
ALBERTA CROP INDUSTRY DEVELOPMENT FUND

**Strategic Research Priorities for the
Feed Grain Supply and Quality Initiative**

Focussed Discussion Workshop

SUMMARY REPORT

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INTRODUCTION AND CONTEXTING

The Alberta Crop Industry Development Fund (ACIDF) is an independent, not-for-profit company operating under the direction of the Alberta crop industry through a memorandum of understanding between thirteen diverse crop industry organizations. The fund is managed by five delegated crop industry representatives. ACIDF funds and supports selected crop related industry development activities including market development, research, and extension.

In June 2005, ACIDF signed a new funding agreement with Alberta Agriculture Food and Rural Development (AAFRD) which will provide \$23,000,000 over the next five years. This money must be committed to meaningful crop industry activities generating measurable outcomes before March 31, 2010 for complete disbursement by March 31, 2012.

The new funding agreement defines three crop initiative areas with a specific scope for each one:

1. Feed grain quality and supply
2. Environment and nutrient management
3. Bio-products

The Feed Grain Quality and Supply Initiative has been allocated \$10,000,000 with the direction of supporting worthy world-class research and development (R&D) programs and projects to:

- Enhance feed grain profitability in Alberta through cultivar development, biotechnology and agronomy directly associated with feed grains
- Add value to feed grains produced in Alberta through improved feed processing technology
- Develop superior feed ingredient determination technology for the benefit of Alberta's crop and livestock sectors

Performance measures for the feed grain quality and supply initiative are:

Measure	Target				
	2005/6	2006/7	2007/8	2008/9	2009/10
New cultivars specific for yield potential in AB to further increase energy harvested per acre, by increasing tonnage and /or energy density.(# per yr)			2	2	2
Energy increase from feed grain per acre (% per year)			5%	5%	5%
Industry adoption of technology. Field implementation by market share. (percent implementation per year)		5%	5%	5%	5%

ACIDF's Board has the responsibility of making the funding decisions. However, they operate on the basis that those charged with making the investment decisions need the best possible information. One part of that information is input from the industry and the research community.

To that end, eighteen invited value-chain representatives from agriculture and food industry convened on June 13, 2005 to identify R&D priorities for the feed grain quality and supply initiative (see Appendix 1 for Participant List).

This workshop brought together a range of perspectives, insights, experience and knowledge with the goal of creating a comprehensive understanding of the needs, and subsequently, the R&D priorities that would respond to the feed grain quality and supply initiative, and moreover provide results for the three defined outcomes. The ACIDF Board, AAFRD, Alberta Agricultural Research Institute (AARI) and likely other funding consortium members will use the results to inform their decision process.

THE FOCUS DISCUSSION PROCESS

The driving question for the workshop was, "What R&D needs to be done to achieve the stated outcomes and performance measures?"

Rather than brainstorming ideas for R&D project and programs, participants addressed six questions (listed below) in their discussion process. The discussion and the responses resulted in a strategic approach to identifying R&D priorities.

The Exploration Questions

1. What is already happening in the area of feed grain quality and supply R&D that can be built upon?
2. What is the most pressing issue that needs to be addressed in feed grain quality and supply? Why is it pressing?
3. What needs to happen to create momentum in feed grain quality and supply R&D and achieving the outcomes?
4. What are the barriers that need to be addressed to achieve the outcomes and measures in the feed grain quality and supply initiative?
5. Who are the major players in feed grain quality and supply R&D?
6. What are leveraging opportunities for new feed grain quality and supply initiative R&D?

DISCUSSION SYNOPSIS

Key Messages

Throughout the discussion a number of consistent themes emerged and became key messages for ACIDF:

1. The critical importance of a crop/livestock interface approach in feed grain quality and supply R&D.

The first question of the day was whether R&D under this initiative was to benefit the crop industry or the livestock industry. The group strongly emphasized it was not an either/or but had to be an integrated approach that addressed and facilitated cooperation and alignment of the two sectors. They agreed the focus must be on the future and the increasing demands for science based knowledge, not on past practices and relationships, or lack thereof.

2. The need for efficacy (effectiveness, usefulness, worth, value and efficiency) of R&D

A challenge cited several times was that R&D, and the technologies and/or products generated, needed to be realistically affordable and implementable by the industry—both crop and livestock. Industry participants stressed that results of any R&D work had to have a direct benefit and be a practical, affordable application in their operations. Technologies that create a standard or a system that make production cost prohibitive must be avoided.

3. A systems approach to R&D

Another strong theme, tied directly to the crop/livestock interface but broader and deeper in scope, was the need for a systems approach to R&D. Industry, government and research representatives concurred that addressing agriculture R&D in the context of the entire operating or production system was essential to industry sustainability.

4. Beneficial management practices (BMPs)

The discussion on BMPs ranged from understanding them in the adoption of technology and utilization of improved feed grains, to understanding which management practices would have the most significant effect on efficiency. The cost/benefit factor was raised many times as was the inability for producers to implement every BMP identified. Education and extension are key components to the effectiveness of BMPs.

Discussion of the Exploration Questions

Response to the six exploratory questions was the tool used to trigger ideas about the R&D required to provide the required outcomes in the feed grain supply and quality initiative. In summary:

1. Identifying what is already happening, the major R&D players and leveraging opportunities.

There is a significant body of research being conducted in Alberta and Western Canada that could serve as the foundation including:

- Feed grain program breeding, genetics and agronomy which includes developing varieties, production technology, studying genetics side for marker work—quality and disease resistance— Field Crop Development Centre (FCDC), Lacombe, Lethbridge
- Market segregation (to segregate the crop) to commercialize Near Infra-Red Spectroscopy (NIRS)—Lacombe
- Feed processing—how processing can affect quality and functional characteristics—University of Alberta (U of A) and Agriculture and Agri-Food Canada
- Consistency of supply—FCDC
- Other countries have created a strategic approach to a highly competitive situation
- Feeding studies and nutrition research—U of A, Lethbridge and Lacombe, Prairie Swine Centre
- Advanced feed valuation for quality using animal models and lab models—U of A, Lethbridge

This discussion identified major players in the area of feed grain research as the U of A, FCDC (Lacombe), AAFRD Crop Diversification Centres, Agriculture and Agri-Food Canada (Lethbridge).

ACIDF clearly stated there would be an expectation to leverage grant funds with at least a 3:1 ratio. Identified leveraging opportunities were with commodity groups, industry partners (feed lots, etc.) and other major R&D funders.

2. Pressing issues.

Participants strongly felt defining the quality of grain required by the industry— understanding what is meant by quality feed grain and what is required by each species in the way of optimum quality/energy as a key issue.

Further to producing specific quality grain was the need to create a market demand through awareness, buy in, and support including the technology transfer aspect of adoption of feeding and other BMPs, and investment in higher priced/higher quality feed.

Finally, consistency of supply was also seen as a pressing issue for the livestock industry—not just consistency of feed but consistency of particular quality characteristics and the ability to test grain in a expedient and cost-effective manner.

3. Creating momentum toward achieving the outcomes.

Several participants noted that historically feed grain has not been developed specifically for feed, but as a result of not being used for other value-added processing. In the current situation, where there is a global demand for specific feed components and qualities, more grain is being developed, grown and used specifically as feed grain. While most participants were aware of this evolution, it was generally held this was not the case throughout the agriculture industry and at the producer level, but it needs to be. To quote one participant, “The industry has to have a strong consensus that without R&D and strategic goals we are going to go nowhere.”

Building a feed grain industry includes:

- Changing the image that feed is the lowest quality grain
- A marketing system that can handle this—something that can tell you that it will provide profitability (quality ID and traceability)
- Expertise pool to adopt technology (i.e. NIRS technology, being able to use the technology that we have available to breed and change varieties)
- Education to demonstrate/convince some of the industry of the economic benefits of R&D and build trust in the technology—prove its value to the industry
- A check-off system that works—that supports R&D—integrated system crop/livestock
- Partnering with industry to drive things forward
- Interfaces between crop and livestock throughout the knowledge chain and industry

4. Barriers

The discussion on barriers to progress in building a feed grain industry and improving the quality and supply of feed grain ranged from those things outside the sphere of influence and control of the R&D community (i.e. regulatory reform) to common concerns throughout the R&D system (ownership of intellectual property) to issues like lack of testing ability and markets.

Again, buy-in of the producer to invest in new technologies, new varieties and value-adding was seen as a key concern. Elements of this barrier included the risk of not having markets for the product, and a caution from the livestock industry about products or technologies that didn't have a clear cost/benefit, or moreover, were cost prohibitive.

These barriers spoke to:

- The opportunity for identifying niche markets and value-added product for specific local and global markets
- The need to fully develop a functional supply chain for cereals and pulse crops
- Adapting the check-off system to support R&D investment
- Building on availability of expertise and tools nationally and globally and not focusing on acquiring everything in Alberta—but having the facility to capacity to test and adapt technology or product to Alberta
- Coordination of supply side and R&D side of the industry

Research community members identified the following barriers:

- The narrow focus of this initiative and the parameters around time frames, partnering, outcomes-based performance measures, etc., were identified as limits to innovation and the facilitation of far-sighted research
- Human resource issues: The lack of a knowledgeable work force or knowledge workers in the continuum—with industry, in scientific and applied research and people who can work across the grain/livestock interface
- Consistent erosion of public breeding facility—in the crop sector if you are going to commercialize something it has to go through a breeding program

Research and Development Priorities

Participants developed and ranked the following R&D priorities as being the most important steps in achieving the outcomes identified in the feed grain quality and supply initiative.

Priority One: Feed Grain Quality Determination

- Define quality (how to evaluate feed grain) which would develop a feed quality standard
- Feed grain ingredient determinants resulting in a system that rewards both the livestock and crop producers in meeting the markets they are striving to produce for in a more profitable manner
- Quality determination by livestock class to develop a new marketing system by value/quality (NIRS) resulting in commercial acceptance of market by quality
- Identify quality traits within cultivars that generate economic returns to the customer
- Animal species specific qualities and traits resulting in increased tonnes used in feeds

Outcomes or Indicators:

- Setting measurable standards for quality used for different classes of livestock
- Standards are used
- R&D team for each livestock group with a crop/livestock interface central quality lab

- Crop species specifications—indicate there is a basic standard and how species fit within the standards and a system that can be used for determining this and how it relates to end value uses
- Quality identification and rapid evaluation system
- NIRS calibration for the major crop species of various quality factors needed
- Number of NIRS machines in use and end users that have them

Investment: \$20 X 8 \$10 X 4 \$5 X 5 **Total: \$225**

Priority Two: BMPs and Agronomy

- Develop BMPs that result in consistent production for quality traits at an economic level

Outcomes or Indicators:

- Measurable impact on profitability
- Ability to determine what the livestock industry wants in terms of feed grain. How do we use BMP to achieve outcomes at an acceptable cost?
- Reduction in imports of feed
- Security and consistency of production
- Increase the probability of successful niche markets/products
- Increase synergism at the crop/livestock interface
- Increase margins and profitability
- Ongoing public crop breeding program

Investment \$20 X 5 \$10 X 1 \$5 X 4 **Total: \$130**

Priority Three: Cultivar Development to Maximize Yield

- Cultivar development which would result in security of supply
- Cultivar development to maximize yield and quality which would result in better crops
- Ongoing public crop breeding programs and economic assessment by crop type (cost/benefit) which would result in new varieties in crop production
- Long-term move to breeding focus toward specific end use quality characteristics (as related to animal production)
- Cultivar development and agronomy research to increase energy output per acre providing consistency of supply and feed grain profitability

Outcomes or Indicators

- Smaller incidence of disease outbreak
- Adapting to the climatic changes (BMP)
- Improved quality characteristics
- Increased energy output on a more consistent basis. (i.e. WUE, disease)
- Diversify farm income

Investment \$20 X 1 \$10 X 6 \$5 X 8 **Total: \$120**

Priority Four: Processing Technologies

- Processing technologies to maximize feed grain utilization by linking evaluation to processing
- NIRS education and knowledge transfer resulting in adoption and prediction of feed quality standards

Outcomes or Indicators:

- Better utilization of new technologies to create feeds that have better utilization
- Leveraging opportunity
- Interaction between processing and varieties, and processing and feed evaluation
- Establishing the impact of certain existing technologies (benchmarking)
- Technology transfer: tie together R&D with industry verification toward general commercialization

Investment \$20 X 1 \$10 X 4 \$5 X 10 **Total: \$110**

Priority Five: Overarching R&D Networks in Crop/Livestock Interface

- Integrated teams (approach)—university, government, industry demonstration projects on usage resulting in increased use of new varieties and new cultivars
- Fund collaborative teams/networks in grain/livestock research

Outcomes or Indicators

- Longer term vision toward new possibilities that will enhance the value of feed grain
- Strategic approach where both sectors benefit
- Introduction of new technologies or techniques
- Technology transfer
- Collaboration of researchers
- Organization of commercial demonstration projects/technology transfer/on-farm resulting in shared information

Investment \$20 X 2 \$10 X 2 \$5 X 7 **Total: \$95**

CONCLUSION

ACIDF committed to summarizing the discussion results into a report, testing it for validity and completeness, and then using the results to round out the business plan and the granting process. They will share it with their partners in the funding consortium, in industry, and with the workshop participants.

This is the first step in this process. While the results probably reflect the important priorities right now, ACIDF has learned this is a generative process and it is committed to a continuous review, learning and adaptation process to ensure the work the organization funds responds to an evolving industry.

ACIDF also realizes some key R&D projects or programs may require coordination and facilitation through solicited proposal calls and are open to that possibility.

Participants

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Poster Questions

1. What is already happening in the area of feed grain quality and supply R&D that can be built upon?

- Feed grain program breeding and genetics and agronomy which includes developing varieties, production technology, studying genetics side for marker work—quality and disease resistance—FCDC, Lacombe, Lethbridge
- Market segregation (to segregate the crop) to commercialize NIRS—Lacombe
- Feed processing—how processing can affect quality and functional characteristics—U of A and Ag Canada
- Consistency of supply—FCDC
- Feeding studies and nutrition research—U of A, Lethbridge and Lacombe, Prairie Swine Centre
- Advanced feed valuation for quality using animal models and lab models—U of A, Lethbridge

2. What is the most pressing issue that needs to be addressed in feed grain quality and supply? Why?

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ▪ Define quality required—we need a def of what quality is? (per animal species and category) ▪ How do we define it? ▪ How do we evaluate it? | <ul style="list-style-type: none"> ▪ We don't understand what the end is—it needs to be defined ▪ What is the market demand? |
| <ul style="list-style-type: none"> ▪ To have a quality laboratory in Alberta (international standards) that can define what quality standards are? | <ul style="list-style-type: none"> ▪ The lab is the tool |
| <ul style="list-style-type: none"> ▪ Cost/benefit—potential risk (of producer) versus potential cost | <ul style="list-style-type: none"> ▪ Need some assurance that it will be a benefit |
| <ul style="list-style-type: none"> ▪ Need a demand for any of the varieties | <ul style="list-style-type: none"> ▪ Market drivers |
| <ul style="list-style-type: none"> ▪ Extension and information transfer | <ul style="list-style-type: none"> ▪ Adoption is critical |
| <ul style="list-style-type: none"> ▪ Is there an awareness of a need? What are the benefits of improved feed grain quality and supply? | <ul style="list-style-type: none"> ▪ Education process required to establish that there is a better way to do it. |
| <ul style="list-style-type: none"> ▪ Consistency of supply—economic and environmental (BMPs) ▪ (ICM) –for new varieties –not just consistency of feed but consistency of particular quality characteristics | <ul style="list-style-type: none"> ▪ If we are going to have a vibrant livestock industry we need consistency to ensure confidence of the producers. ▪ Increased value of cultivars |

3. What needs to happen to create momentum in feed grain quality and supply R&D and achieving the outcomes?

- The industry has to have a strong consensus without R&D and strategic goals we are going to go nowhere.
- You have to be able to have a marketing system that can handle this—something that can tell you that it will provide profitability. (Quality ID and traceability)
Change the image that feed is the lowest quality.
- Expertise pool to adopt NIRS technology (any type of technology)
- Trust in the technology –prove its value to the industry
- Education to show to some of the industry what the economic benefits of R&D are
- Check-off system that works—that supports R&D –integrated system crop/livestock
- Be able to use the technology that we have available to breed and change varieties
- Get partnership-PPP—partnering with industry to drive things forward
- We need interfaces between crop and livestock throughout the knowledge chain and industry

4. What are the barriers that need to be addressed to achieve the outcomes and measures in the feed grain quality and supply initiative?

- Regulatory reform
- Producers mindset—crop and livestock—test weight syndrome
- Parochial attitude—need to build on what is available, not necessarily in Alberta
- Commodity orientation—we don't look at value-adding right now
- Ownership of IP
- Lack of supply chain for new cereals and pulse crops—need markets
- Current check off system—commodity oriented—value chain does not contribute to R&D effort
- Impact that is required of partnerships and leveraging can restrict innovation to look down the road far enough—to allow people to do far sighted research. We tend to work in short term intervals
- The lack of a knowledgeable work force or knowledge works in the continuum – a work force that can work within the industry—scientific and applied. People who can work across the grain/livestock interface.
- Supply side and R&D side need to be coordinated
- In the crop sector if you are going to commercialize something it has to go through a breeding program—consistent erosion of public breeding facility.
- Specific outcome based performance measures – to specific for a research program

5. Who are the major players?

- Feed companies, feed lots will need to become involved
- Research community are the primary drivers
- AAFC and AAFRD, U of A
- Producer, processors, extension information
- Early adopters of industry—leaders

6. Where are there leveraging opportunities?

- Get the industry leaders on side (private industry)
- Partnering with commodity groups
- Governments
- Competitive R&D grants
- AARI

Project Ideas (Raw Data from Posters)

What projects would contribute to achieving the identified outcomes	How
▪ Identify priorities of feed industry—where would they spend research money to increase their profitability	▪ Survey/economic modeling
▪ A means of determining quality for all grains	<ul style="list-style-type: none"> ▪ Determine what is needed for specific species ▪ Do NIRS calibration for the major crop species of various quality factors needed ▪ Industry adoption
▪ Quality identification and rapid evaluation	▪ Industry involvement in establishing
▪ Quality determination by livestock class to develop a new marketing system by value/quality	▪ Research team for each livestock group with a crop livestock interface central quality lab
▪ Define quality	<ul style="list-style-type: none"> ▪ What is it? What are the standards? ▪ How to evaluate? Feeding trials etc and tie to NIRS system
▪ Identify those quality traits with the cultivars that generate economic returns to customer	▪ Broad based survey of production sector/market
▪ Processing technologies to maximize grain utilization	▪ Feed Science and Technology Institute
▪ Processing to maximize feed grain utilization –link evaluation to processing	▪ Feed science and Technology Institute
▪ Specify, measure and development rapid identification system	▪ Industry driven questions
▪ Cultivar development to maximize yield and quality	
▪ Cultivar development and agronomy research needed to increase energy output on a more consistent basis. i.e. WUE, disease	
▪ Security of supply feed gain profitability	<ul style="list-style-type: none"> ▪ Cultivar development ▪ ICM best management practices

What projects would contribute to achieving the identified outcomes	How
<ul style="list-style-type: none"> ▪ Consistency of production for traits and economic level or quality 	
<ul style="list-style-type: none"> ▪ Technology transfer program to establish a virtually integrated grower/industry interface 	<ul style="list-style-type: none"> ▪ Tie together R&D with industry verification toward general commercialization
<ul style="list-style-type: none"> ▪ Adoption and prediction 	<ul style="list-style-type: none"> ▪ NIRS machine in industry ▪ Education ▪ Knowledge transfer ▪ Workforce
<ul style="list-style-type: none"> ▪ Animal species qualities and traits 	<ul style="list-style-type: none"> ▪ Identifying what traits are important and technology transfer
<ul style="list-style-type: none"> ▪ Economic assessment by crop type—cost/benefit 	<ul style="list-style-type: none"> ▪ Show value to producers
<ul style="list-style-type: none"> ▪ Ongoing public crop breeding program 	<ul style="list-style-type: none"> ▪ Continue to verify improvement (agronomic and nutritional)
<ul style="list-style-type: none"> ▪ Integrated teams (university, government, industry) 	<ul style="list-style-type: none"> ▪ Multi-disciplinary approach, team building to address objectives
<ul style="list-style-type: none"> ▪ Build (fund) collaborative teams/networks in grain/livestock research 	<ul style="list-style-type: none"> ▪ NSERC/ALIDF/ACIDF
<ul style="list-style-type: none"> ▪ Public/private partnership—demonstration projects 	
<ul style="list-style-type: none"> ▪ Longer term vision toward new possibilities that will enhance the value of feed 	<ul style="list-style-type: none"> ▪ New cultivars with enhanced quality characteristics