on farm

MEAT & LIVESTOCK
AUSTRALIA

Sheep Confinement Feeding Systems

NATIONAL WORKSHOP OUTCOMES

October 2003

Feedlots

EXECUTIVE SUMMARY

After considerable discussion, the working definition for a sheep confinement feeding system was agreed as:

> *"A sheep confinement feeding system is a feeding program in a confined area, where all or the majority of feed and water are supplied to sheep for production or maintenance."*

It was further agreed that two systems should be recognised:

- Production system:
    - set up as an economic finishing operation;
    - where product is sold to specifications; and
    - where value is added to the product.

- Maintenance system:
    - set up to conserve resource bases;
    - where product is not directly sold; and
    - with a focus on risk management for the basic product.

Future Research and Development

From the analysis of the gaps in current knowledge and the emerging directions for the industry, the workshop established the following priorities for research and development:

Production Systems

- Whole of life management and effect on product quality:
    - nutrition x environment x genetics;
    - linked to high fecundity;
    - linked to 100% ewe.

Manure quantities, quality and relationship to feeding.

- Pad design, leaching, run-off, different environments, drainage, soil type.
- Pen size, stocking density.
- Induction management.
- National Best Practice guidelines for environmental management.
- Feed conversion ratio.
- Waste management after animals are out of the confinement feeding systems.

Maintenance Systems

- Design and site selection:
    - mob size;

- trough length;
- pen surface;
- run-off;
- dust and mud;
- stocking density.

- Nutrition:
  - roughage needs;
  - management of acidosis;
  - minerals,
  - energy content of diets.

- Techniques to monitor residues in alternate feed stuffs and other inputs.

- Case studies (collate and document).

- Shade.

- Evaluate monitoring tools, eg:
  - dung, OFDA (optical fibre diameter analysis);
  - animal temperature;
  - environmental temperature;
  - happiness (welfare) index (including sub-clinical).

Producer Priorities

Given their financial investment in the sheep confinement feeding industry, the producers present rated the priorities from their perspective and results were:

- Nutrition:
  - ration formulation;
  - FCR;
  - rumen function;
  - stimulation of appetite.

- Genetics:
  - backgrounding;
  - whole of life management;
  - breeding;
  - backgrounding/finishing.

- Lowering stress:
  - adaptation to water;
  - induction processes.

- Trucking and delivery:
  - shade cloth;
  - electrolytes;

- lairage and emptying out;
- curfew.

- Focus group within industry:
  - producer support.

Comment:

- Environment slipped out of the top five but the producers acknowledged that sustainability (and animal welfare) are fundamental to assured market access in the future.

Where to From Here?

In terms of actions, it was agreed that:

- The outcomes from the workshop will be compiled and forwarded to MLA, AWI and the attendees.

- The Workshop Report will be circulated to industry for feedback.

- MLA and AWI will:

  - test the fit with existing industry programs;

  - look for new programs arising from the recommendations;

  - seek to develop a joint action plan on the priorities identified.

  - initiate consultation with GRDC (eg: through the Premium Grains Program) and seek joint opportunities.

  - initiate discussions and consultation with:
    o the Sheep CRC;
    o State Departments of Agriculture.

Recommendations

The workshop recommended that:

- National Recommendations for Industry be developed within twelve months:

  - these should be general guidelines and principles;
  - they should address the eight priority areas:
  -
    o Environmental impacts;
    o Design (stocking rate, pen size, shade);
    o Design (feeding systems);
    o Health;
    o Selection of sheep;

- o Site location;
- o Supply chain management;
- o Product integrity.

Standards should be developed over the next three to five years:

- these standards should be developed by industry and be specific to particular environments;

- they should incorporate the findings and outcomes of the priorities for research and development for production systems and maintenance focus, as identified above.

- MLA should seek to work with AWI, GRDC, the Sheep CRC and State Departments to develop new programs and action plans.

CONTENTS

1.   INTRODUCTION

This report contains the outcomes from a planning workshop held at the Adelaide Shores Function Complex on 28-29 October 2003.

1.1   Participants

Participants at the workshop were:

Name:	Department / Company:
Trevor Clark	PIRSA/Rural Solutions, SA
Kirsten Tanner	Environmental Protection Authority, SA
Bruce Hancock	PIRSA, SA
Noel Evans	Landmark, SA
Kelvin Westbrook	Loxton-Producer, SA
Cameron White	Nepowie- Producer, WA
Hamish McKinnon	Keladbro- Producer, VIC
Alan Skerman	Queensland Department of Primary Industries, Toowoomba
Rachel Kirby	Co-operative Research Centre for Sheep, WA
Ned Crossley	Department of Agriculture, WA
Brendan Tatham	Department of Primary Industries, VIC
Nick Linden	Department of Primary Industries, VIC
Geoff Duddy	Department of Agriculture, NSW
Ian Kruger	Department of Agriculture, NSW
Gilly Simos	Meat & Livestock Australia – Feedlots
David Skerman	Meat & Livestock Australia – Feedlots
Peter Rolfe	Meat & Livestock Australia – Animal Health and Welfare
Garry McAlister	Meat & Livestock Australia – SCM
Lu Hogan	Australian Wool Innovation – Sustainable Systems
David Sackett	Holmes Sackett and Associates, NSW
Julie Lloyd	Sheep Council of Australia, SA
Jeff Murrary	Sheep Council of Australia, WA

1.2   Purpose

The purpose of the workshop was to identify issues, possible constraints and gaps in current knowledge for the management of sheep confinement feeding systems nationally, in order that research and development or the consolidation and dissemination of current information may occur.

1.3   Outcomes

By the end of the workshop, participants had:

- increased their awareness of the current operation and environment for sheep confinement feeding systems;

- identified gaps in current knowledge and determined potential impacts;

- identified and prioritised research and development needed;

- provided feedback on the Draft Victorian Code of Practice; and

- agreed on the next steps required.

1.4 Process

1.4.1 Pre-Workshop

Prior to the workshop, participants were asked to complete a questionnaire on the major issues impacting confinement feeding systems. Sixteen completed questionnaires were received and the responses were collated into a summary that is available in Appendix II.

The Questionnaire Response Summary and a package of pre-reading on existing initiatives and topics relating to sheep confinement feeding systems were circulated prior to the workshop.

1.4.2 Workshop

The process consisted of:

- agreement on the definition of sheep confinement feeding systems;

- identification of the top eight priorities to be addressed, from the responses to the questionnaire distributed prior to the workshop;

- a gap analysis on the issues to identify gaps in current knowledge for each area;

- identification of emerging directions for the industry;

- establishment of future research and development priorities for production and maintenance systems;

- generation of leads and contacts for future research and development; and

- agreement on actions and recommendations.

2. OUTCOME ONE: CURRENT SITUATION

2.1 Definitions

A draft definition of a sheep confinement feeding system, refined from the questionnaire feedback, was put up for discussion:

> *"A sheep confinement feeding system is a feeding program in a confined area, where all or the majority of feed and water are supplied to sheep for production or maintenance."*

Participants worked in small groups to discuss the definition, with each group producing a continuum of feeding systems, to indicate what should be "in or out", in terms of confinement feeding systems for sheep.

2.1.1 Workshop Response

After considerable discussion, it was agreed to:

- include maintenance confinement feeding;
- exclude supplementary feeding in the paddock;
- exclude cell grazing;
- focus on provision of feed and water, stocking density and management of waste.

ie:
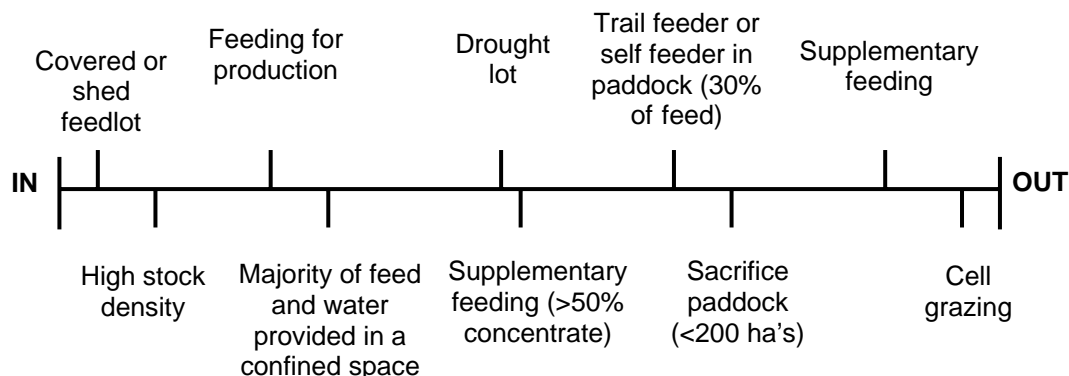
The working definition was agreed as:

> "*A sheep confinement feeding system is a feeding program in a confined area, where all or the majority of feed and water are supplied to sheep for production or maintenance.*"

It was agreed that any supporting paragraphs should emphasise responsible environmental management, animal health and animal welfare.

It was further agreed that two systems should be recognised:

- Production system:
    - set up as an economic finishing operation;
    - where product is sold to specifications; and
    - where value is added to the product.

- Maintenance system:

- set up to conserve resource bases;
- where product is not directly sold; and
- with a focus on risk management for the basic product.

Within the maintenance system, two levels were suggested:

- Level One = fixing a feed shortage (maintenance feeding); and

- Level Two = maintenance feeding plus strategic feeding decisions that will have production benefits for the whole flock / farm.

2.2   Context

The following papers and summaries were outlined to participants, as input to the workshop:

- Confinement Feeding Sheep in Western Australia; by John Milton, University of Western Australia.

- Lot Feeding of Sheep During Drought – a Literature Review; by David Sackett of Holmes Sackett & Associates.

- Draft Victorian Sheep Feedlot Environmental Code of Practice (July 2003); by the Department of Primary Industries, Victoria.

- Outcomes from a Western Australian Forum on Research Issues in Sustainable Sheep Confinement Feeding Systems (conducted at the Department of Agriculture, Western Australia on 23 October 2003).

The outcomes from the West Australian Forum are detailed below:

Gaps and Issues (over and above those identified in the literature review)

- Differences in manure and nutrient loads (drought vs. production; ration; breed; age; season).

- Requirements: State is required to translate Federal guidelines (how - guidelines, Code of Practice, based on what?)

- Best ways to handle sheep waste, including spoilt feed?

- Code of Practice to accommodate different settings (rainfall, soils) and seasonality (key factors associated with each situation need to be identified and developed with industry).

- Tick box test for producers to assess compliance to Best Practice according to local setting, because sites are so variable.

- Need to study sheep behaviour to develop management strategies.

- Is confinement feeding systems magnets for disease vectors?

- Ways to handle the build up of manure, including mobile (temporary) systems.

- Tools and models to assess the level of problems a system will produce.

- Reliability of the models for confinement feeding systems and different environments and can they be adapted for local conditions?

- Difficult to develop management guidelines for opportunistic confinement feeding systems (given the variety of settings, etc).

- Measurement of nutrients in, nutrients out and soil storage but where is the rest (put in adjacent controls)?

- Compare Broomehill /Woodanillling sites versus imported or farm produced feed.

- Management of grass strips (perennials better?).

- Measurement of hydraulic conductivity, infiltration rate and storage capacity of straw manure pack.

- Variability in capital investment in confinement feeding systems.

- Definition of different classes of confinement feeding systems.

Comments on Confinement Feeding Systems Survey for the National Forum in Adelaide

Definition of confinement feeding systems needs to include:

- stocking rates;
- the word "sheep";
- feed and water is brought in, do not derive feed from the paddock;
- not necessarily permanent;
- external system.

Site location

Need for research into:

- slope;
- soil type;
- proximity to water;
- sensitivity of area (land use conflicts, social impacts.)

Design

Need for research into:

- use of straw and hay in the confinement feeding systems;
- hay racks;

- shade and shelter.

Environmental impacts

Need for research into:

- offsite contamination of nutrients;
- pad management;
- transport (noise, dust, light, etc.)
- run-off;
- odour;
- dust;
- vegetation damage;
- Greenhouse Gas emissions;
- variability in nutrient losses from the system as a consequence of breed differences, age, weight, maintenance ration versus production;
- impact of systems in regard to the scale of operation and the position in the catchment;
- the load and how the system handles it (for different classes of confinement feeding systems).

Animal Health and Welfare

Code of Practice is due for review (not very quantitative).

Need research into:

- impact of environmental aspects on sheep health;
- preventative care to stop clostridial diseases, etc;
- prevention of respiratory disease through dust management;
- stocking rates for optimum health (physical animal health);
- trough space – water and feed (versus ad lib);
- shelter provision.

Product Integrity

Need research into:

- dust – carcase contamination;
- dust – respiratory disease;
- e coli O157:H7;
- implementation of withholding periods;
- environmental quality standards (are we conforming);
- weed seed survival rates;
- spoilt feeds – impact on product quality (this is a problem but does not require research).

Other research needs

- pad management technology, role of compaction, straw on infiltration, requirements (stocking rate), maintenance, impact;

- contingency planning;
- holistic approach e.g. exporting manure, downstream fate of nutrients;
- effect of ration on nutrient output, pathogen survival;
- confinement feeding systems disease profiles;
- management of "abandoned" sites;
- important environmental research needs to be undertaken in all States where the environment is significantly different.

NB: -   the comment was made that there is interaction between all these areas and that research into environmental aspects will provide answers for many other areas;

-    emphasis needs to be on the development of tools tailored for producers (ie: tailored for different classes of confinement feeding systems), for NRM groups (land capability maps) and for Supply Chain Alliances (checklist).

3.   OUTCOME TWO: GAPS IN CURRENT KNOWLEDGE

3.1   Confirmation of Priorities

Participants reviewed the responses in the Questionnaire Response Summary and worked in small groups to identify the top eight areas to be addressed.

Group responses were pooled to provide a workshop response.

3.1.1   Consolidated Top Eight Priorities

- Environmental impacts (Questionnaire Section 1.3):
  - run-off;
  - leaching;
  - odour;
  - dust and mud;
  - faeces and urine disposal;
  - waste production and management.

- Design (Section 1.2):
  - stocking density;
  - pen size;
  - shade.

- Design (Section 1.2):

  - feed and water space;
  - feeding systems;
  - lamb creep feeding.

- Health (Section 1.4):
  - induction procedures;
  - acidosis;
  - ration formulation;

- nutrition;
- rumen function.

- Selection of sheep (Section 1.5):
  - genetics;
  - profitable sheep (GR, NFI);
  - rumen function.

- Site location (Section 1.1):
  - soil type.

Supply chain management (Section 1.5):

- Product integrity (Section 1.4):
  - carcase quality;
  - fleece quality.

3.1.2 Group Responses

The priorities identified by each group were:

Group One:

-
- feed conversion efficiency (rumen function);
- supply chain (specialist breeders);
- ration formulation and feedstuff selection (nutrient requirements);
- stocking density;
- feeder, trough and water space allocations;
- environmental impact of sheep versus cattle;
- induction procedures:
  - extension rather than research and development,
  - but still some scope for further research and development;

- lamb creep feeding.

Group Two:

- environmental impacts:
  - run-off and leaching,
  - odour,
  - dust and mud,
  - faeces and urine disposal,
  - ration formulation;

- design standards;
  - stocking density,
  - shade and shelter,
  - feed and water space;

- site location:
  - soil type;

- product integrity:
  - carcase quality,
  - fleece quality.

Group Three:
- stock density (pen size):
  - welfare (dust),
  - environmental impact;

- soil type (link to above):
  - not one cure for all types,
  - pad design;

- odour (effluent);

- nutrition (standards, etc, etc);

- run-off and leaching:
  - nutrient movement;

- profitable sheep:
  - Growth Rate, Net Feed Intake,
  - carcase specifications (Genetics x Environment)
  - induction phase;

- supply chain development
  - utilisation of research and feedback.

Group Four:
- run-off and waste disposal;
- soil type;
- stocking density and pen size;
- odour and dust;
- genetics (sheep selection);
- induction procedures;
- acidosis;
- ration formulation.

Group Five:
- waste production and management;
  - faeces and urine disposal;
  - odour

- stocking density;
- feeding system;
- ration formulation;
- acidosis;
- induction;
- selection of sheep for feeding;
- welfare.

3.2   Gap Analysis

Participants split into five working groups:

- Environment groups (two);
- Production and Health group;
- Design group; and
- Maintenance Focus group.

In each group, participants addressed the following focus question:

"In this area:
- what do we know (what are we confident about)?
- What don't we know (where are the gaps)?"

The results were:

Environment Group One:

We know:

- site locations and soil types;
  - extension of best practice for site location;
  - information needs to be documented.

We don't know:

- research needed into dust management in summer and mud management in winter (stock density and design can fit in with this);
-
- run-off and leachate:
  - capture,
  - drainage,
  - pen slope,
  - cleaning frequency,
  - climate;

- pad construction:
  - under what conditions do we need this?
  - depth of pad and moisture content;

- treatment:
  - what is happening at the moment?

- design standards;
- effluent management and reuse;
- data on urine and faeces production for sheep;
- Greenhouse Gas emissions (NPI).

Environment Group Two:

We know:

- cattle feedlots are being excluded from ground water zones; can sheep feedlots be set up in these areas?

- we know a lot about cattle;

- dust is not a big issue:
    - laneways are worse than pens,
    - feed dust is worse than environmental dust.

We don't know:

- pad design and potential leaching;

- shade;
    - pen drying versus animal production benefits;
    - shelter versus shade;
    - cooling rather than "shade";

- waste management:
    - how to use solid waste,
    - composting, pathogens, appropriate use,
    - scale of operation (different needs);
    - tential run-off and ponding;

- defining of sheep effluent load:
    - cattle not applicable,
    - influenced by:
        - duration,
        - stocking density,
        - soil type,
        - compaction effect (pressure)

    - run-off coefficients;

- can sheep be run on ground water zones, ie: is this an environmental risk?

- defining of "sensitive areas" on the basis of nutrient load, composition and nutrient cycling;

- odour (flies):
    - need to understand odour generation and control,
    - modelling and monitoring,
    - buffer distances specific to sheep;

- production issues:
    - dust in feed;
    - moisture content of feed to reduce dust;
    - pink-eye and respiratory problems;

- pelleting versus loose mix (home mix).

Production and Health Group:

We don't know:

- ration formulation:
    - impact of amino acids and trace elements (Cu, Co, Sulphur, Zn);
    - understanding of the benefit and the need for roughage in the diet;
    - defining energy requirements for accelerated production;
    - shortening the induction period to maximise production (Finisher diet);
    - buffers that are available to assist with production feeding;

- Feed Conversion Ratio (least cost of grain in minimum time):
    - EBVs for FCR:
        - what stimulates appetite and rumen function?

    - other mechanism to measure NFI;

- feeding management – systems:
    - what is the importance of pre-entry (backgrounding);
    - impact of early weaning into feedlot;
    - creep feeding of lambs;
    - impact of weight gain per day on feedlot performance;

- supply chain:
    - gross margins for breeder – finisher systems;
    - joining in confinement feeding systems;
    - deliver communication messages about nutrition:
        - "TopCrop",
        - "TopLamb";

- respiratory disease:
    - what the incidence is;
    - impact on production;
    - prevention and minimisation;
    - moisture content in ration.

Design Group:

We know:

- feeder space (but we need to know the optimum):
    - trough:
        - 10 – 20 cm,
        - one-sided,
        - daily feeding;
    - self feeder:
        - 2 – 10 cm,
        - continuous;

- water space:

- daily requirement of all, met within 3 hours,
- 0.5–2.0 cm / head,
- temperature,
- quality (salinity),
- type of feeding system.

We don't know enough on:

- social interaction:
  - enriched environments,
  - pen size,
  - stocking density (optimum for production);
  - induction,
  - visibility between pens?

- optimum feeder space:
  - data not available for production systems,
  - hay wastage (benefits of racks);

- water:
  - induction (additives, electrolytes, techniques to attract),
  - collate and extend information;

- environment specific:
  - stocking density,
  - feed pad stability,
  - waste management,
  - hygiene (feedlot dags).

Maintenance Focus Group:

Overall:

We know:

- problems in standard systems;

We don't know:

- surface treatments
  - straw
  - industrial waste

- stocking rate:
  - soil type relationship;

- pad development.

- dust and mud:
  - non-contamination.

Ration:

We know:

- animal health issues;

- induction procedures:
    - introduction to grain,
    - refine and simplify;

- blending different feed sources;

- managing shy feeders:
    - ration design,
    - handling,
    - having happy sheep.

We don't know:

- consistency between State recommendations; in terms of DSE's;

- roughage needs from innovative sources, eg:
    - paper waste;
    - silage – minimum requirements;

- ration x duration; for blending different feed sources;

- induction procedures;
    - alternatives
    - consider beyond 14 days;

- mineral supplements in maintenance;

- metabolisable energy content:
    - dung output;

- maintenance versus lambing problems:
    - high birth weights.

Design:

We know:

- trough, feed and water space;

- high flow rates (water);

- pen size;

- easy operation of system:
    - maintenance,

-     labour requirements and efficiency;

- site selection:
  -     soil,
  -     drainage.

We don't know:

- feeding frequency;

- number of troughs for extra performance;

- pen size and mob behaviour;

- feeders versus on-ground feeding:
  -     disease,
  -     parasites;

- maintaining appetite:
  -     designing for extreme events;
  -     capture experience around Australia;

- stocking rate for lambing down:
  -     feeding and joining strategies.

Run-off / Leaching

We know:

- soils

We don't know:

- critical groundwater depth;

- surface treatments:
  -     straw,
  -     compost layer;

- pad development.

Product Integrity

We know:

- management to maintain fibre strength under:
  -     increased nutrition,
  -     decreased nutrition;

- dust;

- monitoring systems for performance:

- OFDA 2000,
- dung,
- animal temperature;

- monitoring systems for environment.

We don't know:

- meat quality;

- wool quality;

- skin quality;

- whole of life management;

- lamb condition;

- chemical residues in feeds:
  - field test kit;

- simple and effective ways to monitor.

3.3 Future Directions

Participants worked to identify areas of emerging research, from the following focus question:

"*Where does the Sheep Confinement Feeding Systems industry need to be in 2010?*"

Responses were generated and the whole workshop voted to establish priorities.

3.3.1 Workshop Response

The priorities for the emerging directions for the industry were:

- whole of life management effect on product quality;
- production systems that run 100% ewes/ha (including early weaning);
- high fecundity Merino ewes or dual purpose genetics;
- better feed grains; and
- specialisation of production and marketing systems.

3.3.2 Group Responses

The responses in each group were:

Group One:

Response	Requires	Votes
➢ Whole of life management effect on product quality:	Research/Development	8

- genes;

- foetus;

- lamb;

- background;

- finishing.

➤ What are our sheep numbers in Australia - critical to know.	Research/Development	4
➤ Genetic potential and feed efficiency.	Research/Development	1
➤ Industry Association needed?:	Extension	-
• lamb feeders;		
• draft protocols for supply chains;		
➤ Extension on biosecurity:	Extension	-
➤ Best saleable meat yield system for value based.	Research/Development	-

Group Two:

➤ Specialisation:	Research/Extension	2
• optimise production systems;		
• costs and environmental issues of sheep/wheat.		
➤ Risk management.	Research	-
• financial (futures);		
• public perception;		
• new pressures in 5-10 years.		
➤ Breed x genetic potential:	Research/Extension	-
• dominant breed for feeder lambs;		
• easy care, high growth, high yield.		
➤ Potential for 2/4 tooth product.	Research/Extension	-

Group Three:

➤ Production systems that run 100% ewes/ha:	Research/Development	5

• early weaning (6-8 weeks) to finishing.		
➢ Supply chain demonstrations of store, background and finishing systems.	Extension	2
➢ Alternatives to grain or better feed grains.	Research/Development	2
➢ Higher fecundity Merino ewes.	Research/Development	3

Group Four:

➢ Market driven specialisation:	Extension	-
• breeding, backgrounding, finishing;		
• (demonstrate efficiencies).		
➢ All development to address environmental, welfare and community expectations.	Extension	-
➢ Enhanced clean, green, responsible image.	Extension	-
➢ More consistent supply and quality:	Extension	-
• Industry alliances.		
➢ Better (more suitable) quality, higher yielding feed, especially grain.	Research/Development	-
➢ Alternatives to grain in feed (ie: by-products).	Research/Development	-
➢ 5th quarter, eg:	Development	-
• offal (Cd levels),		
• skin (getting realistic value).		
➢ Dual purpose genetics (Merino).	Research/Development	-
➢ Better marketing (value based) of skins (especially Western Australia).	Development	-
➢ Improved eating quality and measurement (eg: shelf life).	Research/Development	-

4. OUTCOME THREE: PRIORITIES FOR RESEARCH AND DEVELOPMENT

From the analysis conducted on:

- gaps in current knowledge; and
- future directions and requirements,

Participants identified the requirements for research and development for production systems and for maintenance systems.

The responses were displayed and individuals voted to establish the priorities for research and development within each system

4.1   Production Systems

4.1.1   Workshop Response

The top priorities were:

Priority	*Votes*
• Whole of life management and effect on product quality:	18
— nutrition x environment x genetics;	
— linked to high fecundity;	
— linked to 100% ewe.	
• Manure quantities, quality and relationship to feeding.	16
• Pad design, leaching, run-off, different environments, drainage, soil type.	13
• Pen size, stocking density.	10
• Induction management.	9
• National Best Practice guidelines for environmental management.	8
• Feed conversion ratio.	6
• Waste management after animals are out of the confinement feeding systems.	5

4.2   Maintenance Systems

4.2.1   Workshop Responses

Response	*Requires*	*Votes*
➢ Design and site selection:	Research	4
• mob size;	Research	-
• trough length;	Research	-
• pen surface;	Research	5

• run-off;	Research	6
• dust and mud;		
• stocking density.	Research	8
➢ Nutrition:	Research	3
• roughage needs;	Research	1
• management of acidosis:	Extension	4
− compile and document;		
• minerals, eg:	Research	4
− maximise Cu use for worm control;		
• energy content of diet:	Extension	2
− compile and document existing standards.		
➢ Techniques to monitor residues in alternate feed stuffs and other inputs.	Research	3
➢ Case studies (collate and document).	Extension	2
➢ Shade.	Research	2
➢ Evaluate monitoring tools, eg:	Research	2
• dung, OFDA (optical fibre diameter analysis);	Research	-
• animal temperature;	Research	-
• environmental temperature;	Research	-
• happiness (welfare) index (including sub-clinical).	Research	1

Workshop Comments

Participants made the following comments:

- nutrition here is "least cost per unit of metabolisable energy;
- animals are in poor condition and thus more susceptible to acidosis;
- minerals are important, due to the time that animals are in the confinement feeding system and due to the pressure on the animals from poor condition;
- residues and feedstuff data is available from David Skerman.

4.3   Group Responses

4.3.1   *Top Priorities for Research, Development and Extension - Design*

Group One:

Response	**Requires**	**Votes**
➢ Define optimum space allocations for production, environment and welfare:		
• pen size/stocking density (environment specific as there will be different requirements for housed versus open systems);	Research	7
• feeder space;	Research	3
• water space/supply rate/quality.	Extension	-
➢ Induction:		
• social:	Research	4
− mixing mobs,		
− enriched environments;		
• feed delivery (especially hay);	Research	2
• feed acclimatisation:	Research	2
− rumen adaptation.		
• stress reduction:	Research	1
− visibility between pens		
• water delivery:	Research	-
− electrolytes,		
− attracting to troughs;		
➢ Pen management (environment specific as there will be different requirements for house versus open systems):		
• waste management;	Research	5
• run-off controls;	Research	1
• hygiene - feedlot dags;	Research	-

• water trough cleaning:	Extension	-
− run-off,		
− round versus rectangle,		
➢ Climatic stress:		
• shade (effect on production),	Research/Extension	2
• water temperature.	Research/ Extension	-
➢ Shearing (effect on production).	Development	1

4.3.2 Top Priorities for Research, Development and Extension – Production and Health

Group Two:

➢ Minimise feeding period:	Research/Development	
• could be induction;		2
• feed conversion ratio;		5
• what stimulates rumen function or appetite;		
• ration;		1
• design (space);		
• mineral deficiencies.		1
➢ Alignment of nutrition x genetics x environment to determine energy requirements:	Research/Development/ Extension	5
• production versus maintenance;		
• exotics.		
➢ Supply chain management:	Extension	4
• development of linkages;		
• market signals;		
• education on gross margins, eg. "Top Crop", "Top Lamb";		
➢ Respiratory disease.	Research	1

➢ Establish current best practice:	Research/Development/ Extension	1
• define and set targets.		
• management indicators for sheep/lamb feedlots.		
➢ Backgrounding:	Research/Development/ Extension	-
• four sub areas;		
• initially capture current Best Practice.		

4.3.3 Top Priorities for Research, Development and Extension - Environment

Group One:

Response	Requires	Votes
➢ Pad design, leaching, run-off and effect of different environments.	Research	11
➢ Assessing sheep effluent load (quantity and composition).	Research	8
➢ Odour:		
• recognise that this will be different for sheep versus cattle;		
• way that it is managed, ie: buffer zones and location of feeding system;	Research	4
• perceived problems.		
➢ Feed type and delivery system (effect on manure output).	Research	2
➢ Climatic stress (encompasses heat, shade, wind, wool length).	Research	1
➢ Waste management to address the needs of different scale enterprises.	Research	-
➢ Dust.	Research	-

NB: Size and duration of enterprise is important.

Group Two:

➢ Manure output:	Research	8

• feed trial in controlled environment;		
• mass balance;		
• feed conversion is linked;		
• nutrient concentration;		
• digestibility.		
➢ National Best Practice guidelines.	Extension	8
➢ Pad management will come with production management.	Research	2
• construction;		
• run-off;		
• drainage;		
• stock density.		
➢ Snapshot odour source.	Research	-
➢ Waste treatment methods:	Research	-
• recommendations;		
• what is the minimum?		

4.4   Producer Priorities

The producers present decided to rate the priorities from their perspective as they are the ones who will make the biggest financial investment in the sheep confinement feeding industry if it looks to be commercially viable. Over 75% of this workshop's participants were industry regulators and advisers (with a greater industry focus), rather than a commercial viability focus.

The priorities were:

• Nutrition:
  - ration formulation;
  - FCR;
  - rumen function;
  - stimulation of appetite.

• Genetics:
  - backgrounding;
  - whole of life management;
  - breeding;

- backgrounding/finishing.

- Lowering stress:
  - adaptation to water;
  - induction processes.

- Trucking and delivery:
  - shade cloth;
  - electrolytes;
  - lairage and emptying out;
  - curfew.

- Focus group within industry:
  - producer support.

Comments:

- Environment slipped out of the top five but the producers acknowledged that sustainability (and animal welfare) will be fundamental to assured market access in the future.

- Furthermore, it is assumed that sustainability work is a "given" and that it will go on.

5.   OUTCOME FIVE: NEXT STEPS

Participants agreed that:

5.1   Actions

- The outcomes from the workshop will be compiled and forwarded to MLA, AWI and the attendees.

- The Workshop Report will be circulated to industry for feedback.

- MLA and AWI will:
  - test the fit with existing industry programs;
  - look for new programs arising from the recommendations;
  - seek to develop a joint action plan on the priorities identified.
  - initiate consultation with GRDC (eg: through the Premium Grains Program) and seek joint opportunities.
  - initiate discussions and consultation with:
    o the Sheep CRC;
    o State Departments of Agriculture.

5.2   Future

- National Recommendations for Industry (general guidelines and principles) to be developed within twelve months.

This approach to be treated as a "living document" to drive the industry forward and to incorporate new research findings.

- Standards (industry developed, specific to particular environments) to be developed over the next three to five years.