NATIONAL WOOL RD&E STRATEGY WORKSHOP
NOVEMBER 7&8, 2011

Aims: to develop agreed project scope and Technical group membership for investment gaps within the national Wool RD&E Strategy framework – under the themes of Sheep Reproduction, Physical Fibre Quality, Sheep Health and Productivity and Adaptation of Wool production Systems.

Session 1 Research theme - Sheep Reproduction Jason Trompf

Summary of main discussion points:

a) Reproduction rates have not been improving – what are the points of failure??

- Same issues as 1981!
- Adoption of various recommendations – requires more intensive management!
- Lamb survival has not improved – no drivers?; percentage of people scanning is very low.
- The metric is an issue – high marking x low stocking rate.
- Merino system – self replacing therefore no incentive to increase reproduction.
- No biological limit? How far can we push it?
- Failure to meet animals' needs? / requirements.
- G x E potential.
- With mixed farming – is reproduction a focus?? – or a compromise? Potential is there – but producers are not doing!!
- What combination of traits - Muscle x wool x more lambs?

b) what are the RD&E opportunities in Sheep Reproduction that we should pursue?

- What are the easy improvement opportunities? (eg that will not increase labour requirements).
- Drench capsule – ewes.
- Weaner survival – 10% leakage.
- Merino – singles / multiples focus (losses between scan/marking)? NZ ½ that of Australia!
- 35% lamb mortality / 8% ewe wastage over lifetime – if push too hard – producers will go to cattle!! (Welfare issues!)
- How keep ewes 5-10 years / achieve longevity?
- Extension / PR issue – to deal with (welfare) issues of discontent / as well as achieving potential reproduction rates.
- Benchmarking – do we have good enough information on different types of Merinos? Across the various regions?
- What do we know about the "Inclination" (or aspirations) of producers?
- Genetic component to variability in fecundity? – especially in non-Merino.

Question – what is the value of a 1% increase in reproduction rate for average farmer? What is the Value Proposition???

- Vitamin D status for spring lambing ewes – 15-20% difference in lambing.

c) are there any wool specific issues / trade-offs that should be considered?

- NZ – predominance of more British breeds – more seasonal yet we select animals for continuous wool growth (contradicts reproduction efficiency).
- Join ewe lambs – but does it compromise long term wool production?
- Retaining older ewes – but how does wool quality perform?
- Lifestyle / enterprise trade-offs? – labour requirements / easy-care sheep.
- Issue of adoption and what farmers will take on? Incentives / $ have changed in last few years – what incentive is there to increase reproduction??

Session 2 Research theme - Physical Fibre Quality Bruce McGregor
- presentation of analysis paper and possible project/s
Discussion: feedback on potential projects; suggested improvements to the description / scope for each project; which project/s should proceed?

1. Quantifying on-farm factors which can be manipulated to improve physical fibre and sensory properties of Merino wool based on the 'scientific inquiry method'.	**2. Development of integrated genetic packages and support programs to incorporate new technologies and genomics aiming the improvement of the physical and sensory fibre properties of Merino wool.**
• Current way of measuring – <u>not working</u> – needs to change. • Need to look at current / existing genetic data. • We have enough information from production data to work with now → project should go straight to Extension. • Requires information flow – along supply chain. • Lambs / lost ewes – tie to reproduction. • Targeted <u>nutrition</u> – how does MLA Feedbase program fit? This project to input to existing program? • Importance of ranking animals over time. • Do we need to change mindset from staple-strength? – find factors that make up staple strength and focus on these. (but high RISK!!!) • AWTA – possibility of shift in measurement?? / novel test? → both are needed to change things on-farm.	• Ideal 15µ wool → 70-80mm H - ie a genetic / management solution. • Include breeding objectives – adapting to market demands / flexibility. • Uncertainty of benefits / costs of various traits? With reproduction rate as driver. • Micron blowout – lifetime performance.

3. Refinement and adoption of technology packages for production, processing and sale of woollen products with sought after sensory and easy care quality attributes.
• Package information for producers on how to produce the type of wool that AWI is marketing. • Range of technology packages – new products; address different farming systems. • Easy care aspect (been on radar since early 1980's).

General feedback comments:

Suggest we need a Hierarch of trait opportunities across the 3 project areas:

- Driven by market needs / future needs.
- Information flow x value chain.

- Need an additional project
  "Research relative importance of various fibre quality traits at market end."

- Loss of knowledge – also applies to processing.
- Need to build bridges with manufacturing sector – survey their needs / issues.
- Testing / processing – there is an energy footprint issue! eg reduce washing temperature.
- On-farm – what is the importance of nutrition? – ultimate destination / end use - ≤ 19µ?; need increased understanding of biology and chemical composition.
- Needs supporting words → context / the intent for projects in this area / theme. Eg. what do we mean by "accelerating reproductive rate"?
- Need to build <u>business case</u> for each part of the research proposed and include what other information is required for adoption.

Need integration across the 3 themes – eg fibre outcomes.

- 19µ.
- Improve non-micron attributes.
- Qualifier – need to know what percentage of market for specialised product into future? → information flow up/down the value chain.
- True value of traits?

- CRC outcomes – might provide direction for future research – will be available over next 12-18 months (had five year program on genetics – but what information for farmers??).
- Opportunity – CSIRO research 80's/90's – uncatalogued! Possible AWI / Wool Education Trust project.
- Hierarchy of opportunities – colour?? - can we create opportunity?
- Economic value is non-linear!!

Session 3 Sheep Health and productivity Brown Besier
- presentation of analysis paper and possible project/s
Discussion: feedback on potential projects; suggested improvements to the description / scope for each project; which project/s should proceed?

1: Australia wide sustainable worm control **1.1: Development and demonstration of regionally-appropriate IPM programs** **1.2. Computer simulation Modelling** **1.3: Nematode biology Investigations** **1.4: Improved worm control and resistance management tools**	**2: Control and prevention of dags and scouring** **Defining causal factors / interactions (sheep age, larval exposure, genotypes)** **The pathophysiology of the immune response and relation to genotype** **Developing diagnostic indicators** **Investigating the role of different pasture species** **Potential solutions: sheep management; (possibly) immunological de-sensitising.**
• Need to do Nematode / host biology first. • Main competitor is the retailer (their advice is biased). • Not simply more on Research – still need for E / social research / adoption. Understand the drivers. • 1.1 – will hold this area together – regionally specific information. • Modelling – make Worm World – fit into APSIM system – to get longer life / wider use.	• Huge issue. • Understand host / parasite – Research work. • Relates to top part of 3 genetics → suggestion merge 2 & 3 – lifetime parasite immunity plan. • Principles – from (wool) resistance management (ie what learn about resistance from other fields?)

3: Genetics of parasite resistance – reducing barriers to adoption **3.1: Improved worm resistance tests** **3.2: Determining the economic value of genetic resistance to worms** **3.3: Correlations between worm resistance and other traits** **3.4: Unexplained variation in flystrike incidence**	**4: Enhanced adoption of external parasite management recommendations** **4.1: Practicable and cost-effective detection tools** **4.2: Quantification of the prevalence of lice infestations and insecticide resistance** **4.3: Parasite biology as the basis for improved preventative practices** **4.4: Novel approaches to lice and blowfly control**
• History of genetic improvement?? • Maybe the tools we have are not the best?? – what do we need to measure to select for resistant animals? • Technology of selecting for lower worm egg count has been shown to work, therefore why not adopted??	• Increase adoption of external parasite management. • Predictive (not a diagnostic) tool? → and impact / business case. • Have investment already in eco-friendly control. • ? Query the need for 4.2

General feedback comments:

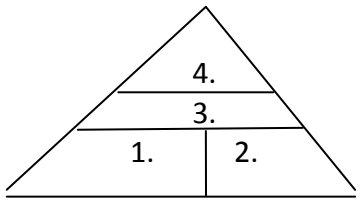
Suggest new project "adoptability" – social science research into drivers / intentions / aspirations.

- How prioritise the issues raised under this theme? – cannot do all!
- Why is current adoption not effective?? – social research. Question of adoptability → have tool – use??
- How get buy-in by Industry, eg resellers.
- Linkages to existing work?
- Integrated Parasite Management
- Lice – needs extension – do not need research.
- Flies – major cost – in control (not damage), therefore how to reduce cost of control?
- Worms –regional issue! Therefore different techniques in each region – we have techniques therefore mostly Extension.
- Sackett calculations on costs – should they be redone? (Link to fibre quality).
- Gap – impact of lice on processing performance.

Relative importance x project areas.

- Worms (more R) > Flies > Lice. (more E emphasis).
- Extra element of animal welfare – how value this?

**Adoptability is the most important project here:



5. ADOPTABILITY**

ADOPTION – approach needs to be iterative

- Producer-driven adoption / telling us their priorities.
- Need a circuit breaker.
- Novel diagnostic tools (? But, how useful??)
- Relevant for different farm systems.
- Research to identify motivators.
- Align messages.

Session 4 Adaptation of Wool Production Systems Andrew Moore
- presentation of analysis paper and possible project/s
Discussion: feedback on potential projects; suggested improvements to the description / scope for each project; which project/s should proceed?

1. Optimizing multi-functional sheep farms in the HRZ Exploitation of within-farm variation in land capability. Perennial pastures as an alternative to environmental tree plantings. Co-benefits of environmental tree plantings or perennial pastures for sequestration. Riskiness of soil sequestration under changing climate.	**2. Finding and exploiting new means of adapting feed demand to variable feed supply** Producer attitudes and practices. Seasonal forecasting of forage supply. Preliminary evaluation of options On-farm demonstration and assessment of a smaller number of practices Reducing the cost of fallback options.
• Concern – too many unknowns / reduced flexibility of locking up your land. • Some farmers will do this anyway – how provide knowledge / information to underpin decision making. • Interested in co-benefits > CFI and increasing return on best land. • Carbon footprint. • Mosaic farming approach – multi benefits.	• Also a priority. • Can learn a lot more from farmers on how currently deal with seasonal variation. • Genetic component – resilience – live weight change over summer / autumn. • Concern – value of seasonal forecasting?? • User-friendliness of tools? → need to find best tools to use. • Drought-lotting-data needs to be Merino specific. • Manage for adoptability – how build resilience and adaptability of farmers?

3. Reducing methane emissions per sheep by genetic means Development of a low cost and rapid methane measurement test to permit selection Establishing the key genetic parameters for the trait (heritability, genetic correlations) Social research to help overcome the traditional resistance of the industry to the adoption of advanced genetic improvement technologies.	**4. Strengthening the value proposition for wool growing in the CLZ** Dual purpose sheep production should reduce exposure of mixed farmers to price risk. A rigorous comparison of Merino and Dorper production systems in the CLZ would quantify not only their expected profitability but also the contribution they might make to the economic resilience of mixed farms.
• Important – but covered by current work in next 3 years. • Links to feedbase area. • More lamb per ewe / links to reproduction.	• Most critical area. • Lack of packing of existing information for CLZ. • Manage for adoptability

• Feed efficiency link → indirect selection – might be a better focus to approach. • Treat as environment portfolio versus just CFI. • Methane emissions area n inefficiency in production, therefore efficiency / production approach. • Carbon footprint.	• Lot of existing information – sell differently!

General feedback comments:

- Focus on 4 as highest priority and 2.
- Want to know more about what is in climate change plan.
- Support in principle – but caution in investing.
- What links to Climate Change RDE Plan?
- Politically saleable –but –can get better decrease in Carbon from other sectors.
- What do buyers of wool want?? eg - want to see reduction in carbon footprint.
- (Is there value on a briefing paper to AWI Board / generally available information– based on these ideas).

Session 5 Confirm projects to be developed:

Physical Fibre Quality:

Market requirements for Australian Wool

Current knowledge, gaps and key researchable issues for physical fibre quality of Australian Wool

Sheep Health and Productivity:

Adoptability

Regionally based IPM programs

Adaptation of Wool Production Systems:

Adapting feed demand to variable feed supply.

Strengthening the value proposition for wool growing in the CLZ

Session 6 In small groups – scope project ideas / identify possible contributors / establish Technical groups to further develop project concepts

Animal Health and Productivity

PROJECT SCOPE Proforma Scribe / team members: Brown Besier, Jane Littlejohn, Jason Trompf, Brian Horton, Col Scrivener, Craig Stevenson, Desley Darby, Tim Hollier, Sally Fairless, Peter Windsor, Forbes Brien, Dave Jordan,

Project title: ADOPTABILITY (of IPM programs)

Project Description	Identify drivers for adoption of parasite control.
Project Objectives	• Barriers and drivers to adoption. • Awareness of new technologies including genetics. • Identify economic benefits / implications and benefits.
Project Deliverables	• Survey that is repeatable periodically. • Report with attitudes etc to inform the entire program (additional investigation). • Share outputs. (Small project: modelling benefits and implications).
High Level (broad) Methodology	• Survey questions (ongoing) → reported periodically. • PhD results. • Collate previous information • Consider regional differences (focus groups / advisory panels). • Surveillance of drench conditions. } Identify what has changed.
Potential Research Team collaborators	• AWI Extension Networks. • Vic – DPI (Ian Carmichael) (Geoff Caine / Tim Hollier). • Barriers to Adoption (ABARE and ABS survey Desley Darby)

PROJECT SCOPE Proforma

Project title: Develop and Demonstrate Regionally based IPM Programs

Project Description	Better adoption of parasite control on a regional basis.
Project Objectives	• Better appreciation of drenching systems (regional basis). • Where possible develop a package of IPM through Wormboss. • Better ecological understanding of parasites using Wormworld.
Project Deliverables	• Regional appropriate packages including training delivered on Wormboss. • Regional adaptive model computer simulations.
High Level (broad) Methodology	• Regional control models inclusive of decision support tree. • Computer models. • Case studies. • Gather and update information Wormboss. • Designing on-farm demonstrating models. • Training. • Risk: must use appropriate product choice. • (Control groups).
Potential Research Team collaborators	• AWI Extension Networks. • MLA. • Brown Besier.

Adaptation of Wool Production Systems

PROJECT SCOPE Proforma Scribe / team members: Andrew Moore, Alex Russell, Michael Friend, Simon De Graff, Diedre Lemerle, Andrew Thompson, Andrew Moore, Gus Manasta, Ian Purvis

Project title: Strengthening the value proposition for wool growing in the CLZ

Project Description	See Position Paper.
Project Objectives	• Quantify the multiple relative costs and benefits of meat only versus dual purpose sheep production systems in CLZ. • Communication these costs and benefits in a form that informs sound decisions on sheep enterprise choice on mixed farms.
Project Deliverables	• Information.
High Level (broad) Methodology	• Replicated, long-term (5 years) experiment comparing – a/ "average" merino bloodline; b/ "high" merino bloodline; and c/ Dorper on complete feedbases (annuals, stubble, etc). • Shorter-term comparisons to estimate feed conversion efficiency. • Extrapolation via modelling.
Potential Research Team collaborators	• CSU – major (Friend). • DAFWA – link (Kennedy).

PROJECT SCOPE Proforma Scribe / team members:

Project title: Finding and exploiting new means of adapting feed demand to variable feed supply

Project Description	Finding and exploiting new means of adapting feed demand to variable feed supply.
Project Objectives	• Enhance the resilience of Merino breeding ewe systems to short term climatic variability through tactical management of the demand for feed.
Project Deliverables	1. Forage supply metrics that are relevant to producers facing climate variability. 2. Measurement of the skill of multiple forecasting schemes with respect to these metrics. 3. Evaluation of producer relevant demand modification tactics. 4. Value of differences between breeds in resilience of production to year-to-year variability. 5. Estimates of parameters required to incorporate breed resilience into breeding objectives.
High Level (broad) Methodology	See Position Paper, plus – 6. Analysis of existing data sets for deliverable #4. 7. Field or pen experimentation to establish the physiological basis of differences in nutritional resilience.
Potential Research Team collaborators	• BOM. • Social Research – Alan Curtis / Mark Morrissey, CSU, Ally? UNE? Emma XXX, ANU Anthony Hogan • Phil Graham and Slazoz Team. • Moore, Kennedy. • Best Wool / Best Lamb etc (AWI Evergraze networks). • DAFWA (Thompson), SARDI (Bryan).

Physical Quality of Australian Wool Fibre

Scribe / team members: Sue Hatcher (scribe NSWDPI), Peter Wynn (CSU), Jimmy Jackson (AWI), David Cottle (UNE), Phil Hynd (AdelU), David Tester (SheepCRC), Simon de Graf (USyd), David Crowe (AWTA) & Bruce McGregor (Deakin Uni).

1. Project title: Scoping study – Market requirements for Australian wool

Project Description	This project seeks to build communication channels between Australian fibre researchers and key manufacturers, brands and retailers of Australian wool to determine the key issues regarding Australian wool fibre, production or product development. These will be linked with analysis of Australian auction price data and the AWI Millward Brown consumer survey to quantify the short, medium and long term requirements for physical fibre quality, production and product development for the Australian wool clip.
Project Objectives	I. Conduct systematic market research with the Australian wool supply chain, including manufactures (spinner & weaners) retailers and brands (including designers and the returns departments) to quantify the short, medium and long term requirements for physical fibre quality, manufacturing and product development of the Australian wool clip. II. Analyse Australian wool auction data to quantify price signals for measured and assessed traits of Australian wool, calculate relative economic values (REVs) for a range of traits and complete a sensitivity analysis of the impact of incorrect REVs on Merino breeding objectives. III. Revise the 'star system' for the importance of measured and assessed wool traits and tailor these rankings for a range of product/process group clusters. IV. Access the Millward Brown consumer survey results (Funded by AWI every 2-3 years) and link these outcomes to the range of product/process group clusters. V. Identify and access 'grey' research relevant to physical fibre quality and processing performance of wool.
Project Deliverables	1. Short, medium and long term requirements for physical fibre quality, manufacturing and product development. 1.1. Identify key manufactures, retailers and brands across a range of products/process groups clusters to participate in survey. 1.2. Initial questionnaire designed by specialist with input of project team. 1.3. Analysis of survey results & stratification of respondents for follow-up one-to-one survey. 1.4. Design questionnaire for facilitated interview. 1.5. Co-ordinate interview team and schedule. 1.6. Analyse & report results. 2. Price analysis for REVs. 3. Revise star system. 4. Access Millward Brown Consumer Survey data. 5. Searchable electronic catalogue.

High Level Methodology	• Systematic market research to focus on what is needed and why. It will identify new opportunities. • Revised 'star system' will identify the potential for new/novel traits (eg scale pattern, scale height, medullation). This will be linked to the literature scoping in project 2. Include interactions between traits. This must be relevant to the ultimate destination (i.e product/process group cluster). • Develop electronic library – process already begin by JJ group at AWI. Has 2 components: i) access and scan reports/papers, and ii) cataloguing which will require librarian skills. Includes overseas hubs of info (former IWS sites, Australian research groups and IWTO tech papers, WRONZ, SAWTRI).
Potential Research Team collaborators	Bruce McGregor (Deakin); Jimmy Jackson (AWI); David Cottle (UNE); David Crowe (AWTA) Kimball Curtis (DAFWA); Sue Hatcher (NSW DPI) Peter Wynn (CSU), Phil Hynd (AdelU), David Tester (SheepCRC), Simon de Graf (USyd), Ian Purvis (CSIRO).

2 Project title: Scoping study – Current knowledge, gaps and key researchable issues for physical fibre quality of Australian wool.

Project Description	This project seeks to quantify the current knowledge, gaps and key researchable issues to improve the physical fibre quality of the Australian wool clip and develop technical packages for Australian wool producers to tailor their wool production for particular product/process group clusters.
Project Objectives	I. Build a template to be used as the basis for the review of physical fibre quality. II. Identify the key fibre attributes to be reviewed and the key skills required by the report team. III. A program of linked projects to improve the physical fibre quality of the Australian wool clip. IV. Technical packages for Australian wool producers for a range of product/process group clusters.
Project Deliverables	1. A special issue of an international scientific journal (Animal Production Science, Textile Research journal) with the review papers for each of the key fibre attribute groups. 2. Identification of areas for future research. 3. A "Wool Boss". Investigate the potential for a system/tool for growers to use to identify the product/process cluster for their wool and modify their production system to target the particular market (eg how to increase H by 5mm or decrease FD by 1 um).

High Level Methodology	1. Review papers 1.1. Must consider relevance to topmakers & spinners also the woollen processing system. 1.2. On-farm management (including genetic gain). 1.3. Identify opportunities for new product development – eg long H low FD wools. 1.4. Potential trait groupings: i) SL, SS, FD (incl variability) & VM; ii) fibre surface structure & cortical cells; iii) chemical structure and ; iv) colour (current system and NIR), RTOC (&bulk), style, handle, fibre curvature). 2. Workshop to prioritise future research needs and scope projects 2.1. Identify workshop participants - incl past industry personnel (eg Hansford, Marler, Robinson, Couchman, Lamb, Peterson). 3. Link new product development with 'how to' packages for woolgrowers. 4. Technical packages for particular product categories – (i.e. how to make the 'best knitwear'). Optimising productive performance and profitability. eg cockling & loop distortion in knitwear. 5. Quantify the cost:benefit of fibre based solutions relative to technological solutions – consider environmental footprint.
Potential Research Team collaborators	Sue Hatcher (NSWDPI), Peter Wynn (CSU), Jimmy Jackson (AWI), David Cottle (UNE), Phil Hynd (AdelU), David Tester (SheepCRC), Simon de Graf (USyd), David Crowe (AWTA) & Bruce McGregor (Deakin Uni), Ian Purvis (CSIRO).

Session 7 Next steps in developing projects

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