey Results

Figure 2 provides a breakdown of survey respondents by goat enterprise type and state. Overall, the survey generated 228 responses, of which 83% were goat producers, 11% comprised other industry stakeholders, and 6% were of unknown role/enterprise.

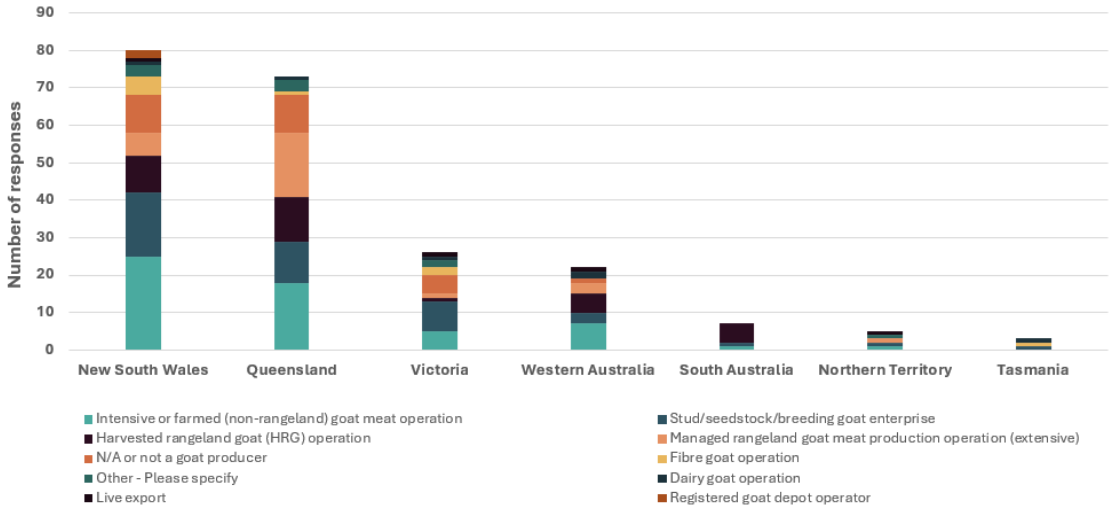

Figure 2: Number of Producers Surveyed and Geographic representation across Australia

Table 3 presents preference rankings by goat producer type for each RD&A topic presented in the survey. Rankings were based on the proportion of respondents within each producer type who either 'Agreed' or 'Strongly Agreed' that the RD&A topic should be prioritised for future investment. The percentage values refer to the proportion of respondents within each segment that agreed or strongly agreed that the RD&A topic should be prioritised for investment.

Further analysis of preference rank across other stakeholder types was not undertaken due to small sample sizes within other stakeholder categories.

Table 3: Preference rankings (1=most preferred) for each RD&A topic across different goat producer types and the proportion of producers that 'agreed' or 'strongly agreed' that the topic should be prioritised for investment

RD&A Sub-Topic	Harvested Rangeland Goat Producers	Intensive Meat Goat Producers	Managed Rangeland Goat Producers	Stud/ Seedstock/ Breeding Goat Producers
Improving parasite management	7 (58%)	1 (92%)	3 (75%)	1 (95%)
Improving quality and consistency of supply to processors	3 (68%)	7 (84%)	2 (80%)	6 (76%)
Industry and market reporting systems and information	1 (76%)	4 (87%)	1 (81%)	22 (59%)
Improving kid survival	4 (65%)	3 (89%)	8 (60%)	2 (77%)
Carcase quality grading (Meat Standards Australia - MSA)	9 (56%)	4 (87%)	7 (64%)	2 (77%)
Improving doe fertility and survival	12 (54%)	4 (87%)	5 (69%)	8 (73%)
Improving disease management	16 (48%)	2 (89%)	12 (53%)	8 (73%)
Economic analysis and benchmarking of goat enterprises	4 (65%)	12 (73%)	8 (60%)	20 (62%)
Enterprise benefits of integrating goats into mixed livestock systems	15 (50%)	12 (73%)	10 (57%)	2 (77%)
Industry leadership and advocacy	2 (69%)	14 (72%)	22 (36%)	2 (77%)
Kid nutrition and finishing systems	20 (44%)	8 (79%)	18 (50%)	7 (75%)
Supplementation and nutrition strategies for breeding systems	21 42%)	8 (79%)	12 (53%)	12 (68%)
Financial and enterprise management resources	23 (38%)	16 (70%)	3 (75%)	24 (57%)
Supplementation and nutrition strategies for kids and finishing systems	14 (54%)	11 (76%)	19 (47%)	17 (64%)
Environmental benefits of integrating goats into mixed livestock systems	6 (64%)	10 (76%)	28 (29%)	12 (68%)

RD&A Sub-Topic	Harvested Rangeland Goat Producers	Intensive Meat Goat Producers	Managed Rangeland Goat Producers	Stud/ Seedstock/ Breeding Goat Producers
Farm development and infrastructure for goat enterprises	12 (54%)	21 (65%)	10 (57%)	22 (59%)
Preparedness for emergency animal diseases	9 (56%)	22 (63%)	19 (47%)	21 (60%)
Remote management and labour-saving systems and technologies	7 (58%)	26 (54%)	6 (67%)	28 (43%)
Improved pasture and forage options for intensive goat enterprises	25 (35%)	16 (70%)	21 (40%)	8 (73%)
Drought and climate risk management strategies	16 (48%)	16 (70%)	23 (33%)	17 (64%)
Improving the application and adoption of genetic improvement programs e.g. KIDPLAN	21 (42%)	22 (63%)	12 (53%)	25 (52%)
Strategies to attract people and labour to the goat industry	25 (35%)	20 (66%)	23 (33%)	11 (71%)
Development of training and information for entry level workers	25 (35%)	15 (71%)	31 (21%)	16 (65%)
Improved knowledge and tools for on-farm biosecurity	25 (35%)	25 (55%)	23 (33%)	14 (67%)
Pain relief and/or alternatives to husbandry procedures	31 (23%)	19 (68%)	23 (33%)	17 (64%)
On-farm digital technologies for data capture and analysis	24 (36%)	29 (46%)	12 (53%)	26 (50%)
Diet quality and grazing management for rangeland goats	18 (46%)	30 (43%)	12 (53%)	30 (40%)
Developing sustainability metrics and benchmarks for the goat industry	18 (46%)	24 (61%)	28 (29%)	27 (45%)
Strategies for intensifying management of rangeland goat enterprises	9 (56%)	31 (42%)	12 (53%)	31 (29%)
Improved industry welfare standards and systems for rangeland harvesting, on-farm management and handling, and off-farm (e.g. transport, processing and live export)	25 (35%)	28 (49%)	30 (27%)	14 (67%)
Evaluating impacts of goats on rangeland ecosystems and the environment	25 (35%)	27 (53%)	27 (31%)	29 (41%)
Improved measurement and reporting goat industry emissions	32 (15%)	32 (24%)	31 (21%)	33 (14%)
Interventions and strategies to reduce goat industry emissions	32 (15%)	33 (22%)	33 (13%)	32 (19%)

Results presented in Table 3 demonstrated a reasonable level of concordance of preference ranking across goat producer types.

Areas where significant divergence in preference rank was observed were relatively intuitive. For example, stud/seedstock breeders exhibited lower preference for market reporting systems due to their key market comprising sales of bucks and other breeding stock to other producers. Similarly, rangeland producers (both managed and harvested) showed stronger preference for remote management solutions and intensification strategies reflecting the greater relevance of these topics to more extensive production systems.

Key priorities that were identified in consultation with MLA for further discussion during the stakeholder workshop comprised the following:

- Improved parasite management.
- Improving quality and consistency of supply to processors.
- Improving kid survival.
- Improving nanny/doe fertility and survival.
- Economic analysis and benchmarking of goat enterprises.
- Enterprise benefits of integrating goats into mixed livestock systems.

The level of preference exhibited for 'Industry and market reporting systems and information' and 'Carcase quality grading (Meat Standards Australia - MSA)' was noted. However, these topics fall outside the scope of the GPP, with feedback on the relative priority of these topics shared with GICA and the relevant programs within MLA.

4.2.2 Outcomes from Stakeholder Consultation Workshop

An online consultation workshop was held with industry stakeholders on 19/12/2024, attended by 19 producer participants (no participants were identified from other stakeholder segments). Table 4 provides a summary of key stakeholder insights from the workshop.

Table 4: Key commentary and insights from Goat Producer Workshop

RD&A Priority	Summary of Key Stakeholder Comments
Improving Parasite Management	• Concerns over lack of parasite treatment products/options. • Limited vet knowledge, and insufficient extension resources available regarding off label products. • Key opportunity for MLA to provide more knowledge resources and education around treatment options available for goats. Information should be targeted to both producers and vets.
Improving Quality and Consistency of Supply to Processors	• Market supply-demand inconsistency is a major issue, with producers dependent on processor demand which is often seasonal and opportunistic. • Also challenges around lack of animal/meat quality specifications that provide inadequate signals to improve genetics and management. • Some advocated for supporting market development through producer levies.
Improving Kid Survival	• Kid survival is poorly understood in rangeland systems, exacerbated by uncontrolled mating and a lack of pregnancy scanning which obscures the problem. • Predation is a key concern. • Opportunity for research to better quantify the key causes and extent of kid losses. • Likely that many key management interventions follow current best practice sheep management e.g. monitoring and managing doe/nanny body condition.
Improving Nanny/Doe Fertility and Survival	• Similar discussion points to kid survival. • Some producers noted the high fertility of rangeland goats and challenges maintaining fertility with crossbred females bred from improved bucks (e.g., Rangeland - Boer cross does). • Producers noted a need for further RD&A around crossbred goat genetics and resources to support selection and use of improved genetics within rangeland systems.
Economic Analysis and Benchmarking	• Producers emphasized the need for economic and production benchmarking across goat and other livestock enterprises. • Opportunity to learn from the top producers – could help with messages around kid survival and fertility topics. • Better understand relatively profitability and efficiency of goats when comparing across mixed systems – help promote the industry.

	• Previous benchmarking projects had been discontinued but these had produced valuable insights.
Enterprise Benefit of Integrating Goats into mixed Livestock Systems	• Similar discussion points to economic analysis and benchmarking. • Goats offer significant grazing benefits, but management remains challenging. • Good opportunity to use benchmarking insights to promote benefits of goats and their integration into mixed livestock enterprises.

Based on producer feedback, several key RD&A opportunities were identified for further evaluation (see section 5).

4.3 International RD&A Scan

Appendix 9.3 contains an overview of international RD&A across opportunities potentially relevant to the Australian goat industry. A summary of potential RD&A opportunities is provided in Table 5.

Table 5: Summary of RD&A opportunities based on outcomes of international RD&A scan

Research Area	Opportunity for Potential Research

Genetics	• Opportunities to further expand the suite of traits offered within KIDPLAN to consider further traits such as disease and parasite resistance, longevity and survival.
	• Opportunities to develop genetic evaluations for milk and fibre goats.
	• Opportunities to explore crossbreeding strategies that focus on the introgression of improved genetics into rangeland herds.
	  ○ Benchmark and quantify productivity outcomes to support greater adoption of improved genetics.
	  ○ Development of adapted crossbred genetics for Australian rangeland environments.
	  ○ Strategies for managing improved bucks within extensive rangeland systems.
	  ○ Management systems to support optimal performance of improved genetics within rangeland systems – health management, supplementation, husbandry, doe and kid survival etc.

Reproduction	• Opportunities to improve the reproductive performance in extensively managed rangeland goat systems via research focusing on:
	  ○ Supplementation options strategies to lift conception rates in rangeland goat enterprises.
	  ○ Cost-Benefit of implementing seasonal mating systems in rangeland environments.
	  ○ Doe/nanny BCS guidelines and management strategies leveraging knowledge gained from sheep production in rangeland environments.
	  ○ Further investigation of causes and extent of doe/nanny and kid mortality.
	  ○ Buck fertility, semen quality and associated nutrition and management practices.
	• Undertake research into goat reproductive diseases applicable to Australian environments and their impacts on herd fertility.

Animal Health and Welfare	• Potential to develop integrated parasite management strategies applicable to Australian environments and production systems to reduce reliance on anthelmintic treatments. • Exploration of guidelines for responsible antibiotic/anthelmintic use and alternative treatments to mitigate resistance in goats. • Exploration of opportunities to adopt improved handling practices and infrastructure design to enhance welfare outcomes and simultaneously improve labour efficiencies.
Environmental Sustainability	• Measurement of goat methane emissions under Australian conditions (including across goat breed types) and diets to support more accurate estimation of goat emissions within the national GHG inventory.

	• LCA assessment of Australian goat production systems to support comparison to the GHG emissions intensity of other red meat industries. Comparative analysis could be extended to broader resource use efficiency of goats versus other livestock classes. • Undertake research to quantify the environmental benefits (including GHG emission reductions) associated with rangeland harvesting of feral goat populations. • Evaluation of the efficacy of GHG emission interventions in Australian goats, particularly key inhibitors/additives approaching commercialisation. • Research to evaluate the drought and climate resilience of goats versus other livestock classes. Evaluate advantages and disadvantages of goats, and the inclusion of goats within mixed enterprise systems.

Feedbase and Farm Systems	• Opportunities to explore goat grazing management in an Australian rangeland context, in particular the following:
	  ○ Diet selection and preferences in diverse rangeland environments, including in combination with other livestock classes.
	  ○ Grazing impacts on ground cover, biomass and biodiversity.
	  ○ Opportunities associated with weed and woody regrowth control/suppression.
	• Co-grazing benefits of integrating goats alongside other livestock.
	• In combination with collection of improved liveweight and reproduction datasets, and understanding of grazing and diet selection, opportunities exist to review DSE ratings and subsequent assessment of carrying capacities and stocking rates applicable to goats.
	• Novel technologies suitable for Australian goat enterprises e.g. virtual fencing, walk over weighing etc.

As a global livestock industry there was an extensive body of international RD&A focused on goat production. However, the identification of RD&A relevant to Australian producers and the broader Australian industry required a very targeted approach due to the uniqueness of Australian goat production systems and industry needs relative to those within other international contexts.

Many of the largest international goat industries are located in developing countries. China, India, Pakistan, Nigeria, Bangladesh and Ethiopia are responsible for over 65% of global goat meat production (Meat & Livestock Australia, 2024), whilst goats represent a key protein source in many smaller developing countries particularly across Africa.

RD&A needs to support goat producers and industry development within these countries are vastly different to the needs of the Australian industry. The international RD&A scan identified a predominance of RD&A focussed on low-input smallholder and village production systems which focussed on very basic husbandry and management systems, as well as other topics less relevant in an Australian context (e.g. gender participation studies).

Furthermore, with goat production predominantly focussed on meeting local and household consumption needs, RD&A associated with value chain and industry development was also focused at a more basic level.

RD&A investment in more mature, developed markets across Continental Europe and North America was generally at a more advanced stage but not always well aligned with Australian producer needs. This was due to greater prevalence of milk and fibre goat industries within these markets (particularly Europe), and major differences in predominant farm production systems that also shape the RD&A needs of producers.

Despite the above, Table 5 highlights multiple opportunities identified through the international RD&A scan that were of potential relevance to the Australian goat industry. These opportunities were identified across a variety of international contexts and research institutions.

Appendix 9.3 highlights a strong pool of RD&A originating from Southern USA, Mexico and Southern Africa that demonstrated the greatest relevance to the Australian goat industry due to its focus on semi-arid and extensive grazing systems, which better align with Australian production systems. Meanwhile Europe and North America offer potential synergies around genetics and ag technology RD&A opportunities.

5. Evaluation of RD&A Opportunities

5.1 Potential RD&A Opportunities

Outcomes from the RD&A gap analysis (section 4.1), stakeholder consultation (section 4.2) and international RD&A scan (section 4.3) were consolidated to identify a list of potential RD&A opportunities for further evaluation.

Table 6 lists and summarises the potential RD&A opportunities that were evaluated via the impact-ease approach described in section 3.4.

Table 6: Short-listed research opportunities identified during Producer Workshop

Opportunity No.	RD&A Topic Description	Source of Opportunity
1	Extension information for vets and producers regarding off label parasite treatments options and efficacy	Stakeholder priority
2	Assess the feasibility of integrated parasite management systems to reduce reliance on anthelmintic treatments	International RD&A scan
3	Quantify kid losses in rangeland systems to understand full impact on farm system and inform further RD&A interventions	Stakeholder priority
4	Crossbreeding and composite breed development for rangeland systems	Stakeholder priority
5	Further investigation of supplementation strategies to lift conception rates in rangeland goat enterprises	International RD&A scan
6	Adoption programs focussing on importance of doe BCS and strategies to manage BCS to optimise performance	Stakeholder priority
7	Further investigation of causes and extent of doe/nanny mortality.	International RD&A scan
8	Develop resistance/resilience traits for KIDPLAN	Investment gap
9	Research into prevalence and impact of reproductive diseases	Investment gap
10	Enterprise Benchmarking analysis of goat enterprises including comparison to other enterprises	Stakeholder priority
11	Expand upon current MLA COP/Benchmarking tools to provide additional economic resources for goat producers	Investment gap
12	Evaluate co-grazing benefits of integrating goats alongside other livestock.	International RD&A scan
13	Review DSE ratings applicable to goats to support more accurate assessment of stocking rate across different environments	International RD&A scan
14	Scholarships, leadership and policy/advocacy training for goat producers	Investment gap

Opportunity No.	RD&A Topic Description	Source of Opportunity
15	Further explore cost-effective nutrition strategies to optimise kids/finishing systems. Consider broader range of supplement options (beyond concentrates) and management interventions	Investment gap
16	Evaluate impact of goats and goat harvesting on rangeland biodiversity and resilience.	International RD&A scan
17	Economic analysis of key investment considerations relating to goat enterprise infrastructure development e.g. cost-benefit of exclusion fencing, water infrastructure and grazing radii etc.	Investment gap
18	Assessment of labour-saving technologies (e.g. virtual fencing, drones, walk over weighing) and their applicability for use in goat production systems.	International RD&A scan
19	Conduct research on forage variety selection and its impact on productivity and health in intensive goat production systems	Investment gap
20	Evaluate drought/climate resilience of goats and impacts on broader production system and business resilience.	International RD&A scan
21	Work with stakeholders along the value chain to evaluate strategies to better manage market volatility during drought/dry conditions	Investment gap
22	Develop KIDPLAN genetic evaluations for milk and fibre goats.	International RD&A scan
23	Adoption programs to improve uptake of KIDPLAN and access to improved genetics	Investment gap
24	Develop case study and comms materials promoting the benefits of goats and careers in the goat industry	Investment gap
25	Work with producers to identify key skills and knowledge specific to goat production that could be incorporated into industry training programs.	Investment gap
26	Review current on farm biosecurity resources and adapt to meet needs/requirements of goat producers.	Investment gap
27	Research the effectiveness of wearable devices for health and performance tracking.	Investment gap
28	Evaluate opportunities to enhance on farm data platforms to support management of goat enterprises	Investment gap
29	Evaluate remote sensing and remote data collection technologies to support goat enterprise management	Investment gap
30	LCA of Australian goat systems to compare GHG emissions and resource efficiency with other livestock	International RD&A scan
31	Quantify and benchmark resource use efficiency of goat systems	International RD&A scan
32	Undertake economic analysis and case studies to develop recommendations for phasing the intensification of rangeland enterprises	Investment gap
33	Continue to improve and develop industry welfare standards and systems for rangeland harvesting, on-farm management and handling, and off-farm (e.g. transport, processing and live export)	Investment gap
34	Measurement of goat methane emissions under Australian conditions to support development of Tier 2 inventory methodologies.	International RD&A scan

Opportunity No.	RD&A Topic Description	Source of Opportunity
35	Evaluation of the efficacy of GHG emission interventions in Australian goats, particularly key inhibitors/additives approaching commercialisation.	International RD&A scan

5.2 Impact – Ease Evaluation

As previously described, the impact-ease evaluation was undertaken to rank and prioritise RD&A opportunities based on consideration of their expected impact on Australian goat producers, and their ease of producing adoptable outcomes for goat producers.

Table 7 summarises the impact and ease scores assigned to each RD&A opportunity, with further assessment notes provided in Appendix 9.4.

Figure 3 subsequently maps each opportunity based on the respective impact and ease scores into high impact and high ease, high impact and low ease, low impact and high ease, and low impact and low ease quadrants.

Table 7: Results of impact-ease scoring of potential RD&A opportunities

No	RD&A Opportunity	Impact Score (/10)	Ease Score (/10)
1	Extension information for vets and producers regarding off label treatments options and efficacy	8.5	8.3
2	Assess the feasibility of integrated parasite management systems to reduce reliance on anthelmintic treatments	6.8	4.2
3	Quantify kid losses in rangeland systems to understand full impact on farm system and inform further RD&A interventions	7.5	6.5
4	Crossbreeding and composite breed development for rangeland systems	4.4	2.3
5	Further investigation of supplementation strategies to lift conception rates in rangeland goat enterprises	5.9	4.5
6	Adoption programs focussing on importance of doe BCS and strategies to manage BCS to optimise performance	7.0	6.8
7	Further investigation of causes and extent of doe/nanny mortality.	5.8	5.0
8	Develop resistance/resilience traits for KIDPLAN	4.3	2.3
9	Research into prevalence and impact of reproductive diseases	4.9	3.5
10	Enterprise benchmarking analysis of goat enterprises including comparison to other enterprises	7.1	7.8
11	Expand upon current MLA COP/Benchmarking tools to provide additional economic resources for goat producers	5.8	6.8
12	Evaluate co-grazing benefits of integrating goats alongside other livestock.	6.0	6.3
13	Review DSE ratings applicable to goats to support more accurate assessment of stocking rate across different environments	4.4	7.3
14	Scholarships, leadership and policy/advocacy training for goat producers	5.5	4.7

No	RD&A Opportunity	Impact Score (/10)	Ease Score (/10)
15	Further explore cost-effective nutrition strategies to optimise kids/finishing systems. Consider broader range of supplement options (beyond concentrates) and management interventions	4.0	4.7
16	Evaluate impact of goats and goat harvesting on rangeland biodiversity and resilience.	4.2	4.5
17	Economic analysis of key investment considerations relating to goat enterprise infrastructure development e.g. cost-benefit of exclusion fencing, water infrastructure and grazing radii etc.	3.5	7.0
18	Assessment of labour-saving technologies (e.g. virtual fencing, drones, walk over weighing) and their applicability for use in goat production systems.	4.8	4.8
19	Conduct research on forage variety selection and its impact on productivity and health in intensive goat production systems	4.4	4.3
20	Evaluate drought/climate resilience of goats and impacts on broader production system and business resilience.	5.6	6.1
21	Work with stakeholders along the value chain to evaluate strategies to better manage market volatility during drought/dry conditions	6.9	3.5
22	Develop KIDPLAN genetic evaluations for milk and fibre goats.	2.9	1.8
23	Adoption programs to improve uptake of KIDPLAN and access to improved genetics	4.3	6.7
24	Develop case study and comms materials promoting the benefits of goats and careers in the goat industry	3.8	7.6
25	Work with producers to identify key skills and knowledge specific to goat production that could be incorporated into industry training programs.	4.2	5.5
26	Review current on farm biosecurity resources and adapt to meet needs/requirements of goat producers.	4.2	6.8
27	Research the effectiveness of wearable devices for health and performance tracking.	4.0	3.3
28	Evaluate opportunities to enhance on farm data platforms to support management of goat enterprises	4.3	4.4
29	Evaluate remote sensing and remote data collection technologies to support goat enterprise management	5.8	4.0
30	LCA of Australian goat systems to compare GHG emissions and resource efficiency with other livestock	4.8	6.5
31	Quantify and benchmark resource use efficiency of goat systems	4.2	5.8
32	Undertake economic analysis and case studies to develop recommendations for phasing the intensification of rangeland enterprises	3.9	6.8
33	Continue to improve and develop industry welfare standards and systems for rangeland harvesting, on-farm management and handling, and off-farm (e.g. transport, processing and live export)	3.8	6.3
34	Measurement of goat methane emissions under Australian conditions to support development of Tier 2 inventory methodologies.	4.0	4.0
35	Evaluation of the efficacy of GHG emission interventions in Australian goats, particularly key inhibitors/additives approaching commercialisation.	3.9	2.1

Figure 3: Impact-Ease Assessment

Based on the outcomes of the impact-ease assessment, the following opportunities were identified as high impact and high ease opportunities.

- **Opportunity 1**: Extension information for vets and producers regarding off label treatments options and efficacy.
- **Opportunity 10**: Enterprise benchmarking analysis of goat enterprises including comparison to other enterprises.
- **Opportunity 3**: Quantify kid losses in rangeland systems to understand full impact on farm system and inform further RD&A interventions.
- **Opportunity 6**: Adoption programs focussing on importance of doe BCS and strategies to manage BCS to optimise performance.
- **Opportunity 11**: Expand upon current MLA COP/Benchmarking tools to provide additional economic resources for goat producers.
- **Opportunity 12**: Evaluate co-grazing benefits of integrating goats alongside other livestock.
- **Opportunity 20**: Evaluate drought/climate resilience of goats and impacts on broader production system and business resilience.
- **Opportunity 7**: Further investigation of causes and extent of doe/nanny mortality.

Importantly, opportunities 1, 10, 3, 6 and 7 were identified as high priority from the stakeholder consultation activities, whilst opportunities 11, 12 and 20 more closely align with key gaps identified from the investment mapping.

Whilst managed and harvested rangeland goat operations currently represent most of the industry levy base, there is a need to ensure future RD&A investments support outcomes across other

industry segments. Most of the identified priorities, particularly opportunities 1, 10, 11, 12 and 20 are applicable to producers across industry segments extending beyond the rangeland goat producers.

In addition, the identified priorities also span a broad range of investment categories covering a range of topics relating to animal health and welfare, animal production, and business/enterprise management topics. This approach is beneficial in ensuring the subsequent RD&A investment portfolio targets a diverse range of industry needs.

5.3 Discussion

Whilst these high impact and high ease opportunities can form the basis of subsequent investment priorities recommended to MLA and GIRDAC, there are additional strategic factors that require consideration.

Opportunities 3, 6 and 7 overlap with the ongoing Kids+ project (P.PSH.1373) that was initiated in March 2022 (Meat & Livestock Australia, 2025). Given P.PSH.1373 comprises a new and ongoing project due for completion in 2027, it is likely that future project outcomes may affect the perceived importance, needs and scope of further RD&A in the area of reproduction and doe/kid survival.

Furthermore, it is also noted that several strategic investment areas, particularly industry communications, and capacity building in industry leadership and advocacy, were not featured amongst the high impact and high ease opportunities identified above despite their strategic importance to the broader industry.

It is likely that this was reflective of the impact-ease approach and its assessment criteria whereby these areas (for example opportunities 14, 24 and 25) were not strongly prioritised by stakeholders and were also not identified as key investment gaps due to past investments in these areas. As a result, these areas were not recognised as current investment gaps but this status would change without ongoing investment. Consequently, MLA and GIRDAC should consider ongoing investment needs in these critical communications and advocacy areas despite the outcomes of this assessment.

Lastly, there is value in considering potential opportunities that fall just outside the high impact and high ease quadrants as there could be opportunities that comprise easy wins (very high ease but lower impact) or provide solutions to more complex industry challenges (very high impact but lower ease). In this context there were several opportunities that fell just outside the high impact – high ease quadrant that could warrant investigation as a source of easy wins or longer-term strategic opportunities. Examples of these comprise the following:

- **Opportunity 13**: Review DSE ratings applicable to goats to support more accurate assessment of stocking rate across different environments.
- **Opportunity 30**: LCA of Australian goat systems to compare GHG emissions and resource efficiency with other livestock.
- **Opportunity 2**: Assess the feasibility of integrated parasite management systems to reduce reliance on anthelmintic treatments.
- **Opportunity 21**: Work with stakeholders along the value chain to evaluate strategies to better manage market volatility during drought/dry conditions.

These additional strategic factors have subsequently been considered when framing up subsequent recommendations for MLA and GIRDAC.

6. Future research and recommendations

This project comprised a scoping assessment to identify potential RD&A investment priorities for MLA's Goat Productivity Program. Based on the outcomes from this project, a range of high and medium priority investment areas have been identified for consideration by MLA and GIRDAC.

Table 8 collates the key findings from this project to recommend potential RD&A investments based on the identified investment priorities.

Table 8: Recommended RD&A investments based on identified investment priorities

Topic	Priority	Recommendations
Parasite Management (Opportunity 1)	High	• Work with vets and producers to collate information on available off label anthelmintic treatment options and their efficacy. • Develop adoption resources and coordinate extension activities targeting vets and producers to educate on treatment options.
Doe and kid survival (Opportunity 3 and 7)	High	• Review and communicate early outcomes from P.PSH.1373 around extent and key causes of kid and doe mortality. • Undertake economic modelling to highlight economic costs and inform development of intervention strategies. • Explore opportunities through potential benchmarking and enterprise analysis investments to establish PDS and other peer-to-peer learning opportunities (e.g. producer groups) to capture and share management insights from leading businesses.
Doe fertility – management of BCS (Opportunity 6)	High	• Supported by early outcomes from P.PSH.1373 and knowledge from other livestock species, develop more targeted adoption material focused on the importance of BCS management to optimal reproductive performance and survival. Describe applicable strategies for different systems and environments. • In conjunction with doe and kid survival initiatives, use economic modelling to quantify potential economic costs and the feasibility of management interventions. • Explore opportunities through potential benchmarking and enterprise analysis investments to establish PDS and other peer-to-peer learning opportunities (e.g. producer groups) to capture and share management insights from leading businesses.
Enterprise analysis and benchmarking (Opportunity 10, 11, 12 and 20)	High	• Undertake an enterprise benchmarking project based around local producer groups. • Capture data and compare impacts of enterprise mix (particularly the integration of goats) on key whole-farm production and economic KPIs. Use data and consultation with producer groups to identify direct and indirect (e.g. enterprise synergies) benefits of integrating goats. Understand optimal enterprise ratios across environments. • Over a longer-term horizon, evaluate the impact of goat enterprise integration on the year-to-year stability of benchmarked farm businesses to assess potential benefits of goat enterprises in the context of risk management and resilience. • Explore opportunities through potential benchmarking and enterprise analysis investments to establish PDS and other peer-to-

Topic	Priority	Recommendations
		peer learning opportunities (e.g. producer groups) to capture and share management insights from leading businesses.
Industry communications and advocacy (Opportunity 14, 24 and 25)	Medium	• Undertake a consultation and needs assessment project to review investments in goat industry communications and broader capacity building initiatives. • Review scope of current industry communication resources to explore opportunities to strengthen alignment with strategic pillars relating to People and Community pillars of the industry strategic plans.
Review DSE ratings applicable to goats (Opportunity 13)	Medium	• Undertake a project to develop a more comprehensive set of DSE ratings applicable to goats across environments. Ratings need to better consider differences in animal size and production and consider regional diet types/preferences to better align stocking rate comparisons between goats and other livestock. • Based on outcomes, develop more comprehensive resources for assessing carrying capacity and determining stocking rates of goat enterprises across regional contexts.
LCA of Australian goat systems (Opportunity 30)	Medium	• Undertake a project to complete life cycle assessment of the goat meat supply chain to quantify emissions and emissions intensity of the Australian goat meat sector. Compare emissions footprint to other Australian and international industries. • LCA needs to consider rangeland harvesting enterprises and inform communication around the benefits of feral goat harvesting and population management. • Outcomes could support broader industry communications around the goat industry.
Feasibility of integrated parasite management systems (Opportunity 2)	Medium	• Undertake an initial literature review of integrated parasite management options to identify opportunities to deliver integrated solutions to industry that support better parasite management outcomes and reduce reliance on anthelmintic treatments. Scope of review can span genetic improvement and breed selection, pasture and browse management, diet selection and bioactive plants, animal management strategies, biological control and other potential interventions. Consider potential applicability in Australian environments and production systems. Identify a toolbox of potential strategies that could undergo further validation and/or delivery to industry.
Strategies to better manage market volatility (Opportunity 21)	Medium	• Undertake a project that engages industry stakeholders along the value chain to more consistently align the supply and demand of goats to processors. • Project could explore opportunities for improved information flow and forecasting of goat supply and demand, improving price and market signals, as well as investigation of on-farm systems and animal specifications that could provide greater flexibility. • Project could also identify potential barriers that limit options and flexibility.

In addition to the investment recommendations identified in Table 8, additional recommendations have been identified. These comprise the following:

1. **Industry communications**: Based on the contribution of industry stakeholders to the consultation phase of this project it is recommended that MLA share project outcomes with industry. It is important to highlight the extent to which the consultation informed key project outcomes to encourage ongoing engagement with industry consultation activities.
2. **Information sharing**: Stakeholder consultation identified strong stakeholder interest in market reporting and information systems, and carcase quality grading (MSA). In addition, stakeholders also identified consistency of processor demand as a key challenge. These areas fall partially or entirely outside the scope of the GPP and require coordination with other MLA programs to explore solutions for industry.
3. **International collaboration**: Identify opportunities to strengthen collaboration with potential international partners and partner networks to scale investments and resourcing of goat RD&A initiatives that target topics relevant to both Australian and international contexts.

7. Conclusion

7.1 Key findings

The project has recommended a range of RD&A priorities for future investment within the Goat Productivity Program. The recommended opportunities were identified via consideration of their potential impact on the Australian industry, and the ease of delivering adoptable outcomes to the industry.

The recommended RD&A priorities comprised the following topic areas:

- Parasite management resources for vets and producers.
- Doe/nanny and kid survival studies building on P.PSH.1373.
- Adoption resources focused on management of Doe/nanny body condition score.
- Enterprise analysis and benchmarking.

Additional medium priority opportunities comprised the following:

- Ongoing investment in industry communications and capacity building.
- Review DSE ratings applicable to goats.
- Life cycle assessment of the Australian goat industry to benchmark emissions and emissions intensity.
- Feasibility of integrated approaches to parasite management.
- Strategies to better manage market volatility.

7.2 Benefits to industry

This project has undertaken an RD&A gap analysis to inform future investment priorities for the Goat Productivity Program. Outcomes from the project can contribute to improved RD&A investment

prioritisation within the Goat Productivity Program based on the identification of recommended investment priorities that consider industry stakeholder needs, alignment with industry strategic plans, and novel opportunities identified through international RD&A scanning.

8. References

Note: Further literature references are recorded within the International RD&A summaries included in Appendix 9.3.

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9. Appendix

9.1 Stakeholder Survey Questions

A. Farm characteristics/Demographics

1. What is your role in the Australian goat industry (tick all that apply)

Goat producer/farmer

- Processor
- Industry service provider (e.g transport, stock agent, consultant, veterinarian)
- Industry research and extension (including State and Territory Government organisation)
- Live export
- Other (please specify)

2. What is your main goat enterprise type? (tick all that apply)
   - Rangeland managed goat meat operation
   - Rangeland harvested goat meat operation
   - Intensive (non-rangeland) goat meat operation
   - Stud/seedstock/breeding goat enterprise
   - Fibre goat operation
   - Dairy goat operation
   - N/A or not a goat producer
   - Other (please specify)

3. Where is your goat operation located? (2 tier 1 state and then region within state)

State	Region
NSW	Central and Western NSW
	Northern NSW
	Southern NSW
VIC	Central VIC
	SE VIC
	Western VIC
QLD	Central QLD
	North QLD
	NW QLD
	SE QLD
	South QLD
	Western QLD
NT	Northern Territories
TAS	Tasmania
WA	Southern WA
	Kimberley
	Pilbara

SA South Australia

N/A or not involved in a goat operation

4. What is the scale of your goat farming operation (three-year average)?
   - Number of goats sold
   - N/A or not a goat producer

5. What is the scale (hectares) of your goat farming operation?

   - Area farmed (hectares)
   - N/A or not a goat producer

6. Approximately what percentage of your farming operation income is derived from goats (three-year average)?
   - 0% to 100% (Slide scale)
   - N/A or not a goat producer

7. How long have you worked in the Australian goat industry? (Slide scale)
   - 0-50+ years

B. RD+A Preferences and Requirements

8. Which of the following categories should be prioritised for future R&D investment based on expected importance to industry (rank from 1 highest priority to 6 lowest priority):
   - Genetics and reproduction
   - Animal health, husbandry and nutrition
   - Feedbase and farm systems
   - Environmental Sustainability
   - Industry systems and risk management (biosecurity, transport, traceability, animal welfare)
   - People, leadership and advocacy

9. Should the following livestock-related topics be prioritised for future RD&A investment? (likert scale – strongly disagree, disagree, slightly disagree, slightly agree, agree, strongly agree):
   - Improving the application and adoption of genetic improvement programs (e.g. KIDPLAN) for identification of superior buck genetics.
   - Improving doe fertility/survival.
   - Improving kid survival.
   - Improving parasite management.
   - Improving disease management.
   - Improving quality and consistency of supply to processors.
   - Kid nutrition and finishing systems.
   - Pain relief and/or alternatives to husbandry procedures.
   - Supplementation and nutrition strategies for breeding systems.
   - Supplementation and nutrition strategies for kids/finishing systems.
   - Other (please specify)

10. Should the following feedbase and farm systems topics be prioritised for future RD&A investment? (likert scale – strongly disagree, disagree, slightly disagree, slightly agree, agree, strongly agree):

- Diet quality and grazing management for rangeland goats.
- Improved pasture and forage options for intensive goat enterprises.
- Drought and climate risk management strategies.
- Enterprise benefits of integrating goats into mixed livestock systems.
- Strategies for intensifying management of rangeland goat enterprises.
- Farm development and infrastructure for goat enterprises.
- Financial and enterprise management resources.
- Economic analysis and benchmarking of goat enterprises (including comparison to other livestock enterprises).
- Remote management and labour-saving systems/technologies.
- On-farm digital technologies for data capture and analysis.
- Other (please specify)

11. Should the following environmental sustainability topics be prioritised for future RD&A investment? (likert scale – strongly disagree, disagree, slightly disagree, slightly agree, agree, strongly agree):
    - Improved measurement and reporting of goat industry emissions.
    - Interventions and strategies to reduce goat industry emissions.
    - Evaluating impacts of goats on rangeland ecosystems and the environment.
    - Developing sustainability metrics and benchmarks for the goat industry.
    - Environmental benefits of integrating goats into mixed livestock systems.
    - Other (please specify).

12. Should the following general topic areas be prioritised for future RD&A investment? (likert scale – strongly disagree, disagree, slightly disagree, slightly agree, agree, strongly agree):
    - Further development of improved industry animal welfare standards and systems for rangeland harvesting, on-farm management and handling, and off-farm (e.g transport, processing and live export).
    - Improved knowledge and tools relating to on-farm biosecurity.
    - Preparedness programs for emergency animal diseases.
    - Carcase quality grading e.g. (Meat Standards Australia - MSA).
    - Industry and market reporting systems and information.
    - Development of training and information resources for entry level workers.
    - Strategies to attract people/labour to the goat industry.
    - Industry leadership and advocacy.
    - Other (please specify)

C. Information sources

13. Where do you currently seek information on goat farming the most?
    - Internet
    - Newspaper
    - Industry research project publications
    - Goats on the Move Newsletter
    - Webinars
    - Goat Industry Conferences
    - Discussion/focus groups
    - Goat farm consultant
    - Discussions with other goat farmers/harvesters
    - Other (please specify)

14. What would you like to see more?

- Webinars
  - Goat Industry Conferences
  - Online resources
  - Newsletters
  - Discussion/focus groups
  - Field days
  - Other (please specify)

D. General

15. Please provide any further comments relating to how you would like to see your goat levy invested within the Goat Productivity Program?

16. Would you be willing to attend a one hour online workshop to discuss goat RD&A in more detail? Please provide your contact details:

Name _____
Email _____
Phone _____

9.2 RDA Investment Map

Project Code/Ref	Title	Funder	Primary Researcher	Start	Term (Yrs)	Status	GISP Alignment	RM2030 Alignment
B.GOA.0127	Response of Rangeland goats to supplements and development of a least-cost supplement calculator	MLA	University of QLD	2018	3	Complete	L4, L6, P4	L3, E4
B.GOA.0092	PDS: Boer Select – Buck Evaluation Program	MLA	BCS Agribusiness	2013	1	Complete	L6, P3, P4	L3
B.GOA.0084	Management of National GiG Roadshow	MLA	Schuster Consulting	2012	1	Complete	L4, L6, P2, P3, P4	P3, L2, L3, E4
B.GOA.2401	Goat Pain Relief Phase One	MLA	Animal Health Australia	2024	1	Complete	L5, L1, L2, L4,	L1, L2
B.GOA.0073	The Australian Meat Goat Survey	MLA	James Cook University	2012	2	Complete	P3, L6	P3, L3
B.GOA.0095	Development of web-based cost of production tools for the goat industry	MLA	Holmes Sackett Pty Ltd	2013	1	Complete	P2, P4, C3	L3
B.GOA.0061	Assessment of the extent and capacity of goatmeat industry supply chains	MLA	Blue Sky Agribusiness Pty Ltd	2012	2	Complete	S3, P5, L4	P3
W.LiV.0159	Preparation of rangeland goats for live export	MLA	Murdoch University	2011	3	Complete	L3, L4, P2, C4, S1, S3	L2, S1
B.GOA.0088	Evaluate the efficacy of anthelmintics and dosing practices in goats	MLA	CSIRO	2012	2	Complete	L1, L2, L5, L6, C4	L1, L2
B.GOA.0091	Goats On The Move eNewsletter and Market Report Delivery	MLA	Schuster Consulting Group Pty Ltd	2013	3	Complete	P2, P3, P4, P5, C1, C5, S3	P3, L3
B.GOA.0096	Operational upgrade of KID Plan website	MLA	Schuster Consulting Group Pty Ltd	2013	1	Complete	L6, P2, P4	P3, L3
P.PIP.0302	Automated Goat Head Browning	MLA	Western Meat Exporters Pty Ltd	2012	3	Complete	L4, P4	No Linkage
B.AHE.0010	Livestock disease survey – stage Phases 1 and 2	MLA	GHD Pty Ltd	2014	1	Complete	L1, L5, L6, P2, S1, S2, S5	P3, L1, L2, S1, S5
P.PSH.0672	Barbervax, a vaccine for Haemonchus contortus infection of sheep: attempts to extend the registration claim to include goats	MLA	The Moredun Research Institute	2014	2	Complete	L1, L2, L4, L5, S1, S2	L1, L3
B.GOA.0130	FECPAC validation for use in goats	MLA	Dawbuts Pty Ltd	2020	1	Complete	L2, L6	L2, L3
B.GOA.1901	Goat Industry Leadership Program Scholarship: Course 26	MLA	Australian Rural Leadership Foundation	2018	3	Complete	P1, P3, P6	P1, P2

Project Code/Ref	Title	Funder	Primary Researcher	Start	Term (Yrs)	Status	GISP Alignment	RM2030 Alignment
B.GOA.1906	Goat Industry TRAIL Program Scholarships 2019-2021	MLA	Australian Rural Leadership Foundation	2019	4	Complete	P1, P3, P6	P1, P2
B.GOA.1907	Sustainable internal parasite control in goats: Effective and safe anthelmintic use	MLA	University of New England	2018	3	Complete	L1, L2, L5, L6, C4	L1, L2
P.PSH.2137	Survey of Australian goat producers' use of KIDPLAN	MLA	University of Queensland Research	2021	1	Complete	L6, P2, P4	P3, L3
B.GOA.0132	A review of internal parasite management and control in the Australian Goat Industry	MLA	Colere Group Pty Ltd	2023	1	Complete	L2, L6	L2, L3
PRJ-010223	A national approach to improving the capacity of the goat milk industry	AgriFutures	Department of Primary Industries NSW	2017	1	Complete	L4, L6, P2, P3, P4	P3, L2, L3,
PRJ-009413	Scoping study for genetic evaluation and improvement of Australian dairy goats	AgriFutures	University of New England	2014	1	Complete	L6	L3
PRJ-012077	Goat Fibre Sustainable Production Guidelines and Manual	AgriFutures	Schuster Consulting Group Pty Ltd	2019	1	Complete	L2, P2, P4, C1, C4, E4, S3	P3, C2, E1, S1
PRJ-010339	Development of a Dairy Goat Industry RD&E Plan	AgriFutures	Miracle Dog Pty Ltd	2015	1	Complete	P2, P3, P5	P3
PRO-017393	Australian Goat Fibre extension and industry development program – Future fibre farming	AgriFutures	neXtgen Agri International	2023	3	In progress	P2, P3, P5	P3
PRO-013268	Development of RD&E strategic plan for Goat Fibre Program 2021-2026	AgriFutures	RM Consulting Group Pty Ltd	2021	1	Complete	P2, P3, P6	P3
B.GOA.0126	National Goat Roadshow	MLA	AgCommunicators Pty Ltd	2018	5	Complete	L1, L4, L6, P1, P2, P4, C4, C5, S1, S3,	P1, P2, P3, C1, L1, L2,
B.GOA.0129	Quarterly Goats on the Move Newsletter	MLA	Dentsu Creative Pty Ltd	2020	4	Complete	L1, L6, P1, P2, P4, C1, C2, C3, C4, C5, C6, M6, S1	P1, P3, C1, L1, L2,
B.STU.2400	Goat Industry Capacity Building Scholarship	MLA	The University of Queensland	2024	1	Complete	L1, L2, P2	P2, L1, L3, E4
B.GOA.2403	Development plan for a Goat Industry Sustainability Framework	MLA	Currie Communications Pty Ltd	2024	?	In progress	C1, E1, E4	P2, C2, C3, E1, E4
B.GOA.0123	Goat Data Collation and Tracking - Phase 1	MLA	NSW DPI	2023	1	Complete	Nil	Nil
B.GOA.0131	Goat Data Collation and Tracking - Phase 2	MLA	NSW DPI	2021	3	Complete	Nil	Nil
B.GOA.0133	Goat Data Collation and Tracking - Phase 3	MLA	NSW DPI	2024	4	In progress	Nil	Nil

Project Code/Ref	Title	Funder	Primary Researcher	Start	Term (Yrs)	Status	GISP Alignment	RM2030 Alignment
P.PSH.1373	Quantifying and improving goat reproduction performance and reducing kid loss	MLA	The University of Queensland	2022	5	In progress	L1, L6, P2, P4, S1	P2, P3, L3
P.PSH.1453	Measuring Rangeland Goats - realising the potential	MLA	NSW DPI	2023	6	In progress	P4,	P3, L2, L3
AHA.01 (no project code)	Revamp Market Assurance Program for Goats (GoatMAP)	Animal Health Australia	Herd Health Pty Ltd			Complete	L1, P2, C4, S1. S3	P2, P3, L1, M2, S5
AHA.02 (no project code)	Update ParaBoss parasite management website and extension program	Animal Health Australia and MLA	University of New England	2024		In progress	L1, P2, C4, S1. S3	P2, P3, L1, M2, S5
AHA.03 (no project code)	Foot-and-Mouth Disease (FMD) Ready	Australian Government Department of Agriculture, Water and the Environment	Commonwealth Science and Industrial Research Organisation (CSIRO)				C4, M7, S3, S5	P2, L1, M2, S5

9.3 Summaries of International RD&A Scan

Intervention Category: Reproduction

Summary of key international research topics

- General reproduction of goats: Broad research into interventions to enhance goat reproductive efficiency, particularly within rangeland contexts. Examples include the following:
    - Reproductive responses to supplementation of mixed/indigenous breed does/nannies in semi-arid rangeland environments. Studies identified favourable responses to both protein and energy supplementation provided for 30 days pre-mating.
    - Breed and management effects on reproduction were evaluated to explore the impact of a host of management interventions (supplementation, parasite control, trace mineral supplementation) on reproduction in the context of typical low-input rangeland goat enterprises. Breed differences were also evaluated and whilst some differences were observed, these were generally of a lower magnitude than the impact of the management interventions.
    - Relationships between liveweight, body condition score, lipid reserves, litter size etc and reproductive performance were evaluated in crossbred rangeland goats. Follicular volume, pregnancy rate, kidding rate, and total number of kids born alive were higher in goats with higher BCS, though fetal mortality and prolificacy showed no relationship with BCS.
    - Extent and causes of perinatal mortality.
    - Effects of controlled seasonal breeding on reproductive performance and liveweight (both does and kids) were evaluated across indigenous goat breeds in low input rangeland environments. Inter-year seasonal variability confounded observations of significant differences in reproductive performance attributable to seasonal mating, though favourable interactions with kid body weight and development were observed.
    - Diet and nutrition interactions with buck semen quality. Research explored interactions between diet selection and subsequent semen quality to determine potential sensitivities to common rangeland browse/forages.
- Research has explored the prevalence, impact and control options for key reproductive diseases, particularly oxiella burnetii, Chlamydophila abortus, and Brucella spp. Biosecurity practices to reduce prevalence of reproductive diseases were also evaluated.
- Studies on methods to synchronize estrus in goats to facilitate timed breeding and improve fertility rates have been undertaken.

Where is the research being undertaken?

General research focusing on reproduction in goats is undertaken across many key countries and research institutions. In particular, several key studies have been identified from a consortium of universities in Mexico.

Examples of relevant key topics and leading research institutions are provided below:

- Effects of supplementation on pregnancy rates of goats under semi-arid rangeland conditions. Universidad Autónoma Chapingo, Unidad Regional Universitaria de Zonas Áridas, Bermejillo, Durango, Mexico (and other partners).
- Effects of breed and management practices on reproductive and milking performance of rangeland goats. Faculty of Agronomy and Veterinary Medicine, Autonomous University of San Luis Potosi, San Luis Potosi, Mexico (and other partners).
- Effect of body condition score (BCS) on ovarian function, sexual behavior, (i.e., females and males; appetitive and consummative), estrus, ovulation, and reproductive performance was investigated in crossbred dairy goats under extensive conditions. Programa de Posgrado en Ciencias en Producción Agropecuaria, Universidad Autónoma Agraria Antonio Narro Unidad Laguna, Torreón 27054, Mexico (and other partners).
- The effect of pregnancy and lactation on diet composition and dietary preference of goats in a desert rangeland. Departamento de Nutrición y Alimentos, Universidad Autónoma Agraria Antonio Narro, Saltillo, Coah 25315, México.
- Relation between semen quality and rangeland diets of mixed-breed male goats. University Autonoma Agraria Antonio Narro, Department of Nutrition, Saltillo, Coah. 25315, Mexico. .
- Effects of controlled seasonal breeding on reproductive performance traits of pastoral goat herds in northern Kenya, plus relationships with doe and kid liveweight and development. Institut für Nutztierwissenschaften, Fachgebiet Nutztierökologie, Humboldt-Universität zu Berlin, Philippstrasse 13, 10099 Berlin, Germany (and Department of Animal Production, University of Nairobi).
- Doe/nanny and kid mortality in rangeland systems – levels of mortality and mortality predictors. Kenya Agricultural and Livestock Research Organization, Arid and Range Lands Research Institute, Makueni/Kenya.

Research into goat reproductive diseases and their management are also undertaken across many countries and research institutions, examples include:

- Biosecurity practices to manage risks and prevalence of reproductive diseases in sheep and goats. Auburn University (USA).
- Identification and management of major goat reproductive diseases. Nanaji Deshmukh Veterinary Science University, Jabalpur, MP, India.
- Identification of risk factors associated with reproductive disorders caused by bacterial infections. Thailand.
- Vaccination programs for reproductive diseases in small ruminants. University of Guelph, Canada.

Research into artificial breeding and estrus synchronisation has also been undertaken internationally across multiple countries/institutions. Researchers are exploring various methods to synchronize estrus in goats to facilitate timed breeding and improve fertility rates.

Potential opportunities for the Australian goat industry

- Opportunities to improve the reproductive performance in extensively managed rangeland goat systems via research focusing on:
    - Supplementation options strategies to lift conception rates in rangeland goat enterprises.
    - Cost-Benefit of implementing seasonal mating systems in rangeland environments.
    - Doe/nanny BCS guidelines and management strategies leveraging knowledge gained from sheep production in rangeland environments.
    - Further investigation of causes and extent of doe/nanny and kid mortality.

    - Buck fertility, semen quality and associated nutrition and management practices.
- Undertake research into goat reproductive diseases applicable to Australian environments and their impacts on herd fertility.

How do these link to RM2030 and the GISP priorities?

Relevant GISP Priorities:
- L1 – support 5 domains of animal welfare.
- L6 - Kid Loss, repro efficiency, predation management, diversity, ethics - social licence.
- P4 – Encourage the adoption of technology and best practice by producers.

Relevant Red Meat 2030 Priorities:
- P3 - Enabling practice change.
- L2 - Adopting animal health, welfare, biosecurity and production best practices.
- L3 - Optimising animal production for the environment and market.
- E4 - Building on our proactive approach to climate variability

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Intervention Category: Animal health & welfare

Summary of key international research topics

- Research has been undertaken on the development of vaccines for major goat diseases, including Peste des Petits Ruminants (PPR), coxiella and goat pox. Goats generally require the same vaccinations as sheep.
- Significant body of research undertaken exploring parasite control, treatment and management strategies applicable to goats. Limited research was identified focusing on development or testing of anthelmintic treatments suitable for major parasites in goats. Instead, most international research focused on integrated and alternative management strategies for parasite control. Examples include:
    - Identification of risk factors associated with parasite infection in low input systems, plus relationships between FEC and health status. Studies showed significant spatial and seasonal variation in parasitic loads with younger animals and males more susceptible to infection. Studies also demonstrated linear relationships between FEC, FAMACHA score and parasite burdens.
    - Studies have explored the efficacy of alternative management practices (e.g. pasture rotations and pasture management, selective breeding, medicinal and bioactive plants, nutritional management) for control of key parasites. Studies have demonstrated the impact of an integrated approach to parasite management that includes strategies such as browsing behaviour, pasture management, bioactive forages and identifying and treating individual animals. In particular, the grazing behaviour of goats and adaptations to the consumption of secondary compounds contained in browse, can support more effective management of key internal parasites.
    - Studies have also explored the prevalence of anthelmintic resistance and strategies to manage risks associated with the development of resistance. Commonly these strategies link back to a 'toolbox' approach combining multiple interventions to manage parasites and parasite infections.
- In addition to anthelmintic resistance, research has also been undertaken on the impact of antibiotic use in goats, including strategies to mitigate resistance risks in Europe and North America. This includes developing guidelines for responsible antibiotic use and exploring alternative treatments.
- Research has been undertaken into goat welfare and welfare indicators. This has predominantly focused on dairy goat enterprises, though studies have explored broader impacts of environment and husbandry practices on indigenous goat breeds in rangeland environments. Interactions involving handling procedures, including routine handling practices induced acute levels of stress, moreso than environmental stressors.

Where is the research being undertaken?

General research focusing on reproduction in goats is undertaken across many key countries and research institutions. Examples of relevant key topics and leading research institutions are provided below:

- Nutrition and parasite interactions to understand potential nutritional and behavioural interactions with immune responses to parasitic nematodes. UMR, INRA/DGER, France.
- Risk factors associated with gastrointestinal parasite infection in rangeland goat herds. Department of Animal Sciences, University of Stellenbosch, South Africa.
- Relationships between faecal egg count and health status of goats in semi-arid rangelands. University of Venda, South Africa.
- Opportunities for alternative management practices to assist with the management and control of parasites. Potential alternative management practices included:
    - Grazing management. Veterinary College, Anjora, Durg, Chhattisgarh, India.
    - Bioactive forages that contain compounds that are associated with reduced parasite infection loads. UMR, INRA/DGER, France.
- Advances in peste des petits ruminants vaccines have been undertaken by National Centre for Veterinary Type Cultures, ICAR-National Research Centre on Equines, Hisar, Haryana, India.
- Research on antibiotic resistance in goats. These regions are developing guidelines for responsible antibiotic use and exploring alternative treatments to mitigate resistance.
- Research on antibiotic resistance associated with the use of antibiotics within goat enterprises was mainly focused on intensive dairy goat systems in North America and Europe. Research was undertaken across a variety of key institutions including University St Louis (USA).

Potential opportunities for the Australian goat industry

- Potential to develop integrated parasite management strategies applicable to Australian environments and production systems to reduce reliance on anthelmintic treatments.
- Exploration of guidelines for responsible antibiotic/anthelmintic use and alternative treatments to mitigate resistance in goats.
- Exploration of opportunities to adopt improved handling practices and infrastructure design to enhance welfare outcomes and simultaneously improve labour efficiencies.

How do these link to RM2030 and the GISP priorities?

Relevant GISP Priorities

- L1 – Support the concept of the 5 domains of animal welfare
- L2 – Pursue access to approved animal husbandry products
- L3 – Promote and periodically review the Fit to Load Guide for goats
- L4 – Implement programs to ensure continuity of supply under ethical standards
- L6 – Kid Loss, repro efficiency, predation management, diversity, ethics - social licence
- P4 – Encourage the adoption of technology and best practice by producers
- S1 - Engage and enable robust systems to underpin trust in the goat industry

Relevant Red Meat 2030 Priorities:

- P3 - Enabling practice change
- L1 – Ensuring whole-of-industry animal health and welfare standards and system
- L2 – Adopting animal health, welfare, biosecurity and production best practices

- L3 - Optimising animal production for the environment and market
- S1 - Ensuring end-to-end integrity, traceability and provenance

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Intervention Category: Feedbase and Farm Systems

Summary of key international research topics

- Goat grazing behaviour and diet selection: Significant research has been undertaken internationally exploring the grazing behaviour and diet selection of goats within rangeland environments. Relevant research topics have included the following:
  - Goat grazing behaviour and diet selection, and how these differ from sheep and cattle. Studies have highlighted more diverse diet selection behaviour and greater diet versatility that confers advantages under variable seasonal and geographic conditions. Goats also possess greater tolerance of secondary plant compounds (eg tannins) which supports grazing of browse and forages that are not as readily consumed by other livestock. Gaps remain around precise estimations of intake and digestibility for goats under grazing conditions.
  - Diet selection of goats within diverse rangeland environments and subsequent impacts on biodiversity. Research has demonstrated that maintenance of moderate grazing pressure from goats in rangeland environments is compatible with maintaining biodiverse rangeland ecosystems.
  - Use of goats for control of weeds and shrubby regrowth. Research has highlighted opportunities for goats to be used to assist with the control of weeds and shrubby regrowth in extensive rangeland environments via intensive, short-term grazing systems. Use of goats to support the control of vegetation fuel loads for wildfire mitigation has also been evaluated.
- Co-benefits of integrating goats into mixed livestock systems: Research has highlighted benefits of incorporating goats alongside other ruminant livestock to leverage co-grazing benefits and other enterprise synergies.
  - Studies have demonstrated increases in overall stocking rate via the inclusion of goats alongside other livestock (sheep). This leverages different grazing behaviours and dietary preferences between goats and other co-grazed animals. The extent of increases in overall stocking rate depend on the level of dietary overlap between the species and thus will depend on the available forage and browse.
  - Studies have highlighted pasture management benefits associated with improved sward composition and biomass from co-grazing goats and sheep.
  - Some studies have also evaluated impacts of co-grazing systems on parasitic loads albeit with mixed, inconclusive results.
- Diet selection and grazing behaviour under continuous versus rotational grazing systems: Research identified some changes in diet selection and composition across grazing systems and highlighted potential benefits of the use of rotational grazing systems for goat production.
- Comparative goat enterprise profitability and production efficiency: numerous studies have analysed and benchmarked the profitability of goat enterprises, including comparisons to alternate enterprises. Studies have also evaluated and compared the production and resource use efficiency.
- Precision livestock management and technological innovations for goat enterprise management: Research has started to explore the application of precision livestock management and broader technological innovations within goat enterprises. Examples of research in this area include the following:
  - Automated systems for monitoring responses to environmental stressors (e.g. thermal stress) via GPS tracking, RFID sensors, and intra ruminal devices.
  - Demonstration that goats are able to adapt to the use of virtual fencing technologies.

Where is the research being undertaken?

Research focusing on grazing and enterprise management of goats is undertaken across many key countries and research institutions. Research examples were identified across Europe, North America, Central and South America, Asia, New Zealand and Africa.

Potential opportunities for the Australian goat industry

- Opportunities to explore goat grazing management in an Australian rangeland context, in particular the following:
  - Diet selection and preferences in diverse rangeland environments, including in combination with other livestock classes.
  - Grazing impacts on ground cover, biomass and biodiversity.
  - Opportunities associated with weed and woody regrowth control/suppression.
- Co-grazing benefits of integrating goats alongside other livestock.
- In combination with collection of improved liveweight and reproduction datasets, and understanding of grazing and diet selection, opportunities exist to review DSE ratings and subsequent assessment of carrying capacities and stocking rates applicable to goats.
- Novel technologies suitable for Australian goat enterprises.

How do these link to RM2030 and the GISP priorities?

Relevant GISP Priorities:
- L6 – Kid Loss, repro efficiency, predation management, diversity, ethics - social licence
- P4 – Encourage the adoption of technology and best practice by producers
- E4 - Promote environmental stewardship by the goat industry

Relevant Red Meat 2030 Priorities:
- P3 - Enabling practice change
- L2 – Adopting animal health, welfare, biosecurity and production best practices
- L3 - Optimising animal production for the environment and market
- E3 - Expanding our role in environmental stewardship
- E4 - Building on our proactive approach to climate variability

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Intervention Category: Environmental sustainability

Summary of key international research topics

Note: Grazing management and impacts of goats on rangeland condition and biodiversity have been discussed under feedbase and farm systems.

- Research has been undertaken to measure and predict enteric methane emissions from goats. This has included research measuring individual goat emissions across breeds, physiological states and diets to inform more accurate estimations of goat emissions. Research has also evaluated the accuracy of different methane measurement systems on goats, including respiration chambers and laser methane detector systems applied within grazing contexts.
- Research has evaluated a broad suite of interventions for reducing goat enteric methane emissions. Generally, these results have aligned with research findings in other ruminants, highlighting potential for key interventions to be deployed in goats. Examples have included the following:
    - Impacts of supplements (concentrates), fats and oils, by-products (e.g. DDG) and natural additives (e.g. cumin) on enteric methane emissions.
    - Emission responses to the feeding of methane inhibitors such as bromoform (inhibitor compound found in *Asparagopsis*). Results from a study incorporating the feeding of bromochloromethane found reductions of enteric methane emissions of up to 33% in goats supplemented twice daily with bromochloromethane (0.30 g of BCM/100 kg of body weight per day).
    - Research has evaluated the enteric methane emissions of goats fed forages containing different concentrations of secondary plant compounds such as condensed tannins.
    - Impacts of early life interventions to alter rumen microbial populations have also been evaluated. Early intervention with bromochloromethane produced reductions in methane emissions that persisted beyond weaning.
- Numerous greenhouse gas life cycle assessments have been undertaken to quantify life cycle emissions and carbon footprints predominantly associated with dairy goat systems. Several studies have demonstrated emissions intensities comparable to advanced bovine dairy systems.
- Research into the climate resilience of agricultural systems has highlighted key advantages of goat production relative to other livestock. These advantages comprise enhanced heat tolerance, greater drought tolerance due to their lower intake requirements and more diverse diet selection, and broader capacity for behavioural adaptation.
- Research has explored and compared the resource efficiency of goat production systems to evaluate and compare sustainability outcomes. This has also included the development sustainability indicators and scorecards for benchmarking the sustainability of goat production across international contexts. Generally, goats compared favourably to other livestock in terms of resource use efficiency, particularly on the basis of carbon footprint and water use efficiency.

Where is the research being undertaken?

Research focusing on emissions measurement of goats and broader sustainability topics is undertaken across many key countries and research institutions. Research examples were identified across Europe, North America, Central and South America, Asia, New Zealand and Africa.

Potential opportunities for the Australian goat industry

- Measurement of goat methane emissions under Australian conditions (including goat breed types) and diets to support more accurate estimation of goat emissions within the national GHG inventory. In particular, research should explore variation across common browse and forages consumed by goats within Australian production systems.
- LCA assessment of Australian goat production systems to support comparison to the GHG emissions intensity of other red meat industries. Comparative analysis could be extended to broader resource use efficiency of goats versus other livestock classes.
- Undertake research to quantify the environmental benefits (including GHG emission reductions) associated with rangeland harvesting of feral goat populations.
- Evaluation of the efficacy of GHG emission interventions in Australian goats, particularly key inhibitors/additives approaching commercialisation.
- Research to evaluate the drought and climate resilience of goats versus other livestock classes. Evaluate advantages and disadvantages of goats, and the inclusion of goats within mixed enterprise systems.

How do these link to RM2030 and the GISP priorities?

Relevant GISP Priorities
- C1 - Instil a positive perception around goats and goat products
- E1 – Develop a sustainability framework for the goat industry
- E2 – Pursue actions consistent with the Carbon Neutral 30 (CN30) policy
- E4 – Promote environmental stewardship by the goat industry

Relevant Red Meat 2030 Priorities:
- C1 – Educating and advocating for Australian red meat
- C2 – Responding to our audience
- L3 – Optimising animal production for the environment and market
- E1 – Advancing our sustainability frameworks and supporting their adoption
- E2 – Moving to a carbon neutral industry by 2030
- E3 – Expanding our role in environmental stewardship
- E4 – Building on our proactive approach to climate variability

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Intervention Category: Genetics

Summary of key international research topics

- Goat genomic resources, research on genes associated with economically important traits. The availability of reference whole-genome assembly of goats, annotated genes, and transcriptomics makes comparative genomics a useful tool for systemic genetic improvement. Quantitative approaches are still required though to enable breeding programs to be implemented adequately.
- Several examples of research into novel traits that fall outside the scope of current traits implemented in KIDPLAN (or under development). Examples include disease resistance traits (CAE), milk production and composition, and longevity/survival traits.
- Strong focus on the role of genomics within genetic improvement programmes across multiple goat industries, particularly in the dairy sector. Use of molecular genetics also investigated across complex traits such as disease resistance and adaptability to environmental conditions.
- Several projects focussed on crossbreeding of wild/indigenous goat breeds with exotic/improved breeds to enhance productivity. Research focuses on quantifying production benefits across multiple traits: milk, meat production, growth rates, fertility.
- The African Goat Improvement Network (AGIN), CBBP (ICARDA & ILRI), other initiatives focused on empowering smallholder farmers, with emphasis on genetic improvement of goats in small holder communities across the African continent. The goals of this program are to improve indigenous goat production in Africa; characterize existing goat populations and to facilitate germplasm preservation where appropriate; and to enhance genomic approaches to better understand adaptation. The long-term goal is to develop cost-effective strategies to apply genomics to improve productivity of small holder farmers without sacrificing adaptation.

Where is the research being undertaken?

- Europe - various research areas within genetics carried out by several groups combined through the research consortia such as SMARTER (https://smarterproject.eu/) and TechCare (https://techcare-project.eu/).
  - Main partners of these projects and research initiatives are INRAE (FR), Institute de L'Elevage IDELE (FR), SRUC (UK), TEAGASC (IE), Universitat Autonoma De Barcelona UAB (ES), Aristotle University of Thessalonikis AUT (GR), ICAR, University of Edinburgh (UK).
- China – research on crossbreeding, population structure, and selective breeding aiming at improved productivity.
  - Department of Animal Science, Jiangxi Biotech Vocational College, Yin Fan (fanyin8662@126.com); Northwest A&F University, Baolong Liu (baolong@nwafu.edu.cn)
- Africa
  - African Goat Improvement Network (AGIN) – Coordination by Curtis P. Van Tassell, Animal Genomics and Improvement Laboratory, USDA Agricultural Research Service, Beltsville, MD, United States, curt.vantassell@usda.gov.
  - ILRI, ICARDA, AfDB - https://www.icarda.org/research/innovations/community-based-breeding-programs-sheep-and-goats. Several initiatives, such as: East Africa Dairy Goat Project (EADGP), KALRO Goat Improvement Program - Kenya, Goat Agribusiness Development for Increased Productivity (GADIP) – Nigeria, Scaling Out of Improved Goat Technologies - Malawi and Mozambique, etc.
- South America

  - Embrapa (Brazilian Agricultural Research Corporation): Embrapa Caprinos e Ovinos focuses on the genetic improvement, nutrition, and management of goats, particularly in Brazil's semi-arid regions. https://www.embrapa.br/caprinos-e-ovinos
  - Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP) works on goat nutrition, genetics, and disease control. Active in dairy goat production and breeding in Mexico. https://vun.inifap.gob.mx/BibliotecaWeb/_Content?/=14364
  - PRODECA (Programa de Desarrollo Caprino): A regional initiative that fosters goat farming development across Latin America, promoting research and knowledge exchange. https://www.argentina.gob.ar/economia/planificacion-del-desarrollo-y-la-competitividad-federal/prodecca
- USA
  - Texas A&M University conducts extensive research on meat goats (especially Boer goats) and dairy goats, with a focus on genetics, nutrition, and management practices for improving goat productivity. https://kinney.agrilife.org/publications/goats/
  - Cornell University, Small Ruminant Parasite Research, resources for parasite control in goats & sheep in the NE US https://blogs.cornell.edu/smallruminantparasites/
  - American Dairy Goat Association (ADGA) supports research related to dairy goats, particularly in genetics, milk production, and herd management practices. They provide funding for research and collaborate with universities and private organizations. https://genetics.adga.org/IndexSearch.aspx
  - CDCB - Genetic evaluation provider for dairy goats in the USA. https://webconnect.uscdcb.com/#/queries

Potential opportunities for the Australian goat industry

- Opportunities to further expand the suite of traits offered within KIDPLAN to consider further traits such as disease and parasite resistance, longevity and survival. Include quantitative genomics and genotyping data/information within Australia, across industries and where genotyping platforms are available. Consider breed types, industries, and services on offer for development of Australia specific SNP profiles.
- Opportunities to develop genetic evaluations for milk and fibre goats, and link these to KIDPLAN to consider meat outcomes in milk/fibre systems. Create strong connections with projects such as Measured Goats.
- Opportunities to explore crossbreeding strategies that focus on the introgression of improved genetics into rangeland herds.
  - Benchmark and quantify productivity outcomes to support greater adoption of improved genetics.
  - Development of adapted crossbred genetics for Australian rangeland environments.
  - Strategies for managing improved bucks within extensive rangeland systems.
  - Management systems to support optimal performance of improved genetics within rangeland systems – health management, supplementation, husbandry, doe and kid survival etc.

- There is evidence that host genetics play a role in determining susceptibility/resistance to CAE and other serious infections and disease progressions. A number of genes and single nucleotide polymorphisms (SNPs) in target genes involved in resistance to infections and diseases have been identified. As there are limitations in traditional control strategies, a genetically based approach could represent a suitable mean to effective control of these diseases.

How do these link to RM2030 and the GISP priorities?

- Novel trait development – GISP: L1, L4, L6, P4. Red Meat 2030: L2, L3.
- Crossbreeding and benefits of improved genetics – GISP: L1, L4, L6, P4, C3. Red Meat 2030: P2, L2, L3, E4.

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9.4 Impact-Ease Scoring and Justification

R&D project	No	Impact	Ease	Comments
Extension information for vets and producers regarding off label treatments options and efficacy	1	8.5	8.3	Impact: High stakeholder priority and strong alignment to multiple industry plan initiatives. Ease: Primarily desktop exercise to prepare adoption content.
Assess the feasibility of integrated parasite management systems to reduce reliance on anthelmintic treatments	2	6.8	4.2	Impact: High stakeholder priority but topic only moderately aligned to strategic priorities. Ease: Long term project with multiple areas of investigation.
Quantify kid losses in rangeland systems to understand full impact on farm system and inform further RD&A interventions	3	7.5	6.5	Impact: High stakeholder priority and strong alignment to multiple industry plan initiatives. Ease: On-farm project. Longer duration to capture seasonal variation. Linked to ongoing projects.
Crossbreeding and composite breed development for rangeland systems	4	4.4	2.3	Impact: Moderate to high stakeholder priority but weak alignment to industry plans. Ease: Complex and long-term project. May duplicate outcomes from existing initiatives.
Further investigation of supplementation strategies to lift conception rates in rangeland goat enterprises	5	5.9	4.5	Impact: Moderate to high stakeholder priority and moderate alignment to industry plans. Ease: On-farm project. Longer duration and complexity to capture seasonal and regional variation. Linked to ongoing projects.
Adoption programs focussing on importance of doe BCS and strategies to manage BCS to optimise performance	6	7.0	6.8	Impact: Doe fertility is high stakeholder priority and moderate to high alignment with industry plan initiatives. Ease: Adoption program that can draw on common strategies from other livestock.
Further investigation of causes and extent of doe/nanny mortality.	7	5.8	5.0	Impact: High stakeholder priority and moderate alignment to multiple industry plan initiatives. Ease: On-farm project. Longer duration to capture seasonal variation. More complex than kid loss. Linked to ongoing projects.

R&D project	No	Impact	Ease	Comments
Develop resistance/resilience traits for KIDPLAN	8	4.3	2.3	Impact: Topics are high stakeholder priority, but genetic solutions not directly considered. Not directly aligned to industry plans. Ease: Large and long-term project to record phenotypes for hard to measure traits.
Research into prevalence and impact of reproductive diseases	9	4.9	3.5	Impact: Fertility is a high stakeholder priority, but diseases not directly considered. Not directly aligned to industry plans. Ease: Large scale on farm project with potentially high cost.
Enterprise Benchmarking analysis of goat enterprises including comparison to other enterprises	10	7.1	7.8	Impact: High stakeholder priority and moderate alignment to industry plans. Ease: Potential to leverage previous project method. Possible fit for MDC model to share cost. Longer term project but could deliver earlier results via historic data.
Expand upon current MLA COP/Benchmarking tools to provide additional economic resources for goat producers	11	5.8	6.8	Impact: Economic analysis/tools are moderate to high priority and moderately aligned to industry plans. Ease: Opportunity to build upon existing tools and leverage outcomes from benchmarking.
Evaluate co-grazing benefits of integrating goats alongside other livestock.	12	6.0	6.3	Impact: Economic analysis/tools are moderate to high priority and moderately aligned to industry plans. Ease: Opportunity to integrate with enterprise benchmarking but may need further on farm work to better understand land condition and biodiversity.
Review DSE ratings applicable to goats to support more accurate assessment of stocking rate across different environments	13	4.4	7.3	Impact: Not recognised as a stakeholder priority and only indirectly linked to industry plans via environmental and biodiversity initiatives.

R&D project	No	Impact	Ease	Comments
				Ease: Can build upon previous work. Challenge understanding contribution of browse across regions.
Scholarships, leadership and policy/advocacy training for goat producers	14	5.5	4.7	Impact: Moderate stakeholder priority and moderate to high alignment to industry plans. Ease: Ongoing investment area. Needs industry engagement and identification of suitable investment opportunities.
Further explore cost-effective nutrition strategies to optimise kids/finishing systems. Consider broader range of supplement options (beyond concentrates) and management interventions	15	4.0	4.7	Impact: Moderate stakeholder priority and indirectly aligned to strategic plans. Ease: On-farm project. Longer duration and complexity to capture seasonal and regional variation. Linked to ongoing projects.
Evaluate impact of goats and goat harvesting on rangeland biodiversity and resilience.	16	4.2	4.5	Impact: Low to moderate stakeholder priority but moderate to high alignment to industry plans. Ease: On-farm project. Longer duration and complexity to capture seasonal and regional variation. Linked to ongoing projects.
Economic analysis of key investment considerations relating to goat enterprise infrastructure development e.g. cost-benefit of exclusion fencing, water infrastructure and grazing radii etc.	17	3.5	7.0	Impact: Low to moderate stakeholder priority and not well aligned with industry plans. Ease: Desktop project supplemented by producer case studies and PDS. Not likely to be a one-size-fits-all approach.
Assessment of labour-saving technologies (eg virtual fencing, drones, walk over weighing) and their applicability for use in goat production systems.	18	4.8	4.8	Impact: Moderate stakeholder priority (high for rangeland producers) and moderately aligned to industry plans. Ease: On-farm project with complexity to consider application of multiple technologies across different enterprise types and environments.
Conduct research on forage variety selection and its impact on productivity and health in intensive goat production systems	19	4.4	4.3	Impact: Lower stakeholder priority outside intensive systems and moderate alignment to industry plans.

R&D project	No	Impact	Ease	Comments
				Ease: Multi-year on-farm project with complexity to consider application of multiple forages across different enterprise types and environments.
Evaluate drought/climate resilience of goats and impacts on broader production system and business resilience.	20	5.6	6.1	Impact: Component topics are of mixed levels of stakeholder priority while drought resilience is highly aligned to industry plans. Ease: Could integrate with benchmarking projects as an initial desktop exercise. Opportunity to leverage case studies and PDS.
Evaluate strategies to better manage market volatility during drought/dry conditions	21	6.9	3.5	Impact: High stakeholder priority and moderate alignment to industry plans around value chain integration initiatives. Ease: Complex area for MLA to influence given topic is largely a commercial and market development issue.
Develop KIDPLAN genetic evaluations for milk and fibre goats.	22	2.9	1.8	Impact: Low stakeholder priority and limited alignment to industry plans. Ease: Large and multi-year investment required.
Adoption programs to improve uptake of KIDPLAN and access to improved genetics	23	4.3	6.7	Impact: Low to moderate stakeholder priority and moderate alignment to industry plans. Ease: Existing models and content for delivery of genetics adoption programs. Long term investment to achieve impact.
Develop case study and comms materials promoting the benefits of goats and careers in the goat industry	24	3.8	7.6	Impact: Low stakeholder priority but moderate to highly aligned to industry plans. Ease: Simple scope to deliver content across some of the topic areas.
Work with producers to identify key skills and knowledge specific to goat production that could be incorporated into industry training programs.	25	4.2	5.5	Impact: Low stakeholder priority but moderate to highly aligned to industry plans. Ease: Potentially complex implementation pathways.

R&D project	No	Impact	Ease	Comments
Review current on farm biosecurity resources and adapt to meet needs/requirements of goat producers.	26	4.2	6.8	Impact: Low to moderate stakeholder priority and moderate to high alignment to industry strategies. Ease: Largely desktop project with industry and stakeholder consultation. Potential for complex implementation pathways.
Research the effectiveness of wearable devices for health and performance tracking.	27	4.0	3.3	Impact: Low stakeholder priority and moderate alignment to industry plans. Ease: On-farm project with complexity to consider application of multiple technologies across different enterprise types and environments.
Evaluate opportunities to enhance on farm data platforms to support management of goat enterprises	28	4.3	4.4	Impact: Low stakeholder priority but moderate to high alignment to industry plans. Ease: On-farm project with complexity to consider application of multiple technologies across different enterprise types and environments.
Evaluate remote sensing and remote data collection technologies to support goat enterprise management	29	5.8	4.0	Impact: Low to moderate stakeholder priority but moderate to high alignment to industry plans. Ease: On-farm project with complexity to consider application of multiple technologies across different enterprise types and environments.
LCA of Australian goat systems to compare GHG emissions and resource efficiency with other livestock	30	4.8	6.5	Impact: Low stakeholder priority but high alignment to industry plans. Ease: Desktop project. Some methodology complexity around harvesting systems.
Quantify and benchmark resource use efficiency of goat systems	31	4.2	5.8	Impact: Low stakeholder priority and moderate alignment to industry plans. Ease: Desktop project. Some methodology complexity around harvesting systems.

R&D project	No	Impact	Ease	Comments
Undertake economic analysis and case studies to develop recommendations for phasing the intensification of rangeland enterprises	32	3.9	6.8	Impact: Moderate stakeholder priority (high for rangeland producers) but not directly aligned to industry plans. Ease: Desktop project supplemented by producer case studies and PDS. Not likely to be a one-size-fits-all approach.
Continue to improve and develop industry welfare standards and systems for rangeland harvesting, on-farm management and handling, and off-farm (e.g transport, processing and live export)	33	3.8	6.3	Impact: Low stakeholder priority and with mixed alignment to industry plans based on each component. Ease: Largely desktop project with industry and stakeholder consultation. Potential for complex implementation pathways.
Measurement of goat methane emissions under Australian conditions to support development of Tier 2 inventory methodologies.	34	4.0	4.0	Impact: Low stakeholder priority but high alignment to industry plans. Ease: Moderate to high cost but short term. Implementation of Tier 2 approach in inventory is likely to be slow.
Evaluation of the efficacy of GHG emission interventions in Australian goats, particularly key inhibitors/additives approaching commercialisation.	35	3.9	2.1	Impact: Low stakeholder priority but high alignment to industry plans. Ease: High cost and complexity.