Vision: The wool industry to be profitable, acceptable and sustainable, as an industry in its own right

Data to support total investment

Analysis to determine tipping point beyond which industry investment to support production volumes in declining demand scenario is unviable

Research should address cause, not the symptoms

Collaboration between researchers to reduce duplication as a guiding principle

					Drivers	for vision		0	utcome	es			
Vision	Themes	Strategy	Issue	Action	primary	additional or future	Market Access MA	Product- ivity P	Cost C	Animal Welfare AW	Environm ent E	Priority	Timeframe
Increased on farm		Best practice animal	Painful husbandry	Cost benefit analysis on age of sale for lambs without tailing or castration/ interaction with growth rates and genetic gains (M)								med	
profitability		management	procedures	Immunocastration***cross reference with refined animal husbandry (H,M)								low	med
	potential			Preoperative anaesthesia for castration and tail docking (Y)		consumer	MA			AW			
	(productivity: cost)			Research pre-operative analgesia for tailing and castration ** cross reference with labour efficiency (M)									
			Long distance	Facilitate dialogue with investors in live export research (K)	consume	profit	MA			AW		high	short
			transport	Long distance transport and live export: not explored (M)									
			Reproductive	Toxoplasmosis abortion risk from wild cats (L)	profit			Р					
			efficiency	Research semen treatments for sex selection (M)	profit				С				
				** cross reference with Genetic tool development and uptake									
				** cross reference with information transfer									
				Lowering mortality rates through targeted extension of risk factors for mortality (A),	profit	consumer		Р		AW		high	short
			mortality and	Identification and quantification causes of lamb mortality and economic impact (A)								med	
			morbidity	Identification and quantification of gains from addressing minor identified risk factors, prior to investment in research (H)									
				Defined indicator toolkit for identifying mortality risk (condition score at different gestation times, body score, growth rates, weaning rates, weaning growth rates, birth weights) (H)								high	
				Define risk management strategies for accelerated lambing systems to reduce lamb and ewe losses (K)								med	short
				Literature review to build case for wider commercial application based on subclinical production loss countered by ARGT vaccine (M)								high	short
				ARGT pasture based early warning test (M)									
				Feed supplementation (minerals, energy, protein, vitamins) for identified targeted situations and seasonal conditions including in periods of climate stress (H) ** cross reference with adaptable pasture systems strategy (M)									
				Immune system boost: identify immune system key regulators and cost effective supplementation (H,L)									
		Precision management	Individual animal management	Virtual fencing/ satellite control of sheep movements linked to electronic sheep identification (H,M)	profit			Р				med	
				Cost benefit analysis for use of precision management system and other farm automation by regions (L,A,Y)								high	long/ ongoing /short
				Develop identification systems: RFID (L)								high	long
				Research identification alternatives (microchip, RNA, DNA, tattoo) (M)								low	long
				Field days with equipment demonstration **collaboration with commercial interests (Y)								high	short
				Case studies of producer use of new infrastructure innovations (Y)									
	1	Labour	Disease immunity	Footrot vaccine: multi serotype (H,L)	profit				С			high	short

		Modify Johne's disease vaccine for improved efficacy, reduced injection site abscess, improved OHS (L) Whole of life vaccines (H)					high	short
	Utilizing sheep behaviour	Sheep behavioural pattern, movement patterns and sheep taste preferences (relating to taste of drenches) (H) for ease of management (M) Sheep behavioural relating to self dosing (L)	profit		С		high	med short
		Research sheep aptitude for behavioural training for self treatment (M)					high	short
		Research trait selection for behaviour **cross reference genetic tool development and uptake strategy (M)					high	short
		Investigate capacity for sheep to self medicate against trace element deficiencies in pasture (Y)					high	short
		Mechanised self dosing system (L)					commercial (Gallagher)	long
		Delivery of treatments and supplements in water (M)						
		Cost benefit analysis of lick feeders as a delivery mechanism (M)						med
predation	Wild dog control	Support wild dog control through research supporting continued use of 1080 and animal welfare impacts (M)	profit		P	AW	high	short
management		Cost benefit analysis of wild dog control ** collaborate with other RDCs (A)					high	
	Fox control	Fox control options (A,M) Investigate and extend the advantages of block bating and timing of block baiting over a significant sized area (A)					high	short-med
	Eagle management	Investigate food supplementation schemes for protected species, to address on farm predation levels (M)						
		Quantify animal numbers taken by predators by season, to support seasonal management plans (M)					high	short
		Extend lessons from CSIRO Eagle Ecology study (M) Predation control: not explored (K)					high	short
Feed	Feed conversion	Research effect of feed types and additive on feed efficiency (K)	profit	sustainabilit	Р		E med	long
	rate	Address feed inefficiencies related to methane production **collaboration with ruminant livestock RDC's (L)					med	
		** cross reference with Genetic tool development and uptake (Y)						
		Identify impact on productivity of feed conversion and methane and its impact on marketing (include the full carbon on farm cycle within this assessment) **link with other ruminant industries (A)					high	
Genetic gain	Genomic gain in	Development of SNP chip codes research, validation and commercialisation (H) (K)					high	short
	hard to measure	Quantify and promote level of accuracy of genomic breeding values (L)						
and easy care	traits	Development of snp chip technology to increase accuracy ASBV (L)						
		Validate genomic enhanced breeding value on farm before release (Y) Barriers to adoption of EBV's (L)					high	short
		Development of on-farm genetic marker test (H,A)					high	
		Extension on how to use the information generated from snp technology: simple, usable form, with commercial collaboration (L)** cross reference with targeted information					high	short ong
	Principles for	Cost benefit analysis of traits (A)					high	ongoing
	investment	Research traits which reduce cost of production** cross reference with information distribution (A,L)						
		Information on performance when genetics removed from environment in which originally measured, and relevance to alternative environments (M)					high	short
	Reproductive traits	Research and development of mothering ability heritability and measurement methods (H)	profit		P		high	short
		Research and development of Merino reproductive efficiency traits (K) Research and development of mothering ability and maternal instincts (L)					med	long
		Research and development of birth weight traits (L)						
		Research and development of robustness traits (L) Identify effect of 4 teat ewes on increasing lambing percentage (Y)					high	short

			Research and development survivability traits for 3-12 month old weaners (K)							high	short
		Feed efficiency traits	Research and development of feed efficiency & conversion traits ** cross reference with Feed efficiency (H,Y)	profit	consumer	Р			Е	high	short
			Identify genetic component of methane production **cross reference with feed efficiency strategy (K)							med	long
			Research and develop genetic component of methane (K)								short
			Develop a measure of feed conversion efficiency: review CSIRO work (Y)								
		Disease traits	Identify genetic resistance trait for Johne's disease (L)	profit			С	AW		high	short
			Research and development of footrot resistance traits (H)								
		Temperament traits	efficiency improvements strategy (H,M)	profit			С			high	short
			Research and development of increased productivity traits (Y)								
			Promotion of easy care sheep and fitness for environment (eg mouth confirmation/ feeding/ grazing) (L)							high	short
feed base pa	Adaptable pasture systems	Genomic gain	Pasture genomics research to improve species and adaptability addressing climate adaptation and complementarily with mixed farming systems (A,M) capitalising on summer storms (K)	profit	sustainabilit y	Р	С		E	high	long short
uantity and	,		Pasture genomics research to improve drought tolerance (Y)							high	long
ality)			Develop new drought and heat tolerant pasture species with high palatability (A)							†	
			Establish the link between nutrient cycling and time control grazing and extend (Y)							1	
			Salt tolerant pastures (L)							high	long
			Independent assessment of pasture species (L)							high	short
			Collaborate with other RDCs on National Pasture Strategy (A)								
			Choice of pastures for seasonal requirements and climatic variability (L)								
			Pasture species that provide shelter and feedbase (L)							high	long
		Native pasture	Native pasture species commercialisation (Y)	profit	sustainabilit	Р	С		Е		
		agronomy	Management of native grass in merino systems (A)							high	
		Perennial pasture reliability	Perennial legumes in declining autumn rainfall reliability scenario: identify new species of perennial legumes for nitrogen fixation that are resilient to climate change (L)	profit	sustainabilit y	Р	С		E	med	
			Establishment and persistence of perennials in cropping systems (M)							high	short
			Long term persistence of pastures (L)							high	long
			Investigate ways to re-establish and maintain native and perennial pastures, focusing on native's drought tolerant capacity, in all zones and enterprise systems (Y)							med	ongoing
			Set stocking of perennial pastures: not explored (K)								
			Maximising fodder production in non cropped areas on farm eg acid soils (M)							high	short
			Literature review done on previous work on pasture grub control (winter corbie Oncopera rufobrunnea, red headed cockchafer Adoryphorus coulonii) (L)							high	long
			Decision support tool for chemical usage for pasture grub control (L)							high	short
			Biotechnology to control pasture grubs, eg transgenesis of Phalaris resistance into ryegrass (L)								
			Extension of pasture cropping techniques: low level investment (Y)							high	ongoing
			Reliable establishment and maintenance of pastures in cropping systems within 1 year (K)							high	short
			Use of crop refuse: not explored (M)								
			Optimising feed supplementation and pasture base in cropped areas/ paddocks (March/ April) (M)							high	short
			Grazable crops: not explored (K)								
		Soil nutrient use	, , , , , , , , , , , , , , , , , , , ,	profit	sustainabilit	Р	С		Е	low	med
		efficiency	NPKS use efficiency and alternatives (soil/ supplement) through pasture genomics and investigating interaction with soil microfauna and flora, other minerals and additives **cross check with agronomist (M,H,K)							high	long short
			Review technology on phosphorus fixation from previous works (findings in 1980's) **collaborate with grains industry (L)								

		Pasture genomics research to improve species and adaptability: low phosphorus input pasture species **collaborate with grains industry (K,L)					high	short
		Review potential for increasing availability of phosphorus in soil (Carol Hungerford) (Y)					high	short
		Decision support tool for phosphorus use **collaborate with grains industry (L)						
		Balancing soil biology to improve NPK availability (Y)					low	ongoing
		Literature review of international research of nitrogen fixing grasses for Australian application (L)					ongoing	long
		Species or treatments that increase the efficiency of uptake of nutrient supplementation (L)						
		Pasture supplementation application methods for low input systems: not explored (M)						
		Literature review comparing nutrient value of pastures in fertilised systems (traditional vs. non traditional) vs. non fertilised systems (CSIRO Chiswick) and identify research gaps (A)					high	
		Soil scoping study of effect of soil biodynamics on mineral availability (L)					med	long
		Scientific validation of concept of livestock interaction with composting and pasture growth					med-high	short
		with reduced fertiliser use and increased carrying capacity (whole system knock on effect) (Reference Sheep Camp concept, Ian Richard Innis, South Africa) (A)						
		Cost benefit analysis of Sheep Camp concept (A)						
	Soil nutrient	Investigate ways to recycle phosphorus (A,K)	profit	sustainabilit	Р	С	E high	short
	supply	Investigate decontaminating Australian phosphorus supplies from heavy metals (K)					high	short
		Scoping study on phosphorus sources **collaborate with grains industry (L)						
		Literature review and review CSIRO study on plant chemical processes which release elements into soil (L)						
		Investigate alternative fertilisation programs (chemicals and applications eg microbes and nutrient recycling) in different systems in different climatic zones. Analysis includes assessment of individual techniques and decision support system for designing a fertilisation					med-high	short
		program (A) Develop alternatives to fertilisation programs (Y)					med	
		Validate alternative fertilisation programs in different systems in different climatic zones (Y)					high	
	Do it yourself pasture analysis	Economic analysis of accuracy measuring dry matter/ protein/ mineral components of pastures on farm adapting existing tests (rapid on farm) or technology advancements in infra red spectroscopy (H,M,K,A)	profit		Р	С	low-med	long
		Benefit cost analysis for accurately measuring dry matter/ protein/ mineral components of pastures on farm adapting existing tests (rapid on farm) or technology advancements in infra red spectroscopy (K)					high	short
		Develop on farm test for trace elements (Y) Improve Pastures from Space for Tasmanian use: issues to be addressed include cloud						
		cover, satellite passes, size (hectares) of readings ** cross reference with pastures strategy (L)						
	Soil health	Investigate methods of improving soil moisture retention (M)	profit	sustainabilit	Р	С	E	
	Rabbit control	Low cost rabbit control (H)	profit	sustainabilit	Р	С	E	
		New biological rabbit control (M)					high	short
		Rabbit control: not explored (K,A)						
ddressing	Modelling	Increased accuracy of modelling over 12 month predictions ** cross reference to pastures	profit	sustainabilit	Р	С	E high	short
mate riability		Validation of current modelling of pastures for long term investment (eg ryegrass production) **check type of modelling & meaning of statement						long
	Information & adaptation	Information to allow adaptation of farming systems to balance impact of climate variability on feedbase (CSIRO model, Grass Grow adapted to different systems)** cross reference to pasture strategy (M)					low	long
		Information to allow adaptation of farming systems to balance impact of climate variability on different wool enterprises and their responses: learn form other industries ** cross reference with Information Adaptation (Y,A)					low-med	
		Indian Ocean dipole research identifying regional Western Australian impact (M)						<u> </u>

				Information to allow flexibility of farming systems to balance impact of climate variability of dual system (M)									
				Extension of use of Midas modelling to other regions and outputs by region (K)									
				Decision support for seasonal management of pasture through modelling (K) **cross reference learn from other industries strategy (H)								high	short
		Whole farm measurement and monitoring	industries	Adapting and extrapolation via literature reviews, research searches, remote technologies, general productivity measures, genetic advantages, crop and climate interaction modelling, feed efficiency from high production industries (such as dairy) **compared with dairy industry daily measurements (H)	profit	sustainabilit y		Р	С		Е	low	
cceptance	Recognised environment	address	base requirement	Identify benefits associated with delivering and verifying credence characteristics on farm (H,M,K): lamb mortality, tail docking, transport, castration (L)	profit	sustainabilit y &	MA	Р	С	AW	E	med	long short
onfidence in	animal	credence characteristic		Market research to identify acceptable credence characteristics in the wool industry that require scientific proof (A)								high	
	production credentials	S		Investment to support existing industry position in regards to current husbandry procedures currently being used (tailing, castration, hot knife) (A) Scientific approach to support story of credence characteristics (Y)								high	
				Cost benefit analysis on including measures of animal welfare in NWD (lamb mortality, tail docking, transport, castration) and their auditing (L)								low	long
				Recognition of best practice (Y) Investment to support policy development of animal welfare standards and guidelines (Y)									
			Traceability	Traceability post farm gate (H,M) including technology to enable scanning of swing tags with mobile phone to learn about where product comes from (A)								commercial	
				Economic analysis of benefits of traceability post farm gate (K)								low	long
			QA	Universal consistency in on-farm QA in terms of requirements and reporting to reduce duplication or individual brand requirements eg ISO for Australian Land Management (ISO 140000), NWD forms. ** where reporting is compulsory, reducing red tape is a high priority (A)								commercial	
				Continue Pesticide Residue survey (L)								ongoing	
		Research for		Research to defend industries position on policy issues and disprove ruminant claims (M)									long
		policy position	,	Research to support industries position on policy issues, including right to farm (K)									short
				Research to support industries position on carbon (Y)									
				Research to support industries position and mitigation strategies for wool portion of carbon from the sheep system **link with other ruminant industries (A)								high	
				Research to support industries position on policy issues: not explored (H)									
				Literature review of existing information to inform future research (K)								high	short
				Qualify environmental impacts of farming systems (H)									
				Prove farm management systems compliment natural environments (H) **link with other									
				Quantify water and energy use in closed system where sheep are used as tools to manage environment (Y)								low	short
				Quantify benefits of on farm management impacts beyond farm boundaries (H) Extension of farming systems environmental impacts to wider community **cross reference									
				with credence characteristics strategy (H) Water saving research ** cross ref to farm sustainability (M)									
				Investigate mobile water systems to lower costs ** cross ref with labour efficiency strategy (M)								high	short
				Relationship between shelter and water consumption: not explored (M)									long
			Pig control	Cost benefit analysis of pig control (A)								high	
			Wildlife control	Quantify effect of loss of pasture from wallabies, possums and white cockatoos (L)									
				Novel controls (range of tools and alternatives) to 1080 (L)								high	immediat

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				Support passage of alternate toxins and delivery methods to APVMA registration (eg Feratox/cyanide) (L)		
				Determine cost of kangaroos to grazing industries ** collaborate with other RDCs (A)	med	
		Life cycle analysis and	Quantify carbon footprint and	Quantify Australian carbon footprint of segments (in wool enterprise, in fleece, in product) (H,K,L,Y,A), in soil (Y,A) to defend industry and disprove ruminant claims (M)	medium	long short
		relevance	carbon cycle		low	commercia
		including energy, water		Compare Australian carbon footprint with European data (H)		
		and chemical use and		Compare on-farm carbon footprint against synthetics and promote if favourable promotion story (A)	high commercial	short commerci
		carbon		Inform future ISO standards for sustainability rating including carbon accounting (A)		
			Carbon	Define impact of carbon economics of farming and profitability (Y)		
			economics	Define impact of carbon on productivity and economics of farming (K)		short
				Literature review of other industries regarding carbon trading (L)	high	short
			Carbon capture	Identify management opportunities to capture carbon on farm (Y)		
				Develop system to measure carbon sequestration (Y)		
			Methane	Investigate additive and nutrition to mitigate methane (K)	med	med-long
				Literature review of research into plant tannins and breed interactions (K)		med
				Research into plant tannins and breed interactions (K)		med
			Identify water, energy and	Quantify on-farm Australian energy, water and chemical use of segments (in wool enterprise, in fleece, in product, in soil) (A)	med	short
			chemical use baselines and	Address public perception on water and energy use in Merino enterprise: life cycle analysis (L)		
			compare to other industries	Compare on-farm energy, water and chemical use against synthetics and promote if favourable promotion story (A)	med	short
				Water, energy and chemical use comparisons with other fibres: not explored (H)		
				On farm energy production for national grid: not explored (H)		
				Quantify off-farm Australian energy, water and chemical use of segments (in wool enterprise,	commercial	commerci
				in fleece, in product, in soil) and compare off-farm energy, water and chemical use against synthetics and promote if favourable promotion story (A)		
				Research to support industries position and mitigation strategies for wool portion of water and energy use from the sheep system **link with other ruminant industries (A)	med	
				** link with Information Adaptation (A)		
		Information	Targeted	Targeted industry extension: market research to inform right subject at the right time, Timing		
	communicati ons with	through	extension	Targeted industry extension focusing on animal welfare (H)		
		targeted	Guidelines for	Standards and guidelines for sheep (Y) and sheep transport (A)	high	short
-	•	communicatio	sheep	Review "Best Practice" 2008 Qld University document for currency (Y)		
		n topics,	Wool staple	Predicting and responding to events to maintain wool staple strength (A)		short
		timing and	Flock	Management of flock for animal survival and welfare, reproductive efficiency and lifetime ewe	high	short
		content	management	management (L)		
				Management of footrot, lice and Johne's disease (L)		
			Multi purpose sheep	Current publications on multi purpose sheep and meat characteristics (Y)		
			Reproduction	Reproductive efficiency: weaning rates and management in adverse seasons (Y)	high	short
			'	Extension and adoption on farm of reproductive efficiency traits and best practice animal	med	med
				husbandry to improve reproductive efficiency (H,K,L,A) : predation, nutrition, time of lambing, shelter (M) **Cross reference with genetics and mortality strategies	high	
			Feeding	Drought feeding (A)		
				Nutrient value of pastures in fertilised systems (traditional vs. non traditional) vs. non fertilised systems (A)	high	
				Ewe nutritional requirements	medium	short
				Develop finishing systems for Merino lambs (Y)		
			Mixed farming	Information distribution on optimising cropping grazing system (M)	high	short

ystems	Targeted industry extension focusing on risk management and decision making in mixed farming systems, incorporating tools into farm management and early warning systems (K)	high	short
	Information to allow flexibility of farming systems to balance impact of climate variability on Merino systems ** cross reference with addressing climate variability (A)	high	short
astures	Extension of treatment options for pasture grub control (L)	high	
Soil	Extension of avoidance of soil acidity through increased nitrogen absorption (L)	med-low	short
lutrients &	Extend current work on role of trees in deep nutrient cycling and water recycling (A)	high	
nergy	Value and impact of renewable energy resources in farming system **collaboration (A)		
	Link water sustainability extension with National Landcare Network and CMA: understand soil water cycle, factors that impact on soil moisture (A)	high	short
	Targeted industry extension focusing on lamb mortality (K) and management (M)	high	short
Vild dogs	Wild dog management plans ** collaborate with other RDCs (A)	high	
	Wild dog and fox control, use of 1080 and chemical training requirements (collaborate with LHPA) ** collaborate with other RDCs (A)	high	
ndustry romotion	Promotion and positive profiling of wool industry to all ages in community, targeting national and international audiences (A)		
	Livestock and farming promotion campaign to community: not explored (Y)		
	Attraction of young growers to industry: not explored (Y)		
	Identify skills gap (market research): productivity, drought and its effect on animal health, reinforce the basics of animal production (L)	ongoing	
lessage deliver	Simple messaging tailored to production areas using multimedia with links to full details		
	Ongoing support for multipliers to deliver messages (private consultants) (M,H) (Sheep's		
	Timing of workshops to maximise exposure (H)		
	Improved technology and format for webinars: interactive, personable electronic medium (not lecture style) (L,A)		
	Targeted investment allocation to leading producers and "early adopters" vs. general farming community: not resolved (A)		
	Targeted investment allocation to practice change vs. awareness: not resolved (A)		
	Information distribution through producer led and driven extension programs (A)		
	Field days: not explored (A)		
	Low cost, low input farm case studies (A)		
xtension	Standardised information delivery of profitability per hectare (K)		
argeted industry		high	short
xtension on	Scenario planning for breeding objective using ASBV combinations (M)		
SBVs	How ASBV's are developed (L)		
	Genetic improvement from bloodline analysis (A)	low	ongoing
	How to balance subjective and objective measures within a breeding objective (A)	low	ongoing
Chemical ackaging	Request APVMA require labels on chemical packaging have larger print fonts (L)		