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Alberta Government

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Conference Agenda

9:00 Registration and Coffee
9:25 Welcome
9:30 Public Trust Research (Farm & Food Care) – Bernard Tobin, Farm & Food Care
10:15 Social License and Climate Change – Creation of the Farm Stewardship Center – Sean Royer, Alberta Agriculture & Forestry (AF)
10:35 Alberta Milk ProAction and Beef Sustainability - Klaas Vander Veen
11:00 Coffee
11:20 Producer Environmental Egg Program (PEEP): Egg Farmers of Alberta – Jenna Griffin
11:40 Manure Tracker: On the trail of hormones, antimicrobials and antimicrobial resistance genes – Frank Larney (AAFC)
12:00 Lunch
1:00 Methane recovery and agronomic values of anaerobically digested solid beef cattle manure – Ben Thomas (AAFC)
1:20 Manure management to reduce greenhouse gas and ammonia emissions – Len Kryzanowski (AF)
1:40 Livestock manure impacts on groundwater quality in Alberta – Mike Iwanyshyn (NRCB)
2:00 Manure technology options – Karen Yakimishyn (AF)
2:30 Coffee
2:50 Impact of amended feedlot pen surface on cattle health and welfare, environmental and economic sustainability – Ike Edeogu (AF)
3:05 Catch basin management – Brian Koberstein (AF)
3:20 Phosphorus filter project – Vince Murray (AF)
3:35 Poultry manure drying belt project – Jesse Vandenberg (AF)
3:50 Tool and App updates – Trevor Wallace (AF)
4:10 Next Policy Framework (Growing Forward) – Wendy McCormick (AF)
4:45 Conference Wrap-up

Speaking up for agriculture – Building public trust through share values

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* No abstract provided, please see the presentation for more details.

Social License and Climate Change – Government Perspective

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* No abstract provided, please see the presentation for more details.

Alberta Milk proAction Initiative & McDonald's Project for Sustainable Beef

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EFA's Environmental Program and its Impact on Manure Management Practices

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In 2014, Egg Farmers of Alberta launched their Producer Environmental Egg Program (PEEP), an on-farm environmental program focused on education and continuous improvement. Adapted from the Environmental Farm Plan, PEEP contains 3 questions related to manure storage, use, and management. Delivery of PEEP from 2014-2016 identified challenges related to the use of field storage as "permanent" manure storage, and opportunity for improvements in the areas of manure drying and covered storage. The program and its findings are helping to improve these practices and drive research and extension in this area.

Key Points:

- As a result of PEEP, on-farm manure management practices are slowly improving however, improvements have been slower for manure management than for other program areas (ex. energy efficiency). Work is underway that aims to accelerate the pace of change.
- PEEP serves as one model to encourage best production practices, better understand opportunities for research and policy, and document changes over time.

Manure Tracker: On the Trail of Hormones, Antimicrobials and Antimicrobial Resistance Genes

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Hormones are used in beef cattle production in Canada to increase performance and hence profitability by enhancing feed efficiency and weight gain. Trenbolone acetate (TBA), a synthetic androgen, is a steroid growth promoter administered by implantation in feedlot animal's ears. Melengestrol acetate (MGA) is a synthetic progestin administered in feed. Antimicrobials are also used mostly therapeutically for disease treatment/prevention but also sub-therapeutically for growth promotion. Both hormones and antimicrobials are excreted in manure and land application has the potential to spread these compounds to wider environments where they may interfere with ecosystem function. Antimicrobials may also contribute to a greater prevalence of antimicrobial resistant bacteria through an increase in the introduction and selection for antimicrobial resistance genes (ARG) in the environment, generating a potential public health concern. This presentation will outline the work underway at AAFC-Lethbridge (+ collaborators) in tracking the fate of hormones, antimicrobials and ARG in manure.

Key points:

- Hormones and antibiotics are used in beef cattle production in Canada and subsequently excreted in manure.
- What is the fate of these compounds once excreted, e.g. on feedlot pen floors, in pen runoff, during composting, or when applied to soil?
- Do management practices affect prevalence of antimicrobial resistance genes?
- Research underway at AAFC on these topics will be presented.

Methane recovery and agronomic values of anaerobically digested solid beef cattle manure in St. Albert and Lethbridge, Alberta

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Solid beef cattle manure is a good anaerobic digestion feedstock for methane production, but few studies have quantified the potential methane recovery and the agronomic values of the anaerobic digestion co-products. Methane recovery was quantified by methane potential batch testing. Potential methane recovery from forage-based beef cattle feedlot manure was 0.350 m^3 kg^{-1} dry matter. In St. Albert and Lethbridge, AB, over four growing seasons, we tested the N and P supply to barley forage from 1) anaerobically digested solid beef cattle manure (digestate), 2) separated solids from the digestate (separated solids), 3) pelletized separated solids (pellets – St. Albert only), and 4) undigested solid beef cattle manure (cattle manure) that were applied at target rates of 1× and 2× the local recommendation. Non-amended soils were included as controls. In Lethbridge, a fifth year was included to test the residual effect. In St. Albert, digestate led to 31 to 50% greater barley forage yield than other co-products and cattle manure, while in Lethbridge digestate led to 24 to 26% greater barley forage yield than cattle manure and separated solids. In St. Albert, the apparent N recovered from digestate (19%) was 8.5-fold greater than pellets (2%), and two times that of the separated solids (9%) and cattle manure (10%). In Lethbridge, the apparent N recovery was 22% for digestate but only 12% for cattle manure and 9% for separated solids. Digestate led to greater barley forage P uptake in St. Albert, while having a significantly lower risk of soil test P accumulation than the other co-products and cattle manure at both field sites. We conclude that management practices developed for solid beef cattle feedlot manure can be used for separated solids, but not digestate. Digestate has a lower risk of soil test P accumulation, when applied at N-based rates, than cattle manure and separated solids. Liquid dairy cattle manure may be the most similar amendment to anaerobically digested solid beef cattle manure given its ammonium to total N ratio and high water content.

Key Points:

- Potential methane recovery from feedlot manure was 0.350 m^3kg^{-1} dry matter.
- Anaerobically digested cattle manure had high NH_4-N to total N ratios.
- 19 to 22% of N from anaerobically digested cattle manure was recovered by barley.
- 9 to 12% of N from undigested cattle manure and separated solids was recovered by barley.
- Digested separated solids can be managed similar to cattle manure.
- Anaerobically digested cattle manure had less soil test P buildup than cattle manure.

Manure management to reduce greenhouse gas and ammonia emissions

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* No abstract provided, please see the presentation for more details.

Livestock manure impacts on groundwater quality in Alberta

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In January 2002, the Alberta Government assumed responsibility for the regulation of confined feeding operations (CFOs) when the Agricultural Operation Practices Act (AOPA) was amended. The Natural Resources Conservation Board (NRCB), the Provincial agency responsible for the administration of AOPA, and Alberta Agriculture and Forestry (AF) are concerned that some manure storage facilities and associated activities, such as land application of manure, may be releasing manure constituents into shallow groundwater resources. An integral part of the administration of AOPA is determining environmental risk, as outlined in a provincially adopted Risk Management Framework policy. This has led to the development and use of a risk screening tool and risk based compliance initiative, both currently focused towards groundwater.

Although the environmental risk based policy being implemented utilizes the best available, current, and relevant science, limited Alberta-specific information exists on the impacts of manure storage and handling on groundwater quality, leading to uncertainty in the actual extent and risk that these activities pose to groundwater. A multi-year groundwater research program was conducted through the establishment and instrumentation of field-scale CFO pilot study sites to improve the understanding of impacts from manure handling and storage on groundwater quality in Alberta and the fate and transport of various manure constituents in groundwater beneath CFOs. Long-term study sites were identified through site characterization, geological investigations, and monitoring well installation, and represent the primary typical hydrogeological conditions in Alberta affected by manure storage and handling activities.

Activities were focused at specific earthen manure storage (EMS) facilities at site specific CFOs, and were also designed to examine the effects of manure land application and on a regional scale on Alberta's groundwater. Research program activities included characterization of the contaminant (i.e., aqueous) source, characterization of the hydrogeological and physical controls on the transport of contaminants, characterization of the background aqueous and solids chemistry, characterization of aqueous and solids chemistry within the contaminant plume, and quantification of the geochemical controls on the fate of contaminants. Results and findings will be presented.

By improving the scientific and practical understanding of the fate and transport of manure constituents in the groundwater in typical Alberta CFO settings, improved management, policy, regulation, and protection of the groundwater and environment can be achieved. The results also provide insights and understanding into the impacts of other point- and non-point-sources of manure associated contamination, particularly land application of inorganic and organic fertilizers and disposal of human waste, on Alberta groundwater. Instrumentation installed may also provide the opportunity to investigate the fate and transport of other emerging contaminants (e.g., pharmaceuticals, viruses, etc.) and thus assess their impact on groundwater.

Opportunities for Manure Management in Alberta

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Impact of amended feedlot pen surface on cattle health and welfare, environmental and economic sustainability

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Feedlot pen floors in Alberta are traditionally constructed of compacted clay. Annual feedlot pen maintenance requires sourcing and excavating clay to repair damaged pen floors, which significantly adds to the input costs and environmental footprint of cattle feedlots in the province. Constructing feedlot pen floors with fly ash-amended concrete, in this case, roller compacted concrete (RCC), has been suggested as one possible sustainable solution for stabilizing the pen floors, and subsequently improving efficiencies of feedlot operations and animal performance, among other potential benefits.

Research is underway at a commercial feedlot operation in southern Alberta where some of the traditional clay floor pens have been retrofitted to RCC floors. Funding to conduct the research project was provided by Government of Alberta. The project commenced in February 2016 and is anticipated to be completed by February 2019.

This research project aims to assess the social, environmental, technological and economic performance (positive, negative or neutral) associated with housing feedlot cattle in RCC floor pens versus traditional clay floor pens.

The primary objective of the project is to assess the following sustainability indicators:

- Social: Cattle Health and Welfare - lameness rates; mud scores; and physiological and behavioral indicators of cattle welfare
- Environmental: Water - runoff volume and water quality (contaminants); Air - ammonia emissions; Climate Change - greenhouse gas emissions; Soil - pen soil quality (contaminant levels); Manure - volume at cleanout and quality (composition and contaminant levels)
- Technological: RCC - compressive strength, floor thickness, density, durability and potential mobility of heavy metals introduced via the use of fly ash in the RCC
- Economic: Cattle - average daily gain and tag scores; Manure - handling costs; Clay - handling costs and pen floor maintenance costs; RCC - construction costs and maintenance costs

Catch Basin Pumping Pilot Project – Update

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* No abstract provided, please see the presentation for more details.

Phosphorus Filter Project

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Oklahoma State University has developed a software package (Phrog) capable of designing landscape scale filters for the removal of dissolved phosphorus from runoff water. Phosphorus binds to the filter media as the runoff water flows down through the filter. Alberta Agriculture and Forestry intends to construct a filter as a demonstration project to determine the performance of a filter designed by Phrog in Alberta. Licenses and permits are being obtained with the intent of installing a filter this year.

Key Points:

- A filter designed using software from Oklahoma State University will be used to design a filter for removing dissolved phosphorus from runoff water.
- A site in Southern Alberta has been selected for use in determining the suitability of this technology in Alberta.
- Installation of the filter is planned for 2017.

Poultry Manure Belt Drying Project

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In 2016, the Egg Farmers of Alberta and Alberta Agriculture and Forestry initiated a project to help fill information gaps related to manure belt drying systems in layer barns. Fresh poultry manure generally has a high moisture content, which results in the volatilization of ammonia. High levels of ammonia in the barn can have adverse effects on egg production as well as poultry and worker health. Additionally, the loss of ammonia by volatilization reduces the amount of nitrogen in the manure, which reduces the value of manure as a fertilizer, and also has a negative impact on the local environment. Manure drying belts are one method that can be used to reduce the moisture content of the manure thus decreasing the amount of ammonia volatilization, but there are still information gaps that need to be clarified for use in Alberta. The current project is aiming to evaluate the effectiveness of installed drying systems and their best practices. This will be done by evaluating the effectiveness of current drying systems in Alberta by measuring the moisture contents of manure from farms with drying compared to those without. Building on that information, in-barn testing on an operating farm will be used to draw conclusions from more controlled scenarios. If needed, further research will be conducted at the University of Alberta Poultry Research Centre to evaluate the change of ammonia emissions based on different drying scenarios.

The main goal of the project is to comprehensively evaluate the benefits and drawbacks of manure drying belts by measuring important factors including the energy usage, nutrient contents in the manure, and ammonia emissions. From these measurements, economics and the net environmental impacts can be calculated to help guide producers to improve efficiencies.

The key questions that the project will aim to answer include:

- The effectiveness of current drying systems and what the moisture contents are in Alberta with and without drying.
- If the extra energy usage for drying manure is justified by the benefits of reducing ammonia volatilization and improving nitrogen retention in the manure.
- The impact of drying in aviary systems.
- Best practices to optimize the drying and manure handling processes.

Tool and App Update

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The Next Agricultural Policy Framework (Growing Forward 3)

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Key Points:

- The Next Agricultural Policy Framework (NPF) will replace Growing Forward 2 April 1, 2018.
- The development of NPF began with the Calgary Statement in July 2016 and will continue with a national framework agreement, and then will move to a provincial agreement later in 2017 that will focus on programs and activities tailored for Alberta's industry.
- The six key priority areas identified in the Calgary Statement and endorsed by Ministers of Agriculture across Canada last July, will guide the development of the next framework.
- Stakeholder input and consultation will help shape the next Agreement.
- Stay informed about NPF and upcoming national or provincial consultation opportunities by visiting Alberta's Growing Forward 2 website and subscribing to receive notifications of updates. . www.growingforward.alberta.ca

What is the Next Policy Framework?

Federal, provincial and territorial (FPT) governments are currently working together to develop the next agricultural policy framework which will launch on April 1, 2018. Last July 2016 when FPT Ministers of Agriculture endorsed the Calgary Statement at their annual meeting it signaled the start of the development of the Next Policy Framework (NPF).

The NPF has three layers of agreements; the Calgary Statement, The Multilateral Framework Agreement and the Bilateral Agreement.

- The Calgary Statement is a directional document that outlines the intent to develop the NPF and highlights areas of importance to the agriculture, agri-processing, and agri-products industry across Canada.
- The Multilateral Framework Agreement is built on the intentions of the Calgary Statement and is a formal signed agreement between the FPT governments to jointly address key issues, and the strategic details of the next agricultural policy framework.
- The Bilateral Agreement is a formal signed agreement between Alberta and Canada which outlines the programs offered within the province; the administrative and operational details; and funding allocations that Canada and Alberta are required to adhere to during the implementation period.

Agricultural frameworks have proven to be an effective way to coordinate Canada's federal, provincial and territorial policies and programs for over 15 years.

How will the Next Policy Framework be developed?

The development process moves through various stages over a period of approximately two years and involves industry consultations at a national and provincial level, multilateral and bilateral negotiations between governments and program development at the provincial level.

Currently, Agriculture and Forestry (AF) officials are in the process of seeking authority to begin the provincial consultation process that will complement the national initiatives, and help refine and focus the six national priority areas to the needs of the Alberta industry.

What are the Key Areas of Focus for the Next Policy Framework?

The Calgary Statement highlights that FPT governments and industry share a collective vision of creating the most modern, sustainable and prosperous sector in the world.

The Calgary Statement identifies the following six key priority areas that will guide the development of the next agricultural policy framework.

1. Markets & Trade
2. Science, Research & Innovation
3. Risk Management
4. Environmental Sustainability & Climate Change
5. Value-Added Agriculture & Agri-Food Processing
6. Public Trust

How can I stay informed?

Stay informed about the NPF by visiting the new tab on Alberta's Growing Forward 2 website and subscribing to receive notification of updates. www.growingforward.alberta.ca.