



Saskatchewan Beef, Feed & Forage Industry
Research Strategy

June 20, 2013

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Executive Summary:

Saskatchewan plays a significant role in terms of infrastructure in beef, feed and forage research. Existing infrastructure includes the Vaccine and Infectious Disease Organization (VIDO), the Western College of Veterinary Medicine (WCVI), the Crop Development Centre, the University of Saskatchewan Beef Cattle Research Teaching Unit (BCRTU), Agriculture and Agri-Food Canada (AAFC), Western Beef Development Centre (WBDC) and the Feed Innovation Institute (FII) thus creating a climate of excellence in the province.

Declining investment in beef and forage research for a number of years has led to the current long term viability situation.

The National Beef Research Strategy has identified its priorities. The Saskatchewan beef, feed and forage research strategy must compliment the national vision, at the same time avoiding duplication, while ensuring the issues of critical importance to Saskatchewan are addressed.

Research must serve a purpose. The goal is to provide the knowledge to producers to give them the efficiencies to make more money and spend less money doing so.

A transition plan is needed to ensure beef and forage researchers are in place to mentor their successors. Without it, applied research and tech transfer expertise will be lost to the detriment of the industry.

Clear outcomes must be determined. We need to identify the facilities and expertise that will help achieve the outcomes, rather than simply identify what the facilities or expertise can do. Industry and government research funders must collaborate in order to avoid duplication and ensure a balanced approach is in place. All priority research areas require adequate funding, not just a few. Greater communication is necessary for this to happen.

Saskatchewan is a center of excellence. Saskatchewan must focus on sustainability of forage and grasslands. A dedicated commitment is required to maintain and expand current forage breeding and management capacity specifically in terms of human resources to ensure that forages, the foundation of the livestock industry, is supported.

Vision:

Saskatchewan is a global leader in beef, feed and forage transforming research into a successful sustainable livestock industry.

Introduction:

Canada is home to approximately 4.5 million beef cows with over 85% of them in western Canada. Our cattle feeding industry competes on a North American basis for both regional and global markets. While the last 20 years has been one of growth for the industry, today it stands at a critical crossroads in its development. Factors such as BSE, high Canadian dollar, lost or restricted access to export markets and

poor cattle prices have all combined to put severe economic pressure on producers and forced industry contraction. If this industry is to grow and fulfill its destiny of becoming an economic engine that drives the rural economy, it must be competitive, be ready and willing to adopt new technology and have access to highly trained youth who will be the business and government leaders of the future.

The beef industry is extremely important to the Canadian economy and to the way of life of the more than 90,000 producers who derive at least part of their income from raising cattle. Beef cattle are raised across Canada; however both the cow/calf and feeding sectors are based in western Canada due to competitive advantages in land, feed, climate and economics of production. The significance of this industry is evident from the fact that in 2010, farm cash receipts from beef cattle totalled more than \$6 billion, surpassing all other livestock sectors¹. The industry does not however stop at the farm gate. Spin-off benefits transcend to a host of other value-added industries including the retail meat industry, the packing sector, value-added processing of beef products, the feed industry, the grain and oil seed sectors, just to name a few. In fact when one looks at total economic activity generated by the industry and associated sectors, it is estimated that the beef industry contributes more than \$25 billion to the Canadian economy. In short, a competitive beef industry translates to a healthy, competitive Canadian economy.

Research and innovation are fundamental to addressing many of the core issues facing the beef cattle industry. Overall, research funding, infrastructure, human capital and technology transfer to support beef cattle and forage research has declined significantly during the past decade.

Currently, 45% of all agriculture research and development (R & D) in Canada is done by Ag Canada. As the federal government agriculture research budget is cut, fewer researchers are being asked to maintain the current levels of research. This is not sustainable. In the past 12 months, Ag Canada has lost 10% (300 staff in research division) of its workforce². Research capacity is being lost.

The Saskatchewan Cattlemen's Association (SCA), is leading the development of a 5 and 20 year beef and forage research strategy. With input from industry stakeholders, it has created a provincial beef and forage research strategy document. The goal is to establish a Saskatchewan long term vision to ensure the future viability of the beef, feed and forage industries. As well, a long term plan and priorities must be determined. On-going deliverables will be the result.

Recently the Saskatchewan Ministry of Agriculture identified the need to review research and development in the beef, feed and forage sector. The stated goal of this review is to develop new, and improve upon, existing technologies for Saskatchewan's forage and livestock industries through research and development funding, the Strategic Research Program (SRP), and research infrastructure.

To address this need, the Ministry established a partnership with MNP to develop a consultation model that would provide a better understanding of the current contribution to beef, feed and forage R&D activities, to understand the future short and long term R&D priorities, to determine the physical and intellectual infrastructure needed to support R&D activities in Saskatchewan and to create a governance model that would attain greater collaboration amongst R&D institutions and science and technology transfer/commercialization with agricultural producers.

¹ Statistics Canada 2011; Catalogue no. 21-011-X, Farm Cash Receipts, Agriculture Economic Statistics.

² Dr. Steven Morgan Jones presentation to Stakeholder's Meeting, Regina Agribition, November, 2012.

The MNP Review focused on four themes:

1. Program Effectiveness;
2. Future Research and Development Priorities;
3. Physical and Intellectual Infrastructure Assessment;
4. Program Governance.

Current Situation:

Currently, beef and forage research takes place in a number of organizations. The primary organizations in Saskatchewan are the College of Agriculture and Bioresources (Departments of Animal and Poultry Science and Plant Sciences), Western College of Veterinary Medicine and the Vaccine Infectious Disease Organization (VIDO), the Western Beef Development Center, GenServ Genetic Testing Lab in the Saskatchewan Research Council, and Agriculture and Agri-Food Canada.

The Saskatchewan Ministry of Agriculture (SMA), Agriculture Research Branch, worked with MNP LLP (MNP) to conduct an independent review of beef, feed and forage research and development activities in Saskatchewan.

The objective of the review was to gather stakeholder and producer perspectives in order to:

1. Quantify the impact of current beef, feed and forage research and development activities in Saskatchewan;
2. Identify the future priorities of the beef, feed and forage industries as they relate to research and development;
3. Assess the ability of the current research and development infrastructure in meeting Saskatchewan's priorities now and in the future; and
4. Create a governance model best suited to Saskatchewan that will allow for greater collaboration and coordination among researchers and improve the transfer of knowledge to producers.

Critical Issues:

1. Establish a common industry-wide short and long term vision for Saskatchewan:
 - Engage and link together with other organizations to maximize efficiencies;
 - Develop a strategy for utilizing limited research and marketing funds;
 - Avoid duplication – both provincially and federally;
 - Strong collaboration with the National strategy.
2. Research:
 - The long term viability of existing research capacity;

- An industry understanding of why we need to change our approach to focus on long term research. We are world leaders in forage and feed grain productivity and processing, animal health and welfare and beef research. These are long-term research projects.
 - Researchers and extension staff need to collaborate;
 - Improve information and technology transfer;
 - Producers need to be actively engaged.
3. Funding:
- A financial commitment from the Saskatchewan Government is needed for the Beef Cattle Research and Teaching Unit (BCRTU).
 - Strong collaboration is needed between Provincial and National Research Industry Strategies;
 - There is reduced funding which requires improved efficiencies.
4. Profitability:
- Industry needs to be profitable.
5. Food security:
- Quality and quantity of food.

Recommendations:

It is acknowledged beef, feed and forage quality are important research priorities. Saskatchewan must focus on sustainability of forage and grasslands.

Where can Saskatchewan have the greatest influence/impact?

1. Forage productivity:
- Breeding- Breeding capacity;
 - Utilization;
 - Agronomy/Management;
2. Feed Grains Productivity:
- Breeding;
 - Utilization;
 - Agronomy/ Management.
3. Animal Health and Welfare:
- Research in limiting diseases/diagnosing;

- Minimize pain.
4. Environmental Sustainability:
 - Environmental stewardship, ecosystems, calculable, life cycle analyst;
 - Economic value of contribution by industry;
 - Maintaining balanced ecosystems.
 5. Transforming Research into Practice:
 - Demonstrate value of research to producers;
 - Tech transfer back to farm gate by adapting research to farm level.
 6. Succession Capacity and Infrastructure:
 - Review of the existing research capacity and a commitment to the creation of a second strategic research program chair focused on forage management/utilization;
 - Longer term funding commitment is needed;
 - Reduced resources from governments and the effect on research has been partially addressed;
 - A funding commitment is needed from the Provincial government and private industry for the Beef Cattle Research Teaching Unit.
 7. Communications Strategy:
 - A food security and growth plan is needed;
 - More research is required to increase the public's awareness of the industry's environmental stewardship;
 8. Governance Model:

We believe that establishing the appropriate governance model to any new research strategy is vital to its success both in the short and long term, and perhaps the most important outcome of the strategy review process.

Striking a balance and alignment between industry goals and accountability, and government funding and support of institutional assets are a critical step in a truly effective strategy. Establishing an improved model will require some immediate actions that will provide guidance for a long term sustainable governance model.

We believe that one of the first steps should be the review of the mandates of the various institutions to see how they align with the future industry strategies and goals.

To accomplish the above stated objectives we recommend a small, high level committee of respected industry individuals appointed and reporting directly to the Minister. This committee needs to be comprised of industry representatives who are fully engaged, knowledgeable and committed to beef, feed and forage research. This committee would make recommendations on governance issues, the proper model for longer term governance, as well as any larger research related issues that may arise going forward.

APPENDIX I

Saskatchewan Cattlemen's Association Research Strategy & Priorities:

The SCA has the responsibility to help fund and oversee beef production research in Saskatchewan. As such it has a significant role in establishing and refining industry research priorities regionally and nationally. At the same time, all stakeholders in this research have the opportunity to contribute to shaping its objectives. The SCA has identified key research priorities it believes are critical to the future success of the Saskatchewan livestock industry.

Genomics:

In order to take full advantage of genomics research, it is important to promote industry sharing of data at each stage of production.

The SCA believes beef cattle genomics can:

1. Create more efficiency at all levels of production;
2. Supply tools to enable breeders to move faster towards breeding goals;
3. Contribute to better control of animal diseases;
4. Lead to improved food quality measurements;
5. Provide the knowledge needed to improve breeding strategies.

Support for research which identifies the benefits of birth to slaughter information programs while incorporating genomic advances, should be encouraged. The success measures of this research will include better feed efficiency, gains realized through forage utilization, progress with animal health and fertility issues and measurable improvements to carcass and beef quality.

Animal Health, Nutrition and Management

The SCA believes that continued research in the area of animal health, nutrition and management is important from the perspective of animal welfare, beef quality and public safety and producer's profitability. Areas of concern include:

1. Receiving and processing protocols;
2. Vaccine development;
3. Use of antibiotics and development of antimicrobial resistance;
4. New feed product development;
5. Feed safety as increasing amounts of ergot and vomitoxin require testing and mitigation strategies;
6. Nutritional management;

7. Interaction of nutrition, behaviour and health.

Environmental Stewardship:

One of the greatest challenges facing the growth of the beef industry is the need to adapt to evolving government environmental regulations and the need to enhance the public perception of the effects of the industry on the environment.

Important research areas include:

1. Environmental effects of extensive beef cattle production practices such as swath and bale grazing;
2. Impact of intensive feeding operations on ground and surface water and air quality;
3. Role of forage management in maintaining a healthy environment;
4. Manure management applications - precision nutrient management;
5. Impact on the environment of intensive livestock grazing management practices.

Forage and By-products:

Forages create value; in economic and environmental terms. There is a clear link between forage and livestock. The forage industry is the foundation for much of animal agriculture, and investment in forage research, development and technology transfer will be of mutual benefit to both sectors. Long term funding is critical for effective forage research since a one or two year commitment is not long enough to allow forage research projects to be completed.

Current opportunities identified for industry focus and investment include:

1. Expanded communication and technology transfer programs which target producers;
2. Development of species which are regionally specific and adapted for identified purposes;
3. Support for forage seed growers and seed market research;
4. Support for long term forage breeding and research programs with a focus on improved forage yields and quality;
5. Better utilization of forages and by-products to decrease dependence on feed grains.

Research Infrastructure, Human Resource Development and Technology Transfer:

Saskatchewan is at a cross roads in terms of beef production research infrastructure. While the facilities that currently exist have fulfilled the need to date, the growth of the industry in Saskatchewan depends on modernizing research infrastructure, including partnerships which are national in scope.

In addition to bricks and mortar, the decline in human resources (i.e. researchers) for beef and forage research must be reversed. Infrastructure and researchers are required to address the need for student training at the undergraduate and graduate level, not to mention the development of tomorrow's leaders. Federal beef research funding in Canada has declined significantly over the last twenty years. An 18% across the board cut in research funding in 1995 was followed by an additional 30% decline in funding between 1995 and 2007.

The Saskatchewan Beef industry has continued to support infrastructure, people and programs in Saskatchewan. Since the early 1990s the industry has supported a Chair in Beef Research, Dr. John MacKinnon, Department of Animal and Poultry Science. This Chair position was one of the first created in Saskatchewan and led the way to the creation of many more chairs.

Ongoing cuts have seriously and negatively impacted projects, scientific expertise, and facilities. As a result, the viability of some very important research programs in areas such as beef quality, food safety, and forages is seriously compromised. Combined with attrition, continued funding cuts threaten the maintenance of core federal research programs. These ongoing cuts contradict the clear recognition that innovation plays an important role in enhancing competitiveness. Industry recognizes the value of research. This has led Saskatchewan's beef industry to double its national check-off allocations to research.

Technology transfer is a key component of research. There is currently a disconnect between end users and researchers in terms of information transfer, which needs to be addressed. Government funded projects require a clear plan to disseminate findings to producers. The SCA is committed to ensuring research information is communicated through its communication channels, including the Saskatchewan Cattlemen's Connection and the SCA website.

Conclusion:

Clearly, industry should direct and lead research with researchers doing the work and governments assisting with funding. The goal of the SCA is to implement a comprehensive research strategy which addresses a diverse number of industry priorities. The SCA is committed to help fund practical research to position the Saskatchewan beef cattle industry as a leader in beef quality, animal health, food safety and environmental stewardship.

The Saskatchewan Beef Industry Development Fund (SBIDF) Committee endeavors to effectively manage the research evaluation process as new priorities and opportunities present themselves. The SCA is committed to ensuring that this process is transparent and available to all stakeholders, giving them the opportunity for input while providing meaningful and practical research to Saskatchewan producers.

APPENDIX II

National Beef Research Strategy

The National Beef Value Chain Roundtable and Beef Cattle Research Council recognized the need to review the beef research situation in Canada and starting in 2008, initiated a process which led to the development of this National Beef Research Strategy.

A comprehensive approach has been undertaken to develop this National Beef Research Strategy including:

1. Review of the overall beef research situation involving assessment of historical and current states of Canadian beef and beef cattle research;
2. comparison of Canadian and international research models; an initial draft framework to coordinate Canadian beef research priorities, funding and technology transfer;
3. First of its kind inventory of beef research projects funded during the past five years;
4. Consultation with stakeholders and workshop to define -short, -medium, and -long term research outcomes in the priority areas of (1) Beef Quality, (2) Food Safety, (3) Animal Health and Welfare, (4) Feed Grains and Feed Efficiency; and (5) Forage and Grassland Productivity;
5. Collaboration with funders to ensure that research funding allocations adequately address industry research priorities, and develop a framework to work together on enhancing extension activities.

At the national level, the beef industry (BCRC) has defined two core research objectives under which more specific priorities are established:

1. To enhance industry sustainability and reduce production costs, priority outcomes are to enhance feed and forage production, quantify the environmental impact of Canada's beef industry, increase feed efficiency, decrease the impact of animal health issues and production limiting diseases, and ensure animal care;
2. To improve beef demand and quality, priority outcomes are to reduce food safety incidences, define quality and yield benchmarks supporting the Canadian Beef Advantage, and improve beef quality through primary production improvements and the development and application of technologies to optimize cut-out values and beef demand.

For all Priority Areas, proposed research needs to give strong consideration to the following overarching aims:

1. Improved communication, collaboration and understanding between researchers and industry, with research/industry collaborations increasing to account for 25% of research activities;
2. Established internship program to mentor new scientists with industry collaborators; having 10 scientists complete the program by 2016;
3. Cost-benefit analysis completed to support recommendations and knowledge transfer from research projects that impact production profitability;
4. Encouragement of interdisciplinary teams undertaking systems-based approaches integrating the entire value chain where appropriate.

It is important to note that a key element of the National Beef Research Strategy is the maintenance of long-term, basic, high-risk, discovery research. Research capacity that can address issues of importance to the Canadian beef industry and speak objectively to consumers, global trading partners and other interested stakeholders on an independent basis is critical in core areas. Funding this basic research is also critical as the knowledge gained through this research will underlie the practical solutions that will be further developed through future downstream applied production research. The knowledge gained through basic research also provides considerable benefits to society at large. Despite established future planning, not all research needs can be planned ahead.

Consequently, there is value in ensuring ongoing investment in high-risk discovery research that ensures expertise and capacity is available when required and addresses public good and competitiveness issues proactively through continued long-term investment in core areas.

The following are the desired research outcomes as determined and validated through stakeholder consultation in the research priority areas of:

Beef Quality:

The objective of research on beef quality is to increase demand for Canadian beef through production and processing improvements to reduce inconsistencies and increase product quality for consumers.

Food Safety:

The objective of research in the area of food safety is to maintain domestic and international consumer demand for beef by developing improved food safety interventions, methods to quantify the effectiveness of food safety interventions, and develop food safety intervention strategies that counteract multiple pathogens.

Animal Health and Welfare:

The objective of research on animal health is to develop effective and economical management, diagnostic, and treatment tools to reduce the costs and losses incurred by major production limiting diseases and animal health issues that affect primary production sectors.

The objective of research on animal welfare is to develop a scientific base for best management practices. The cattle industry is being increasingly pressured to demonstrate the impacts of current practices on animal welfare and address consumer perceptions. Scientifically valid information on the impact of practices used by the industry is beneficial in advancing best management practices, identifying areas of priority, as well as supporting industry and public communication.

Feed Grains and Feed Efficiency:

The objective of research on improving feed efficiency is developing and validating economical methods to identify more feed efficient seed stock and by developing alternative feeding strategies. Improving feed to gain by 1% would save Canada's feedlot sector an estimated \$11.6 million annually. As feed costs increase (either through higher grain prices or a shortage of forage) feed efficiency plays an even larger role in the value equation, with inefficient cattle or management strategies costing more. A difference in conversion of one pound represents \$90 per head, based on US\$4 corn. There are many aspects of feed efficiency – but broadly speaking there is genetic improvement and management.

Forage and Grassland Productivity:

The objective of research on forage and grassland productivity is to increase research program capacity to develop annual and perennial forage varieties with increased yield, drought resistance, maintain or improve nutritional value, and provide an economic alternative to current sources. Improving grassland management to increase productivity and sustainability is also a core objective.

NATIONAL RESEARCH STRATEGY - BEEF QUALITY RESEARCH OUTCOMES**Outcome 1: Improved Consumer Satisfaction with Canadian Beef**

Short Term

- a. Effectiveness and value of genetic markers for tenderness validated in commercial cattle;
- b. Electrical stimulation recommendations re-evaluated to reflect increased carcass weights.
National Beef Research Strategy Page 28 of 60;
- c. Objective in-plant measures of tenderness that can be used at line speed validated.

Medium Term

- a. National Beef Quality Audit (consumer satisfaction) demonstrating that 65% of inside round, 80% of cross-rib, 90% of top sirloin and 99% of strip loin steaks are sufficiently tender and that no tenderness enhancement is necessary;
- b. Potential interactions between tenderness genotype and animal management (e.g. implants, backgrounding, grassing, finishing, etc.) identified and appropriate breeding and management recommendations developed.

Long Term

- a. Data collected to inform consumer messaging regarding the relevant nutritional characteristics of beef, including protein, mineral, vitamin, and lipid components.

Outcome 2: Validation of the Canadian Beef Advantage Relative to International Competitors

Short Term

- a. Packaging and other technologies to improve shelf life and appearance for export developed;
- b. Canada's beef carcass quality and yield benchmarked relative to international competitors;
- c. Beef InfoXchange System data integrated with research analysis in order to monitor changes in industry practices and identify emerging issues.

Medium Term

- a. Improved algorithms for prediction of lean meat yield and / or retail product percentage;

- b. Genomic and grading technologies that allow for market segmentation according to carcass quality and/or yield implemented;
- c. Beef Quality Audit enhanced through development and implementation of processes that facilitate the automated collection, recording and evaluation of carcass quality parameters;
- d. Beef Quality Audit demonstrating a reduction in carcass defects below 2012 levels. National Beef Research Strategy Page 29 of 60.

Long Term

- a. Data collected through the Beef InfoXchange System analyzed to benchmark Canada Beef Advantage attributes, refine research priorities, and identify improvement opportunities.

Outcome 3: Extension, Outreach and Policy

Short Term

- a. Complete a systematic literature review on the nutritional attributes of beef to address consumer concerns, inform consumer education programs, and identify appropriate research directions and applications;
- b. Enhanced consumer education regarding their role and responsibility in ensuring beef quality through selection of appropriate cut-specific preparation and cooking methods.

FOOD SAFETY RESEARCH OUTCOMES

Outcome 1: Improved Food Safety along the Beef Supply Chain

Short Term

- a. Technologies targeting multiple pathogens in cattle and beef production and processing facilities developed and implemented.

Medium Term

- a. Objective approaches for verifying effectiveness of packing plant equipment cleaning processes developed and adopted for 85% of processed cattle;
- b. Increased surveillance to detect, characterize and quantify the relative human health risk of (re)emerging pathogens;
- c. Effective probiotic intervention to eliminate pathogens from beef developed.

Outcome 2: Responsible Antimicrobial Use Demonstrated

Short Term

- a. On-farm data collection and food safety pathogen incidence incorporated into the Canadian Integrated Program for Antimicrobial Resistance Surveillance for beef cattle;
- b. Microbial genome sequencing used to investigate potential associations between pathogen incidence and antimicrobial use in cattle and the presence of pathogens and development of antimicrobial resistance in microbes found in retail beef and human clinical cases.

Medium Term

- a. Statistics collected through the Canadian Integrated Program for Antimicrobial Resistance Surveillance (surveillance) demonstrate that:
 - generic *E. coli* samples collected from abattoir samples demonstrate 0% resistance to five or more antimicrobials and 0% resistance to antimicrobials of very high importance in human health, and
 - generic *E. coli* samples collected from retail beef demonstrate less than 2% resistance to five or more antimicrobials, and less than 1% resistance to antimicrobials of very high importance in human health.

Outcome 3: Improved Beef Quality and Food Safety Research and Training Capacity

Short Term

- a. An industry meat science research chair to address issues facing the beef packing and processing sectors, and reinvigorate food safety research program capacity established.

Long Term

- a. A meat science program is established at a Canadian university with educational and research components to produce highly qualified personnel serving Canada's beef industry.

Outcome 4: Extension, Outreach and Policy

Short Term

- a. Enhanced processor education to encourage the consistent adoption of known best practices to minimize the risk of pathogen contamination in beef processing plants;
- b. Enhanced further processor education to encourage the consistent adoption of proper and thorough cleaning of processing and grinding equipment;
- c. Enhanced consumer education regarding their role and responsibility in ensuring food safety in the home, including the relative efficacy of alternative in-plant interventions and at-home food handling and storage practices to ensure food safety;
- d. Research results used to inform the regulatory approval of trim and ground beef irradiation.

ANIMAL HEALTH AND WELFARE RESEARCH OUTCOMES

Outcome 1: Improved Surveillance of Production Limiting Disease and Welfare Issues

Short Term

- a. Improved diagnostic tests for production limiting diseases;

- b. Nation-wide benchmarking survey of the incidence and economic impact of production limiting diseases, health management, biosecurity practices, and welfare practices in beef cattle (cow-calf, backgrounding and feedlot) conducted.

Medium Term

- a. National production limiting disease surveillance program developed, identifying opportunities to collaborate with wildlife disease surveillance programs. National Beef Research Strategy Page 39 of 60.

Long Term

- a. National surveillance system in place to monitor the incidence of and etiology of re- and emerging production limiting diseases.

Outcome 2: Improved Understanding and Management of Pain and Stress in Beef Cattle

Short Term

- a. Practical, cost-effective methods of objectively quantifying and mitigating pain and stress in beef cattle under production conditions developed (e.g. diet, castration, dehorning, branding, weaning, transport).

Medium Term

- a. Benchmarks to understand the additive effects of beef production practices on pain, stress, immunity and health developed;
- b. Scientifically valid beef cattle welfare audit program developed.

Outcome 3: Improved Prevention of Animal Disease and Welfare Issues

Short Term

- a. Strategies to optimize or improve the effectiveness of existing vaccination programs identified and developed;
- b. Reduced incidence of reproductive failure through improved nutritional management, diagnostic tests, vaccination and biosecurity;
- c. Reduced neonatal loss through improved maternal nutrition, timing of vaccinations, and extension / technology transfer to cow/calf sector;
- d. Modifications to current beef production practices that reduce the need for antimicrobials to prevent or treat respiratory disease in the feedlot identified or developed (e.g. vaccination, weaning, transport and diet);
- e. Improved control of internal and external parasites.

Medium Term

- a. Practical modifications to high energy feeding programs that reduce the incidence of metabolic diseases in feedlot cattle identified or developed (e.g. acidosis, bloat, acute interstitial pneumonia);
- b. Improved immune system function, vaccine efficacy and animal health management to reduce the need for Health Canada Category I and II antimicrobial drugs by 50%;

Long Term

- a. Reduced incidence of metabolic diseases in beef feedlots without increased use of antimicrobials;
- b. Implementation of improved animal management systems in the industry which will reduce stress and improve animal health and productivity.

FEED GRAINS AND FEED EFFICIENCY RESEARCH OUTCOMES

Outcome 1: Improved feed efficiency through animal breeding

Short Term

- a. Cost-effectiveness of genetic markers for feed efficiency validated in commercial feedlot cattle.

Medium Term

- a. Impacts of genetic selection for feed efficiency on other economically relevant beef production traits (longevity, fertility, weaning weight, wintering costs, carcass weight, yield and quality grades, tenderness, etc.) quantified;
- b. Potential interactions between feed efficiency genotype and management (e.g. implants, backgrounding, grassing, finishing, etc.) identified and appropriate breeding and management recommendations developed.

Long Term

- a. Relative contributions of various animal digestive and metabolic processes and rumen microbes to feed efficiency quantified.

Outcome 2: Improved feed supply and utilization

Short Term

- a. The cost: effectiveness of alternative / by-product energy feeds, considering impacts on animal performance, health, product quality, and nutrient management have been identified, evaluated and determined;
- b. Corn and cereal forage variety differences in nutrient profile and ensiling potential characterized;
- c. Feeding and production systems that improve feed efficiency by 15% developed.

Medium Term

- a. Agronomic strategies to increase feed grain energy yield per acre identified.

Long Term

- a. New feed grain varieties developed with improved feed grain energy yield per acre.

Outcome 3: Improved management of manure nutrients

Medium Term

- a. Nutrient management decision tools that incorporate diet nutrient composition, manure handling and transport costs, value of manure nutrients and organic matter, manure management systems (e.g. raw vs. stockpiled vs. composted) soil types, and nutrient uptake by crops developed.

Outcome 4: Research Training and Capacity

- a. Key feed efficiency research capacity (expertise and facilities) is maintained;
- b. Feed grain breeding research capacity (expertise) is reinvigorated.

FORAGE AND GRASSLAND RESEARCH OUTCOMES

Considerable regional variability exists among soil types and climate across Canada. As a result grass, legume and annual forage varieties that thrive in one region of the country may not be optimal for another region. This means that it is necessary to maintain a basic core regional element in forage breeding research. Ensuring that new varieties developed at core breeding locations are then evaluated in a broader range of environments will help to match new varieties with the environments to which they are best suited.

Outcome 1: 33% Improvement in Yields and Nutritional Quality of tame, native and annual species through improved pasture, forage and grazing management and plant breeding

Short Term

- a. Improved grazing and management strategies that optimize hay yields and beef production from native range and tame pastures;
- b. Varietal and species differences in the ability of grasses, legumes and annual forages to maintain nutritional quality throughout the grazing season and in extended stockpiled or swath grazing systems to help inform producers' seed selection decisions quantified.

Medium – Long Term

- a. New annual and perennial grass and legume varieties with improved stand longevity, quality, yield, and adaptability (e.g. flood and drought resistance) through traditional and/or advanced plant breeding techniques developed.

Outcome 2: Environmental Sustainability

Short Term

- a. The “environmental footprint” (carbon sequestration, plant and animal biodiversity, endangered species, soil erosion, watershed protection, etc.) and socio-economic (environmental goods and services) impact of the forage-beef sector in Canada, including the effects of optimal environmental production practices (e.g. stocking rates, riparian area protection) on the above has been quantified.

Outcome 3: Research and Training Capacity

Short Term

- a. Industry research chairs focused on tame grass and legume breeding and management/grazing established to serve Central and Eastern Canada and in the Prairies and B.C. established.

Long Term

- a. Reinvigorate and enhance long-term breeding programs, while capturing near-term opportunities that are currently under development.

Outcome 4: Extension, Outreach and Policy

- a. Enhanced public education regarding the impact of Canada's forage and beef industry on Canada's environment and economy;
- b. Grazing Mentorship Program or other similar formal producer extension programs used to encourage pasture rejuvenation every 5 years and the adoption of grazing-tolerant, drought resistant and bloat-safe legumes into pasture mixtures;
- c. Annual and perennial varieties that have been previously developed and registered but are not commercially available are investigated, and varieties showing significant potential benefits for the beef industry are accelerated to be market ready;
- d. On-farm decision making tools quantifying the return-on-investment from pasture rejuvenation, weed control, fertilization are developed.

APPENDIX III

Alberta Forage/Beef Centre – Preamble

The beef cow-calf sector has suffered economically since 2002-2003 due to many factors, but the sector, which relies on feedstuffs consisting of 90% forage and pasture, remains a significant contributor to the Canadian and Albertan economy. Recent economic, climatic and market events have left the industry less competitive, globally, than a decade ago.

The *Alberta Forage/Beef Centre Strategic Plan* was developed in the summer of 2012 from the steering committee with the producers' associations of Alberta Beef Producers; Agriculture Research and Extension Council of Alberta; Grey Wooded Forage Association; Alberta Forage Industry Network; Beef Cattle Research Commission; Canadian Forage and Grasslands Association; Beef Cattle Research Commission; in partnership with Agriculture and Agri-Food Canada (AAFC) and Alberta Agriculture and Rural Development (ARD).

The Strategic Plan is a conclusion of preliminary discussions between AAFC and ARD for a forage beef program and the outcome of 2011 industry focus group sessions that were held in Strathmore, Lacombe, Vegreville and Grande Prairie; *to explore the need for Forage Beef Research and Extension in Alberta*. The Focus Group Steering Committee consisted of the producer groups and organizations cited along with the Alberta Livestock and Meat Agency and University of Alberta.

Priorities for the Strategic Plan are based on the focus group participants' response to questions about the current situation, the issues, and the threats, opportunities and solutions to move the forage and beef industry forward. The participants were asked for advice on research priorities and what the steering committee needs to do.

1. In response to the questions about support to their industry, many participants voiced the concern that the entire system including research to adoption on the farm is either broken or not working very well. They suggested everyone involved in the industry needs to work at fixing the system. Most agreed that there is currently a lack of resources allocated to forage and beef research and extension. There is a reduction in capacity and resources. There is a need for unbiased "science based research and extension".
2. The steering committee reviewed the focus group outputs and priorities attentive of comments:
 - Our bottom line/profits must be integral to all research and extension;
 - There must be an emphasis on extending information;
 - Producers must be engaged and consulted;
 - Research must be applied to the Alberta climate and conditions;
 - We need research to stay competitive;
 - We need science to inform the public/consumers and industry about the beef and forage industry (greening of the industry/benefits).

3. With support from the focus group participants, the steering committee concluded that there is a need to develop a joint industry and government strategic plan, program and governance structure. The Lacombe facilities within AAFC and ARD are ideally situated to act as the Alberta Forage/Beef Centre (AFBC) Program Hub for research-extension in the province.

This plan will help ensure the long term and continued research necessary to transition the industry forward for the Five-year horizon in a sustainable and successful direction.

APPENDIX IV

Alberta Forage/Beef Centre - Strategic Plan

Purpose: A Centre for Forage/Beef Research and Extension for the Production of Safe, Nutritious, Affordable, and Environmentally Friendly Beef Products

1. Provide practical research and extension information to the forage and beef industry;
2. A systems approach will be used, including economic assessment;
3. Build and maintain research and extension capacity by:
 - integrating and focusing resources within ARD, AAFC, Universities, Colleges and industry;
 - maintaining strong industry partnerships that presently include: ABP, BCRC, AFIN, ARECA, Livestock Gentec and CFGA;
 - establishing long term commitment from government and industry (i.e. succession planning, funding, facilities);
 - building skill and expertise in the forage/beef interface.

Mission:

1. Develop and Transfer Knowledge, Innovative Processes and Tools to Improve the Forage/Beef Industry.

Vision:

1. Forage/Beef Innovation for the Next Generation.

Goals/Objectives:

1. Improve Productivity, Competitiveness, Sustainability, Land and Resource Use Efficiency of the Forage/Beef System:
 - a. **Reduce winter feeding costs by 50%**

Benchmark: Winter feeding costs are about \$2.00/cow/day (ARD 2012)

Strategies:

- Swath Grazing of the cow herd (through higher yield and quality, increasing available carrying capacity);

Yield: Increase yield at swath time (September) – Breeding and Management

- Evaluate cereal species and lines for forage yield when planted late enough to swath in September;
- Select lines with photoperiod insensitivity;

- Identify species and lines that use the whole season and deliver a high forage yield in September;

Quality: Improve quality of swathed product to reduce the daily dry matter requirement for winter grazing cows (breeding, management, physiology and nutrition)

- identify optimum harvest time: i.e. stage of grain development; may vary for barley vs. Triticale;
- develop (breed) and test (management) barley lines with high digestibility;
- develop triticale with improved cell wall or fiber digestibility;
- develop genetic markers for fiber digestibility of barley and triticale;

Dormant Grazing (management, nutrition and production economics)

- define role (time, species, carrying capacity, cost) of dormant grazing relative to swath grazing;
- define dormant grazing relative to minimum yield, quality and carrying capacity requirements;
- define role and economic value of first cut yield as it relates to dormant grazing;
- compare dormant grazing to swath grazing for cow performance and costs

Reduce costs by minimizing waste and reducing inputs

- extend information on limit-grazing and watering in winter;
- evaluate soil nutrient requirements for winter grazing animals by creating or; developing information on nutrient balance in winter grazing environments.

b. Environment

Benchmark: Lifecycle analysis estimated 18-22 kg CO₂e/kg carcass beef

Strategies:

- Investigate the environmental footprint (greenhouse gases (GHG), nutrient cycling, water and air quality) of forage beef production systems;
- investigate interaction between carrying capacity and nutrient balance;
- impact of winter grazing on greenhouse gas emissions.

c. Improve cow efficiency by 15% (beef cows eat 15% less feed at equal body weight, weight gain and body fatness)

Benchmark: heifers - feed to gain ratio ~11:1 for a forage based diet.

Slaughter heifers - 6.44:1, barley based finishing diet

Slaughter steers - 5.85:1, barley based finishing diet

Strategies:

- Breed for a feed efficient (i.e. RFI) cow herd using innovative technologies such as genomics and infrared thermography;
- Reduce the maintenance requirement of beef cattle using RFI and other measures of efficiency;
- Quantify the relationships of feed efficiency with fertility, cow lifetime productivity, early life calf survival, performance, carcass and meat quality, and GHG emissions;
- Quantify the relationship between feed efficiency and cow performance under summer and winter grazing conditions;
- Determine the physiological and genetic basis for efficiency;
- Develop quicker, less expensive “on farm” techniques to identify feed efficient beef animals, and fertile females with longevity (e.g., infrared thermography, genetic markers, near infrared spectrometry);
- Determine the economic benefits of advances in genomics and other innovative technologies related to production efficiency of beef cattle.

d. Reduce backgrounding costs by 50%

Benchmark: dry lot backgrounding, \$1.00 /lb gain

Strategies:

- Investigate the feasibility of transferring winter grazing methods to backgrounding operations (see reduce winter grazing costs by 50%);
- Determine the minimum pasture requirements to provide successful backgrounding programs in terms of production parameters (i.e. cost per day; rate of gain; carrying capacity/ha (pasture days x stocking rate); animal weight; animal gain);
- Determine minimum nutrient requirements for growing beef animals under winter grazing environments;
- Determine daily feed intake of efficient and inefficient stocker cattle on summer pasture;
- Improve digestibility of barley and triticale lines used for silage and winter grazing (using breeding techniques);
- Investigate management methods (species choice, time of grazing) for improving protein, digestibility levels and forage availability in fall and winter grazing operations;
- Evaluate and publish potential of cereal varieties for use on backgrounding rations;
- Determine role of dormant stockpiled grazing relative to swath grazing for backgrounding;

- Develop methods for sorting and identifying young beef animals for potential production efficiency when utilizing forage rations and winter grazing using genomics and other innovative technologies;
- Develop protocols for introducing weaned animals to winter grazing;
- Develop protocols for supplementation during winter feeding and grazing.

e. Improve late summer/fall pasture productivity by 30%

Benchmark: \$1.35 per cow/calf day

Strategies:

- Evaluate species and/or species mixtures for production from August through October;
- Evaluate economic role and capacity of stockpiling perennials for use in backgrounding and cow-calf systems during late summer and fall;
- Define impact of the limiting factor or factors for fall regrowth among the interaction of species x soil moisture x soil nutrients;
- Develop a nutrient balance model for predominantly grass, grass-legume and legume pastures in central Alberta.

f. Improve the role of forage in meat quality

Benchmark: No beef products presently available with the novel food labeling for naturally produced (by the animal) Omega-3, CLA, vaccenic acid and other healthy fatty acid profiles and acceptable storage, shelf life and palatability attributes.

Strategies:

- Investigate nutrient and genomic management (i.e. proportion grain vs. forage; processing, forms and storage methods, genetic markers for beneficial fatty acids) involving forage species (e.g. red clover) for potential in enhancing healthful, fatty acid composition for meat in backgrounding and finishing rations.

g. Build and Maintain Research and Extension Capacity

- *Human Resource Components (recognizing needs and scope may change):*
Beef nutritionist, technical support, production physiologist (forage systems), soil scientist, production economist, beef production management specialist, forage breeder, animal genomics, plant genomics, and knowledge and tech transfer specialist;
- Team approach to forage beef capacity building and training for knowledge workers;

- *Facilities:*
 - Land: Grazing/maintenance, trial plots, land to support cow herd, research facility; (i.e. research pastures, plot land, land to grow breeding material, continually update equipment, i.e. Growsafe system).
- Cow herd and feeder cattle;
- Feed and pasture;
- Laboratory facilities (continually update equipment).

Funding Strategy: (long term/short term)

- ARD;
- AAFC;
- Industry commitment;
- Growing Forward II;
- Beef Cluster;
- ALMA;
- Alberta Innovates;
- Alberta Funding Consortium;
- BCRC;

APPENDIX V

Forage and Beef - Research and Extension Development Focus Group Report

(Executive Summary)

Submitted by: Stroh Consulting December 2011

To: Wes Johnson, Chair Forage & Beef Research & Extension Focus Group Sessions-Fall 2011

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- Steering committees' thoughts
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Executive Summary:

In response to an increase in producers' requests for more forage and beef research and information in Alberta a series of meetings were held with Alberta Agriculture and Rural Development and Agriculture and Agri-Food Canada which discussed the possibility of a forage and beef program. A steering committee including representatives from ARD, AAFC, University of Alberta, ALMA, Alberta Beef Producers, Beef Cattle Research Council, ARECA and the Alberta Forage Industry Network was formed in the summer of 2011. As part of their role, the steering committee initiated focus groups to further consult with the forage and beef industry.

The steering committee worked with Stroh Consulting to coordinate five focus groups throughout the province in October and November 2011. The findings are included in this report.

In total 72 people participated in the five focus groups. Sixty-five percent were producers and the other participants support the industry. The participants responded to questions about the current situation, the issues, and the threats and opportunities and solutions to move the forage and beef industry forward. The participants commented on the current infrastructure, resources and services supporting the industry, and the needs in the future. And finally the participants were asked for advice on research priorities and what the steering committee needs to do.

The tone of the focus groups was quite positive. Participants discussed many issues and threats; however they raised many opportunities and solutions to address the issues and threats.

In response to the questions about support to their industry, many participants voiced the concern that the entire system including research to adoption on the farm is either broken or not working very well. They suggested everyone involved in the industry needs to work at fixing the system. Most agreed that there is currently a lack of resources allocated to forage and beef research and extension. There is a reduction in capacity and resources. There is a need for unbiased "science based research and extension".

The steering committee reviewed the focus group outputs and summarized some priorities including beef production efficiencies, extended grazing, forage productivity and breeding, and land and other resource use efficiencies. Another priority was science to support revenue diversification such as Environmental Goods & Services. The steering committee identified the need for systems based research to address concerns such as regulatory, environmental or marketing restraints.

With support from the focus group participants, the steering committee concluded that there is a need to develop a joint industry and government strategic plan for forage and beef research and extension. This plan will help ensure the long term and continued research necessary to move the industry forward. This plan would address the need to coordinate and set priorities with all the partners so as to ensure the efficient and effective use of resources. The joint plan could attract new resources required for the sustainable and competitive forage and beef industry. The steering committee acknowledged the need for a mechanism for regular producer involvement and consultation. This appeared to be a timely consultation.

Background:

In December 2010, a series of meetings were held between Alberta Agriculture and Rural Development's Deputy Minister, ARD staff and AAFC to look at the possibility of a forage and beef program as a result of producers' requests for more forage beef research and information in Alberta. There has been a need for a focused approach since the Western Forage Beef Group dissolved in 2006 due to a changing political landscape and a difference in priorities within governments and the Western Forage Beef Group.

As a result of the earlier discussions, a working group comprised of various organizations supporting the forage and beef industry met during the summer of 2011. They discussed what they might do collectively to help move the forage and beef industry forward. The steering committee includes representatives from ARD, AAFC, University of Alberta, ALMA, Alberta Beef Producers, Beef Cattle Research Council, ARECA and the Alberta Forage Industry Network. The steering committee initiated province wide focus groups to consult with the forage and beef industry about their thoughts and needs.

The mission of the steering committee is to identify economic, social and environmental issues related to a globally competitive forage and beef industry which could be supported by an Alberta Forage Beef Research and Extension Program.

The following were the objectives of the focus groups. Through broad stakeholder engagement in focus groups:

1. Test the significance of specific issues to competitiveness and sustainability in forage beef products as identified by the steering committee;
2. Identify focus group participants' thoughts on the economic, social and environmental issues related to a globally competitive forage beef industry;
3. Describe the current situation and whom focus group participants think provide relevant research and extension programs and services;
4. Identify extension and research gaps and opportunities;
5. Gather focus group participants' thoughts on priorities and their level of support for a joint Forage Beef Research and Extension Program.

Following the focus groups, the steering committee agreed to clarify the need and support for a Forage and Beef Research and Extension program and if the industry, through the focus groups, supports the need for more research and extension the steering committee would then recommend a process and timeline to develop a joint plan.

Acknowledgements:

Stroh Consulting wishes to thank all the focus group participants who willingly shared their time, thoughts and advice. Stroh Consulting appreciated the direction and input from Wes Johnson and the steering committee. The steering committee members helped with the background information, invited participants, reviewed drafts, asked questions, attended focus groups and interpreted the outputs. We would also like to acknowledge Cathy Bryant for assisting with the coordinating of the focus groups. It was a team effort.

Consultation Approach and Methodology:

We used a structured approach to facilitate group discussions. The focus group approach was used so participants were free to state both positive and negative opinions with minimal interference and disclosure of their practices and personal thoughts.

Together with the steering committee we developed six key questions to guide the group discussion. Probing questions were used to dig deeper and clarify participants' comments. We encouraged the participants to respect and listen to each other. In addition to the facilitated discussions we invited participants to complete a written questionnaire. This questionnaire repeated the structured questions and allowed another opportunity for participants to provide their thoughts.

The consultants facilitated and recorded the four hour workshops which included informal and formal discussions. We recorded discussions from each focus group separately and compared any similarities and differences. We recorded the outputs so as to maintain the anonymity of participants. The focus groups were not intended to reach consensus, however there were themes and common thoughts which emerged from the discussions. The steering committee chair and members were engaged in the analysis of the focus group outputs.

We facilitated five focus groups including a test group. The four focus groups were held in Strathmore, Lacombe, Grande Prairie and Vegreville in October and November 2011. The steering committee was actively involved in recruiting participants to focus groups. The steering committee invited people:

1. who were deemed thoughtful;
2. who desired the forage and beef industry to be profitable and sustainable;
3. who had a willingness to share and learn from others.

The steering committee recommended that two thirds of the participants be directly involved in the industry and the other one third of the participants be involved in supporting the industry in various ways. Phone calls and letters were sent to between fifteen and twenty people for each focus group. The agreed upon criteria for participants guided the recruiting. In addition the steering committee asked for broad representation from throughout Alberta including both men and women of different ages.

About the Focus Group Participants:

In total 72 people participated in the five focus groups. Nine people were part of the test focus group and sixty- three people participated in the four focus groups.

Forty- four percent of the participants were producers and 21% were producers who were also involved in supporting the industry through their work in the private sector or with public research or extension. The other 35% were involved in supporting the forage and beef industry. The steering committee targeted two- thirds of the participants to be directly involved in the industry. The target was nearly achieved in that 65% of the participants were producers. The participants represented a wide age range: there were nine under 34 years, twenty two were 35 – 49 years, twenty three were 50 to 59 years and nine were 60 years plus.

Almost all of the participants indicated that they or their children want to be involved in the forage and beef industry or be supporting the industry in 10-15 years. The participants described what they perceived the industry would look like in the future. They said the industry would be more businesslike and in fewer hands and operations would be larger and more profitable than the last ten years. Some participants were concerned that without change the industry may not have a future.

The tone of the focus groups was quite positive. In most cases participants said that with the right focus and commitment to research and management the forage and beef industry will be vibrant and prosperous in the future.

Current Situation:

As part of the preparations for the focus group, the steering committee developed a background piece with current information about the industry. This was sent with a confirmation letter to focus group participants prior to the focus groups. The following statistics describe the current situation in the forage and beef industry:

1. The beef sector has experienced many challenges since 2002;
2. The beef cow numbers in Alberta have declined by 20% since 2005;
3. The Alberta acres seeded to tame hay has declined by an average of 31,000 acres per year between 2004 and 2010;
4. People aged 65 and over account for 10.7% of the farm population;
5. The number of primary producers in the beef industry in Alberta is less than 27,000;
6. The number of producers involved in hay farming is 5,855;
7. The Alberta beef sector relies on 90% forage and pasture;
8. Canadians' consumption of beef has decreased somewhat in recent years;
9. Direct sales of beef to Alberta consumers have increased to about one percent of total sales;
10. In 2011, 2.7 M ha of barley were seeded which is down from 500,000 ha. 2.4 M ha were harvested for grain while the rest was harvested as a silage or forage crop;
11. In 2011, approximately 600,000 ha of the total coarse grain, 235,000 ha of the total oats and 90,000 ha of the total mixed grains were used for silage, green feed and swath grazing.

These are some additional comments from the focus groups about the current situation:

1. The cattle numbers are down by up to 40% in the Peace;
2. The beef side is more organized than the forage side which is more diverse and dispersed;
3. Forage acres in Alberta are producing only a fraction of the potential;
4. The beef grading system is directed toward fat cattle;
5. The interface between forage and beef is becoming more important;
6. 60% of beef is exported but only 4% of forages.

When asked what words participants would use to describe the forage and beef industry the following were some examples:

1. Catching up to global competition;
2. Sustainable rather than exploitive;
3. Climatically challenged;
4. Evolving;
5. Progressive;
6. Hidden gem;
7. Solar harvester;
8. Complex;
9. Fragmented;
10. Revitalized;
11. Technology challenged;
12. Natural fit for the Peace;
13. Over-regulated;
14. At a crossroad;
15. Unprofitable, Marginal;
16. Labour intensive;
17. Resilient.

Summary of the Focus Groups:

About the Infrastructure and Resources Supporting the Industry:

The steering committee compiled information on the resources, support and infrastructure for the forage and beef Industry in the background document:

1. The resources and infrastructure supporting the forage and beef industry in Alberta includes the industry organizations, research and extension groups and governments and the private sector;
2. There are new organizations such as the Alberta Livestock Meat Agency and Alberta Forage Industry Network in the province, which support the forage and beef industries;
3. There are a number of provincial and regional organizations such as Alberta Beef Producers and the Feeders Associations of Alberta and the various research associations;
4. The University of Alberta, Agriculture and Agri-Food Canada and Alberta Agriculture and Rural Development, the Agriculture colleges and regional forage and research groups continue to be involved in various aspects of forage and beef research and extension;

5. Those involved in research report resource limitations and competition for research dollars; They struggle to sort and prioritize research areas among all the agricultural needs;
6. The Canadian forage research dollars declined by 54% (from \$41 million to less than \$19 million) between 1985 and 1998;
7. Private research is done; it is often based on basic research conducted at public institutions, and is generally proprietary in nature;
8. The agricultural private sector services have grown;
9. National beef industry check-off investments in forage research through the BCRC have increased;
10. The dwindling resources available to support research, infrastructure and extension activities are hindering not only communication of ongoing research results, but also reducing the number of projects that produce results;
11. There have been a number of innovations in the forage and beef industry such as swath and bale grazing which have allowed producers to extend the grazing season;
12. ARECA works to share information with farmers across the province;
13. The Ag –Info Centre continues to offer advice by phone to producers;
14. Agricultural Fieldmen provide services on selected extension topics.

These are some examples of additional comments from the focus group about the current resources and infrastructure which supports the forage and beef industry:

1. The forage industry doesn't have a strong voice;
2. There is not a solid handle on what work(research)in forages is being done and by whom in Canada;
3. There is a lack of understanding of what all the various groups do and no one is coordinating priority setting;
4. The U of A has increased infrastructure- an example is the new research farm at Duchess; however the U of A requires operating and human resources;
5. There are fewer facilities and services to support the beef and forage industry.

The participants cited many ways they access information to make decisions. The range included:

1. Internet;
2. Personal experience;
3. Other producers;
4. Research groups;
5. Forage associations;
6. ABP;
7. Private consultants;
8. There was no apparent theme to how people in the industry source information.

Other than the network and support group that each person valued, the sources of information varied and there appeared to be no common methods. However, there were a few common themes at the focus groups in regards to what information they were looking for.

Participants expressed concerns about a lack of access to unbiased information, and a lack of regional research and information. Participants also expressed concerns about the general lack of practical and new research, and the extension of research to help improve profits in their operations. For more details refer to the written survey summaries in the appendices with recorded answers to the question “What type of information or help do you or the industry depends upon to manage today.”

The focus group participants’ information needs included market research, new production techniques, new genetic research, leading edge advice to look at different ways to do things, risk management advice, agronomics, knowledge about soils, cost of production and sound scientific information to offset public misconceptions.

What all the focus groups agreed on was the importance of information for the future of the industry. When asked about the importance of information to the future success, 45 out of 63 (71%) said it was very to extremely important. Many of the participants expressed the thought that producers must be willing to change and adapt.

Summary of Participants’ Comments on the Current Infrastructure and Resources Supporting the Forage and Beef Industry:

The perception of many participants was that the entire system (research to adoption on the farm) is either broken or not working very well. They suggested everyone involved in the industry needs to work at fixing the system, and that everyone has a stake to play to make it effective. Likely the future system will not be what we had in the past or have now. There is currently a lack of resources allocated to forage and beef research and extension. There has been a reduction in research capacity and resources and there is little forage research being done at this time. Focus group participants expressed a number of concerns about research capacity, maintaining current capacity, transition/succession and long term funding. There is also similar distress about the capacity within the industry.

We need research and new information from when a calf is born till slaughter - systems based research. There must be an emphasis on extension since the effectiveness of research isn’t realized until it is effectively extended or reaches producers.

Producers must be an integral part of the research and extension system. They must drive priorities. Producers are most concerned about their livelihood and bottom-line. Ongoing producer consultation and engagement is key as they expressed they weren’t being asked. They would like to have input in the future.

Issues, Threats and Opportunities:

Issues and Threats:

In the background document for the focus groups, the steering committee outlined eight challenges and opportunities for the forage and beef industry. All of the challenges and opportunities were raised

during the focus groups plus many more. The challenges and opportunities in the background document were:

1. There is a limited land base to produce forages and feed grains;
2. The beef sector contributes more than \$20 billion to the Canadian economy annually;
3. The beef sector has faced numerous competitiveness challenges over the past decade including increasing grain and crop input costs, competition for feed grains due to bio-ethanol mandates, market access, regulatory changes, currency exchange rates, climate change, competing proteins and beef exporting nations;
4. Economists predict an increased international demand for red meat and other proteins in parallel with increasing incomes in developing and emerging economies;
5. The Alberta Beef Producers organization has expressed enthusiasm about the future;
6. There is growing competition for land and water use;
7. Cattle produce considerably more greenhouse gas than competing protein sources, and over 80% of beef production GHG emissions originate from the cow-calf herd with the remaining 20% emitted from the feedlot sector;
8. The forage industry contributes to biodiversity (plant, bird, wildlife and insect species), reduces soil erosion, and maintains watersheds and natural carbon sequestration.

The following is a brief summary of the issue and threats discussed at each focus group:

Strathmore:

1. Participants in Strathmore discussed these issues:
 - Lack of market opportunities as 60% beef exported and much of it to US;
 - Perception that Alberta and Canadian researchers have fallen behind globally;
 - Lack of funds to support forage research without a check off;
 - Challenges with short growing season;
 - Lack of understanding of the value of forage;
 - Return on investment and rising production costs.

Lacombe:

2. Participants in Lacombe discussed:
 - Lack of new market access;
 - Changing consumer preferences and education;
 - Lack of labour and ability to attract new entrants;
 - Increasing competition for land;
 - Fragmented industry;
 - Lack of information on how to optimize the value of forage through beef;
 - Lack of information on which forage improves beef economics;

- Lack of profits and rising cost of production.

Grande Prairie:

3. Participants in Grande Prairie discussed:

- Lack of profit;
- Declining support services;
- Growing competition with grain acres;
- Lack of basic forage agronomy work;
- Increasing weather variability;
- Dealing with absentee landlords;
- Lack of success with any value added initiatives;
- Growing gaps between researchers and producers.

Vegreville:

4. Participants in Vegreville discussed;

- Lack of understanding of who is in the industry;
- Research does not get back to producers;
- Flawed policies such as regulatory barriers, environmental constraints and over-regulation;
- Lack of emphasis on forage agronomy or grazing;
- The research is 10 years behind the rest of the world, lack of research dollars available;
- Understanding who is in the industry;
- Lack of risk management tools.

Test group:

5. Participants in the test group discussed:

- Lack of profits;
- Increasing competition for acres;
- Growing competition with multi-users;
- Fragmented industry;
- Lack of government recognition of value and importance of forage and beef industry;
- Confusion when it comes to priority setting and lack of ability to reach consensus;
- Lack of human resources and knowing the demographics of who is involved.

Opportunities:

6. The focus group participants identified the following opportunities:

- Downsizing of cattle numbers;
- Increasing global population who are hungry;
- Consumer related opportunities such as interest in health;

- Growing new market demand;
- Forage and beef are the sun, soil and grass management;
- Opportunity to maximize land in forage production;
- Peace offers some of the best cattle country;
- People are leaving the industry;
- Land is still more affordable in Peace;
- Peace is the biggest grass seed producers;
- Finding uses for the grass seed bi-products;
- Some long term planning started and underutilized infrastructure for research and, willingness of regional colleges;
- Several of the opportunities need research and extension to realize these opportunities;
- Revenue diversification through ecological/environmental goods and service – carbon off set program for perennials;
- Research infrastructure rich- U of A and Duchess;
- Increasing opportunity for extension;
- More options for land leasing opportunities;
- Opportunity to pay landowners for managing biodiversity;
- Big dividends if manage soil;
- Opportunities to differentiate products;
- Improved food safety (threat as well) and traceability.

Solutions to Move the Industry Forward:

7. In Strathmore of the 44 solutions recommended, 30 were research and extension based. In Lacombe 22 out of 35 solutions sited were research and extension based. In Grande Prairie many of the solutions were research and extension related as well.

The Vegreville focus group suggested the following solutions:

- Industry and government long term research strategy for forage and beef;
- Policy based solutions;
- Harmonize trade among SK, BC and AB;
- Rethink or change measurement of success to profit rather than production;
- Coordination among research groups;
- Public to recognize we are stewards of the land.

Steering Committee Synopsis-Priorities in Research and Extension:

8. The steering committee reviewed the focus group outputs and defined the overarching research needs as: *Develop knowledge and extension systems, innovative processes and tools to improve profit of the forage beef industry leading to safe, nutritious, globally competitive, market driven beef (products).*
- The priority research categories to improve beef production efficiencies through an integrated approach:
 - *improve forage productivity and quality thru management and breeding;*
 - *improve land and resource use efficiencies through production systems such as extended grazing & alternative business models such as off-set programs in water, land & carbon;*
 - *reduce unit cost of production of forage beef.*

The steering committee also identified the need for systems based research to address such things as regulatory, environmental or marketing restraints.

9. The following are some participants' comments on priorities to be considered by the steering committee:
- Our bottom line/profits must be integral to all research and extension;
 - There must be an emphasis on extending information;
 - Producers must be engaged and consulted;
 - Research must be applied to the Alberta climate and conditions;
 - We need research to stay competitive;
 - Producers need to drive research;
 - The industry has to work more unified with governments;
 - We need new beef markets, don't forget the commodity beef;
 - We need local and regional applied research;
 - There needs to be ongoing consumer engagement and education;
 - We need a value chain approach specific to the beef industry;
 - Research is the foundation for producer success;
 - We need science to inform the public/consumers and industry about the beef and forage industry (greening of the industry/benefits);
 - We need more information on nutritional value of beef;
 - We need increased risk management and mitigation strategies – dealing with uncertainty (market access, climate, weather, etc).

Participants' Quotes:

10. These are participants' quotes which were recorded at the focus groups:

- We have to keep leaning on (governments and industry organizations) that we need good research or we're going to get left in the dust;
- We must have good research, continue to put emphasis on research which will give us more good working tools;
- We need a funding model to develop more research in forages;
- We struggle to get information that is going to make the difference on our operations;
- Who is driving the bus for forage and beef research and extension?;
- More integration, an approach that looks at the calf from the time it hits the ground until it is processed;
- If industry organizations and producers want something to happen, they must advocate for it and come together with a greater voice;
- Make sure regional colleges are part of the solutions;
- Bring back unbiased extension people- ARD could move resources from business development back to basic forage agronomy;
- The only industry where you eat your factory;
- Revenue diversification through ecological goods and services, a carbon offset program for perennials;
- Need a long term research strategy for forage and beef;
- Find ways to connect the whole system – farmers, educators, researchers and extension people;
- Industry needs to support efforts;
- The industry is in need of support and focus. There is an opportunity to help bring the pieces together;
- Government needs to recognize the value and importance of the forage and beef industry and fund research and extension;
- We need sound science based information which can translate to practical applications.

Advice to the Steering Committee:

11. Examples of the advice which focus group participants wanted the steering committee to consider include:

- Get started and keep going;
- Coordinate long term planning, continuity ;
- Pool resources, use existing facilities;
- Continue to consult with producers;

- Focus on ways to better extend research- both existing and new;
- Determine which is the right research; identify a mechanism to agree on priorities;
- Remember our bottom line;
- Compile and organize current research and make it available;
- Create mechanisms and ongoing engagement of producers, private sector, researchers and act on the recommendations coming out of this process;
- Commit to some long term, stable research to create capacity to deliver valuable and effective research;
- Think, plan and act;
- Never give up - it is the right thing to do!

Forage Beef Research and Extension Network:

Steering Committees' Thoughts:

The steering committee met on November 25 to discuss focus group inputs and decide on the next steps. They agreed on the following points:

1. There is a need to develop a joint industry and government strategic plan for forage and beef research and extension to ensure the long term and continued research necessary for this industry to move forward;
2. There is a need to set up a mechanism for regular producer involvement and consultation with those supporting the industry and a way to coordinate and set priorities with all the partners. This mechanism will ensure the efficient and effective use of resources for research and extension, and highlight the need for new resources for the sustainability of the forage and beef industry.

Next Steps:

The steering committee agreed on the next steps:

November 28, 2011

The notes from the November 25 steering committee meeting were circulated

December 15, 2011

The consultants will submit report and the steering committee will review report and chair will sign off.

December and January (2011-12)

The members of the steering committee will initiate discussions on the focus group report with their organizations

December 19, 2011

The steering committee will meet to further discuss the next steps: explore process to submit application to the Agriculture Innovation Program- Federal initiative for the development of a strategic plan and to prepare for the presentation with Knapp and McCaughey from the provincial and federal departments of agriculture and to explore possible governance models.

January 2012

The chair will send out follow up letter and information to the focus group participants

February 2012

A meeting is proposed with John Knapp, Deputy Minister of Alberta Agriculture and Rural Development and Paul McCaughey Science Director Ag Canada to consult on strategic direction.

Appendices Pg 15-93 in FBRE final report Jan 2012

The appendices include a copy of the focus group questions, the written survey and the outputs from the five focus group qualitative discussions.

APPENDIX VI

Manitoba Beef Producers

Manitoba Beef Producers is involved with various research projects across the province with different organizations and research agreements. MBP has developed a research analysis template to ensure our financial and in-kind contributions fit in line with our research priorities and benefit our beef producers. This template will also help Manitoba Beef Producers communicate to our members about the research supported by the Association and how that research is benefiting individual producers.

The questions below will be applied to all ongoing and potential research projects.

Key Questions in Analyzing Research Projects:

1. Outline of the research project and an executive summary of the major findings?
2. Was the research project initiated by the Manitoba Beef Producers or a third party?
3. Did Manitoba Beef Producers carry the majority of the costs of research or was our funding leveraged with funding from other parties? What was the percentage split on funding?
4. Was Manitoba Beef Producers the only private (i.e., non-governmental, non-university) funder for the project?
5. Did the research produce results that will be directly beneficial to Manitoba's beef producers?
6. Is additional research necessary before results will be directly beneficial to Manitoba's beef producers?
7. Did, or will, the research directly benefit the formation of public policy in Manitoba and/or Canada?
8. Is it possible to estimate the direct financial benefits that may occur if an individual producer were to apply the results of the research (e.g. cost savings per animal, increased rate of gain, decreased calf mortality, etc.)?
9. Have the results of the research project been communicated to Manitoba's beef Producers?
10. What additional costs are necessary in order to (a) complete the research and (b) effectively communicate this research to Manitoba's beef producers?
11. Are there partners willing to share the costs outlined in (10)?

APPENDIX VII

Feed Innovation Institute

The Feeds Innovation Institute is mandated to draw together a wide cross section of scientific disciplines and industry interests focused on feed product development. The rationale for existence is the development and utilization of University of Saskatchewan (U of S) infrastructure and expertise for purposes of optimizing the value derived from the Saskatchewan feeds value chain.

There are three stakeholder groups which are important for the long term success of FII as a vehicle to commercialize U of S feeds research activities. The three stakeholder groups are the University of Saskatchewan, Saskatchewan Ministry of Agriculture (SMA) and private industry. These three stakeholder groups have interacted through the history of feeds research and extension at the University of Saskatchewan. The three stakeholders consulted and co-developed the rationale for reorganization and re-scoping of the Prairie Feeds Resource Centre into the Feeds Innovation Institute and have been involved in all strategic planning of the Feeds Innovation Institute to date.

Connections to Saskatchewan industry are made through the “Industry Advisory Committee”, which includes both the Saskatchewan Cattleman’s Association as well as the Saskatchewan Stock Growers Association, along with eight other Saskatchewan industry associations, eight private companies and provincial and federal departments. The FII Industry Advisory Committee is also the advisory committee for two additional Saskatchewan Ministry of Agriculture supported research Chairs, Dr. Tom Scott, Feed Processing Chair and Dr. Peiqiang Yu, Feed Chair. The Industry Advisory Committee ensures alignment of University of Saskatchewan basic, applied and commercialization activity in the area of feeds research through this Advisory Committee.

In Saskatchewan, investment in Feeds Research has been specifically through value added processing and feeds evaluation, as opposed to feed grain breeding. In the early 2000s a decision was made, during succession planning for Crop Development Centre breeders, to focus on malting barley and barley and oat foraging. Development of new feed barley cultivars will come only as a secondary priority in the malt barley program. To expand and further develop value added processing research, subsequent investments occurred in the Feeds Processing and Feed Chair, as well as the Canadian Feed Research Centre, a research feed mill owned by the University of Saskatchewan and located at North Battleford.

In Feeds Research in Alberta, there is an ongoing effort to develop a “Feeds Secretariat” which would be a position funded by industry. Discussion of the scope of mandate is ongoing, but the majority of activity would be targeted toward increasing barley acreages, promoting feed barley cultivars, and providing tech transfer support on all livestock feeds.

APPENDIX VIII

Western Beef Development Centre

The Western Beef Development Centre (WBDC) is a division of the [Prairie Agricultural Machinery Institute \(PAMI\)](#) that plays a unique and vital role in the development of the Western Canadian cattle industry. As an intermediary, the WBDC communicates directly with the research community and the cattle industry. Practical and applicable research is used to provide technologies that enable producers to become increasingly competitive in today's marketplace.

APPENDIX IX

University of Saskatchewan

The mission of the College of Agriculture and Bioresources is “to advance the responsible use of land, water and bioresources used to provide products and services that enhance the quality of life”. The goal of its academic, outreach and extension programs is to be recognized as “The leading Agriculture/Bioresource Institution in Canada”. In addition, the University of Saskatchewan is home to the Western College of Veterinary Medicine and the College of Engineering. The Western College of Veterinary Medicine trains veterinary students for the 4 western provinces as well as offering programs at the graduate level, while the College of Engineering is one of the few remaining engineering colleges with agriculture and bioresources program in its curriculum. Professionals graduating from these programs serve the beef industry in a wide variety of ways including but not limited to veterinarians, nutritionists, engineering and environmental specialists, geneticists, feedlot and cow-calf managers, finance officers, academics, government regulatory and extension agents and private consultants in a variety of fields. The University of Saskatchewan is also home to one of the largest concentrations of beef cattle scientists in North America. This group known as the Sustainable Beef Systems Research Group has expertise in virtually all areas of beef production. Members of the group have been recognized nationally and internationally for their contributions to beef cattle research.

APPENDIX X

Saskatchewan Forage Council Research Priorities

The forage industry in Saskatchewan is diverse. Much of the forage produced is consumed by beef cattle, but other livestock, such as dairy cattle, sheep and bison obtain much of their feed from forage sources. Some forage is also produced specifically for hay markets, either domestic or foreign. Pellets and cubes of alfalfa and/or timothy are also produced mainly for export markets. Saskatchewan is also an important seed production area for alfalfa, other legumes and grasses.

The following priorities apply to forage produced for all classes of livestock, unless indicated.

1. Genetic improvement of forage crops:
 - a. Capacity building and long term support for forage breeding;
 - b. A testing system to demonstrate value of new varieties;

- c. Breeding for higher productivity;
 - d. Breeding for improved quality;
 - Slower decline in quality as alfalfa and grasses mature – reduced lignin;
 - Improved fall and winter quality;
 - Bloat-safe alfalfa and improvement of bloat-safe legumes;
 - Alfalfa with improved leaf retention.
 - e. Improved adaptation to stressful environments (drought, salinity etc).
2. Management systems for improved productivity and quality to improve economics of livestock production:
- a. Capacity building and long term support for forage management research;
 - b. Evaluation of new species and mixtures;
 - c. Improved palatability and utilization;
 - d. Grazing systems;
 - Extension of the grazing season;
 - Reduction of bloat in high quality grazing management systems.
 - e. Improved animal performance on forage;
 - f. Economic assessment of all management systems, including development of tools for economic comparison of systems;
 - g. Improved harvesting and drying methods to preserve hay quality;
 - h. Consider all of the above listed practices in terms of the whole system.
3. Improved productivity of forages grown for seed production (adapted from SFSDC research priorities):
- a. Breeding of new legume and grass cultivars adapted to Saskatchewan conditions, taking into;
 - b. account both forage and seed production;
 - c. Weed control in forage legumes and grasses grown for seed;
 - d. summarize present chemical and cultural control methods;
 - e. Best fertility management practices for seed production;
 - f. Control of insect pests of grass and legume seed production;
 - g. Control of diseases of grass and legume seed production;
 - h. Best establishment practices for forages grown for seed.
4. An effective technology transfer system for new information and technologies from forage research.

APPENDIX XI

STRATEGY TEAM AND INVITED PARTICIPANTS

Organization	Representative
STRATEGY TEAM	
Strategy Team- Pound-Maker AgVentures*	Brad Wildeman
Strategy Team- ADF-WBDC*	Tim Oleksyn
Strategy Team- BCRC	Andrea Brocklebank
Strategy Team- Feeds Innovation Institute, U of S*	Colleen Christensen
Strategy Team- Saskatchewan Forage Council*	Leanne Thompson
Strategy Team- SCA*	Ryan Sommerfeld
Strategy Team- SCA*	Michael Spratt
Strategy Team- SCA*	Jack Hextall
Strategy Team- SCA	Ryan Thompson
Strategy Team-Saskatchewan Forage Network*	Janice Bruynooghe
INVITED PARTICIPANTS FOR ENGAGEMENT	
Forage Network – SaskMilk*	Jack Ford
Forage Network - SK Forage Seed Development Commission*	Ray McVicar
Forage Network - SK Leafcutters Association*	Andrew Lindsay-Hawkins
Forage Network - Native Plant Society of SK	Chet Neufeld
Forage Network - SK Forage Council	Aaron Ivey
Alberta Beef Producers*	Karen Schmid
ANAC (Animal Nutrition Assoc of Canada)	Tim Armstrong - New-Life Feeds (SK Director)
APAS*	Donavon Block
BCRC*	Reynold Bergen
Canadian Beef Breeds Council	Doug Fee (Executive Vice-President)
Farm Animal Council of SK	Joe Kleinsasser (Chair)
Livestock Marketers of SK	Bob Blacklock (President)
Manitoba Beef Producers*	Glen Campbell and Maureen Cousins
Prairie Conservation Action Plan (PCAP)*	Natasha Wilkie (Manager)
Saskatchewan Forage Council*	Bruce Coulman
SARM*	Laurel Feltin and Ray Orb
SCFA	Bill Jameson (President)
SK Bison Association	Les Kroeger (President)
SK Sheep Development Board	Gord Schroeder (Executive Director)
SSGA*	Harold Martens (President) and Chad MacPherson
West Central Pelleting	Dean Skinner
Western Grains Research Foundation	Dave Sefton (Chair)
SK Vet Medical Association	Sharon Murray
Cargill	Scott Entz, General Manager
JBS Food Canada Inc.	Willie Van Solkema
SK Cattlemen's Association reps*	Craig Douglas, Barbara Larson and Levi Hull

*Attended