Research, Education, and Development Priorities for the U.S. Sheep Industry

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Production, Education and Research Council
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Survey participants included:

- Producers
- Feeders
- Packers
- Wool Processors and Buyers
Previous surveys and reports were reviewed prior to developing the surveys including:

- American Sheep Industry Association Survey-2010
- USDA, APHIS, Veterinary Services, National Animal Health Monitoring System, 2012 Needs Assessment
- NAHMS Survey 2011
- ALB Lamb Industry Roadmap

Other Data Source: Current Research Information System (CRIS), USDA National Institute of Food and Agriculture
Producer Survey

Producer survey included questions about:

• Most important challenges
• Grazing and forage management
• Flock health
• Genetics and breeding
• Reproductive efficiency and performance
• Nutritional management
• Predator management
• Marketing
• Plans to increase or decrease the sheep operation
Project Design

Identify Industry Challenges/Constraints

- Producer, Feeder, Wool processor & Packer surveys

Based upon identified challenges,
What are the specific Research, Education & Development needs?

- Focus Group Survey
Producer Expansion Plans

Industry identification of Research, Education and Development needs can help the industry grow.
Greatest producer challenges by number of breeding ewes and operations

By number of breeding ewes:
1. Labor/labor management
2. Predator management
3. Government regulations/compliance
4. Marketing
5. Flock health

By percent of operations (respondents):

Common:
- Labor/labor management
- Marketing
- Flock health

Common challenges:
- Grazing & forage management
- Marketing
- Flock health
- Labor/labor management
- Facilities and fencing

• By number of breeding ewes - affects the greatest number of sheep
• By percent of operations (respondents) - affects the greatest number of producers
• Labor/labor management and predator management surfaced as more important priorities when summarized by percent of breeding ewes - influenced by larger flocks especially in the western regions
Greatest producer challenges
commercial and seedstock flocks

By Commercial Operations:
- Grazing and forage management
- Marketing
- Labor/labor management compliance
- Flock health
- Facilities & fencing

By Seedstock Flocks:
- Grazing and forage management
- Genetics
- Marketing
- Flock health
- Labor/labor management

Common:
- Grazing and forage management
- Marketing
- Flock health
- Labor/labor mgt

- Grazing and forage management and marketing - commercial and seedstock flocks
- Importance of genetics is greater for seedstock flocks
- Labor/labor management - important to both commercial and seedstock flocks (e.g., immigration reform/H-2A workers) especially for large operations in the western states
Greatest producer challenges by Flock Size

Small Flocks (1-99 head):
1. Grazing & forage mgt
2. Marketing
3. Facilities & fencing
4. Flock health
5. Labor/labor mgt

Mid-Sized Flocks (100-1,499 head):
1. Predator mgt
2. Labor/labor mgt
3. Grazing & forage mgt
4. Flock health
5. Marketing

Common:
Flock health, Marketing, Labor/labor mgt

Large Flocks (1500+ head):
1. Government regulations/compliance
2. Labor/labor mgt
3. Predator mgt
4. Flock health
5. Marketing
Regional differences for greatest producer challenges
(Weighted by Number of Breeding Ewes)

Great Lakes - Reproductive performance and Facilities & fencing
Mid-Atlantic/South – Flock health and Predator management
Texas - Labor and labor management and Grazing & Forage management
Pacific - Government regulations and Labor/Labor management
Research, Education and Development Needs/Constraints

A Focus Group representing sheep research and extension professionals identified the research, education and development needs/constraints for the producer challenges across the following continuum:

- New research
- Interpretation of research results
- Educational resources
- Acceptance/adoption at the producer level
- Technology development e.g., products, vaccines, software, etc.
Educational Resource Needs/Constraints
(Focus Group Responses)

The Focus Group identified educational resources needs to help improve information delivery/technology adoption

• Currently available
• Easily accessible
• Readily used
• Contain up-to-date information
• New or revised programs were needed
Grazing and pasture management challenges for commercial & seedstock flocks

By Commercial Flocks:
1. Pasture renovation
2. Intensive rotational grazing
3. Multi-species grazing
4. Grazing to control invasive species

Common:
- Intensive rotational grazing
- Pasture renovation
- Multi-species grazing

By Seedstock Flocks:
1. Intensive rotational grazing
2. Pasture renovation
3. Multi-species grazing
4. Forage analysis

The same top three priorities were identified by commercial and seedstock flocks.
Grazing and Forage Management Research, education, and development needs/constraints

**Challenge:**
1. Multi-species grazing
   - Research, Education & Development Recommendations:
     - Educational resources
     - Acceptance/adoption at the producer level

**Challenge:**
1. Intensive rotational grazing
   - Research, Education & Development Recommendations:
     - Educational resources
     - Acceptance/adoption at the producer level

**Challenge:**
Pasture renovation (forage species, mix/balance)
   - Research, Education & Development Recommendations:
     - Educational resources
     - New research information
### Grazing and pasture management challenges

<table>
<thead>
<tr>
<th>Rank</th>
<th>Challenge</th>
<th>Rank</th>
<th>Educational Recommendations</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Multi-species grazing</td>
<td>1</td>
<td>Not readily used</td>
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<tr>
<td></td>
<td></td>
<td>2</td>
<td>Not easily accessible</td>
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<tr>
<td>2</td>
<td>Pasture renovation (forage species, mix/balance)</td>
<td>1</td>
<td>Not readily used</td>
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<tr>
<td></td>
<td></td>
<td>2</td>
<td>Not currently available</td>
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<tr>
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<td>1</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>New or revised programs needed</td>
</tr>
</tbody>
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Potential users are often not aware of the information that is available or how to easily access the information.

These type studies often require site specific studies and access to large tracts of land.
Grazing and Forage Management

- Grazing and pasture research often requires site specific studies and access to large tracts of land. Difficult to get funding for these type studies.

- Link studies to other issues such as wildlife, grazing ecology, environmental objectives.

- Use local farms and ranches and partner with related grants where sheep can be a part of the grant, for example wildlife or cattle grazing studies.

- Economic models are needed to provide examples of the potential financial impact of various management practices and technologies.
The three most important nutritional management challenges were common for commercial and seedstock flocks although in different order influenced by geographic region and flock size.
Nutritional Management
Research, education, and development needs/constraints

• Educational resources and acceptance/adoption were high priority

• Interpretation of research results is needed for nutritional management of ewes by production period, a more complex issue involving numerous factors

• Software (e.g. for least-cost rations) is available free and online but is underutilized

• Train-the-trainer programs could be used to increase software use

• There is a need to coordinate available information for nutritional management

• Research needed for to assure current information is available for the nutritional management
Diseases/disease conditions in lambs that are most difficult to manage

By Commercial Flocks:
1. Starvation
2. Internal parasites (excluding Coccidiosis)
3. Pneumonia/respiratory
4. Coccidiosis

Common:
- Starvation
- Internal parasites (excluding Coccidiosis)
- Pneumonia/Respiratory
- Coccidiosis

By Seedstock Flocks:
1. Internal parasites (excluding Coccidiosis)
2. Pneumonia/respiratory
3. Starvation
4. Coccidiosis
Diseases/disease conditions with the greatest Economic Impact

Common:
- Internal parasites (excluding Coccidioides)

In Breeding Ewes & Rams:
1. Internal parasites (excluding Coccidioides)
2. Mastitis
3. Footrot/Scald
4. OPP
5. Abortion

In Lambs:
1. Internal parasites (excluding Coccidioides)
2. Starvation
3. Pneumonia/respiratory
4. Coccidioides
5. Enterotoxemia
Diseases/disease conditions

Diseases most difficult to manage in lambs:
- Starvation and internal parasites

Diseases most difficult to manage in breeding ewes:
- Internal parasites and mastitis

Diseases with most economic impact in lambs:
- Internal parasites and starvation

Diseases with most economic impact in breeding ewes/rams:
- Internal parasites and mastitis
Disease conditions most difficult to manage in lambs

Research, education, and development needs/constraints

Educational resources were considered an important need for starvation (dam poor milk, mis-mothering) and pneumonia/respiratory diseases.

Existing information about starvation and pneumonia/respiratory diseases is not readily being adopted at the producer level.

New research information and technology development was identified as being needed for internal parasites.

Several approaches are currently being investigated for internal parasites including genetic markers for parasite resistance, animal drugs for treatment, and management practices.
Reproductive performance for commercial and seedstock flocks

Number of lambs weaned per ewe lambing
Number of lambs born per ewe lambing
Reproductive performance for commercial and seedstock flocks

Common priorities for both commercial and seedstock producers across flock size were:

- Number of lambs weaned per ewe lambing
- Number of lambs born per ewe lambing

Emphasis on lamb numbers and out-of-season breeding

Acceptance/adoption of information and improved educational resources were considered the most impactful needs for each of the top three reproductive performance priorities
Genomics focused on genetic markers

Challenges:
- For parasite resistance
- For specific diseases
- For milk production
- For production traits
- For carcass traits

Research, Education & Development Recommendations:

1. New research information
2. Interpretation of research results research information

Parasite resistance, Specific diseases, Milk production, Production traits, Carcass traits
Genomics Application

- Volumes of new genomic and genetic information creates challenges

- Focus group respondents reported that genomics focused on genetic markers requires new research information & interpretation of research results

- Interpretation of new research draws upon multiple disciplines including biochemistry, genetics, computer science/data management, statistics, animal breeding and economics

- Genomic information is particularly valuable in sheep breeding is valuable for managing simply inherited genetic defects and genes with large effects on prolificacy, disease resistance, and muscularity, but currently less valuable for genetic improvement in U.S. sheep for quantitative traits involving numerous genes each with small individual effects

- A mini symposium ‘Utilization of Genomic Information for the Sheep Industry’ was held during the PERC meetings in January 2012.
Marketing - an important challenge identified by producers: Illustrated by Region

Commercial lamb producers (46%) in the Great Lakes identified marketing as a major challenge
Marketing relatively less important as flock size increases
Marketing
Market Outlet and Flock Size

Small and medium-sized operators primary sell at local auctions and on-farm
Large operators sell through lamb pools/co-op and feedlots

A survey for nontraditional lamb marketing by Shiflett and Rodgers in 2010 of sheep and lamb producers revealed that an estimated one million lambs sold direct from producers to consumers from the farms in the year ending November 2009.
Feeder/feedlot survey

Most important concerns

Feeder lamb availability

Labor costs/availability

Market prices – feeder lambs

Market prices – slaughter lambs
Feeders: What are the priority concerns facing your feedlot operation today?

**Identified Challenge:**

1. Market Risk - Lambs
2. Labor costs/availability

**Research, Education & Development Recommendations:**

1. Educational resources
2. Acceptance/adoption at the producer level
Feedlot Causes of Death
Research, education, and development needs

Rectal prolapse – Need for acceptance/adoption of information and improved educational resources

Other respiratory disorders – Need improved educational resources and interpretation of research results (interpretation of multiple factors)

Shipping fever, pneumonia – Need for improved educational resources and acceptance/adoptio
Wool processor survey

Wool Quality Attributes

Local (easy access to wool)
Style, type, length and color
Quality/value weaknesses of U.S. wool

• Wool contamination was considered the top-ranked quality/value weakness of U.S. wool (Contaminates include stain, colored fiber, paint and vegetable matter)
  • Supply (availability of wool) also a concern
Wool research and development priorities

New product development (27%)

Domestic marketing research (24%)
Producer Information Sources

How often each information source is used routinely:

• Internet was used the most routinely (67%)
• Other producers (informal) (43%)
• Veterinarians (37%)
• Extension specialists/county agent (24%)

Changes in how information is accessed and used
- Changing producer demographics – how to provide information
- Concern about the validation of information
- Lack of awareness and access to information
- Existing information is often not being used
Implementation of Priorities

Identify more specific research, education, and development priorities that will benefit the industry in the short-intermediate term

Allocate resources to implement the priorities in the context of the current public and private research and education infrastructure
Public resource allocation trends for sheep research and extension

**All Agricultural Research**
- $4.04B to $3.88B between 2002 and 2014
- 4% decrease

**Animal Agricultural Research**
- $792.9M to $737.3M between 2002 and 2014
- 7% decrease

**Sheep Research**
- $48.3M to $33.7M between 2002 and 2014
- 30% decrease

**Extension Expenditures for Animal 300 Knowledge Areas**
- $110.2M to $97.1M from 2007 to 2014
- 12% decrease
Public Resource Allocation Trends

- Seventy-five percent of Focus Group respondents anticipate that the current level of public funding for sheep research and extension/education will continue to decrease.
  - The remaining 25% expect public funding for sheep research and education to remain about the same.

- There have been several changes in the allocation of funding for sheep research 2004 and 2013.
  - Largest increases over this period were for research related to animal genome and reproductive performance
  - Largest decreases were for management systems, diseases, and marketing
Research and education infrastructure issues

• Continued decrease in public funding for sheep research as shown above
• Reduced number of sheep research and extension professionals
• Decrease in targeted funding for research and education by the US Congress
• Expanded scope of topics for research and education (many non-traditional issues)
• Fewer commodities funded at the State level with loss of some sheep programs
• More emphasis on basic research for competitive grants
• Priority and allocation decisions made at multiple levels
• Many priorities are impacted by regulations, legislation, and special interest groups outside the traditional agricultural research and education arena
• Changes in the way information is accessed and used
• Access to and use of existing validated non-biased information
Use of existing public and private research and education infrastructure

Two examples of existing public and private research and education infrastructure currently available to the industry:

1. eXtension
   - access to information

2. NSIP and the use of Estimated Breeding Values (EBVs)
   - science-based, industry-tested measurements of heritable traits that can be tracked and measured
eXtension

For Extension professionals and the public
Provides ways to collaborate with peers around emerging issues and innovation

- Potential use of eXtension as an extender or multiplier for information
- National in scope
- Industry is currently putting together an electronic resource base
- Need a core of committed individuals to track questions and respond
  - There is a limited resource base of individuals to answer questions
- There is potential value of eXtension to individual county agents, consultants, faculty especially in states where there is no sheep expertise
- eXtension could serve as an information mechanism to access and leverage existing information
Estimated Breeding Values (EBVs)

One of the priority technology constraints was the familiarity and use of Estimated Breeding Values (EBVs)

- Estimated Breeding Values are science-based, industry-tested measurements of heritable traits that can be tracked and measured. EBVs denote the value of the individual animal.
- The National Sheep Improvement Program (NSIP), a not-for-profit corporation, provides a system which describes the genetic worth of animals used in the sheep industry based on the calculation of breeding values.
- Educational material for EBVs is viewed as not readily used and not easily accessible.
- However, the use of EBVs is actually increasing and the National Sheep Improvement Program (NSIP) has recently hired a staff person to focus on educational outreach.
Estimated Breeding Values (EBVs)

The focus group recommendations include:

- Demonstrate examples of increased performance of actual sheep/progeny in the program
- Highlight successes of commercial producers to adopt EBVs, e.g. Montana, Center of the Nation sale, Katahdin Association (parasites)
- Make potential NSIP users aware that any flock or breed may submit data to NSIP
- Enroll university purebred flocks in NSIP and use flocks in the state to serve as a demonstration flock
Some concluding comments

Producer priorities and challenges vary by demographic groups such as geographic regions and flock size but there are many similarities.

Priorities are consistent with previous studies and surveys such as the NRC 2008 Report, ASI 2010 Survey, NAHMS 2012 Needs Assessment, and the NAHMS Survey 2011 and the ALB Lamb Industry Roadmap.

It is important to recognize demographic differences when implementing priorities for research and educational resources.

It became evident that existing information for several topics is not readily being accessed and/or used by the industry.

Producer information sources have changed as the technology to access information has changed.
Some concluding comments

Research is needed to address priorities such as new genomics information focused on markers, parasite resistance, and intensive rotational grazing; and the interpretation of research results for management of ewes by production period.

It is also recognized that research is needed for several other priority areas to assure the continued availability of validated non-biased educational resources for the industry.

Expansion in the industry is expected in certain geographic areas especially by producers with smaller flocks.

The public research and education infrastructure is becoming smaller making it more essential to focus on the priority and challenges most important to the industry.

Public and private partnering to leverage resources for efficiency and effectiveness.

Take advantage of existing private and public research and education infrastructure.
Thank you for the opportunity to share these results, recommendations and comments

Larry R. Miller