Summary of Agriculture Development Fund (ADF)
Livestock and Forages Projects for 2024

- **30** livestock and forage projects were funded by ADF for a total of **$6,846,792.**
- **5** Industry partners co-funded a total of **$478,597.**

Institution	Number of Approved Projects	Total Amount Funded
Agriculture and Agri-Food Canada	2	$275,000
Olds College	1	$150,653
Prairie Diagnostic Services Inc.	1	$245,000
Prairie Swine Centre Inc.	2	$391,000
University of Regina	1	$208,696
University of Saskatchewan	19	$4,499,608
VIDO	4	$1,076,835
Total	**30**	**$6,846,792**

Commodity	Number of Approved Projects	Total Amount Funded
Beef	7	$1,126,761
Environment/Water quality	2	$889,463
Forages	1	$129,854
Forages/Breeding	4	$1,315,181
Forages/Pasture	3	$543,235
Poultry	3	$699,000
Pulses	1	$187,298
Swine	9	$1,956,000
Total	**30**	**$6,846,792**

Livestock and Forages Project Co-funders	Number of Approved Projects	Total Amount Funded
Saskatchewan Canola Development Commission	1	$93,645
Saskatchewan Cattlemen's Association	5	$215,431
Saskatchewan Forage Seed Development Commission	2	$30,869
Saskatchewan Pulse Growers	1	$93,652
Saskatchewan Wheat Development Commission	1	$45,000
Total	**8[1]**	**$478,597**

[1]-A total of 8 projects received co-funding support. Some projects were co-funded by more than one co-funder.

Agriculture and Agri-Food Canada

Maternal nutrition, winter feeding, and calf immune fitness in beef cattle (*20230044*)

Principle Investigator: Nilusha Malmuthuge, Agriculture and Agri-Food Canada
Objectives:

- Assess the impact of extended grazing (EG) with or without supplement on priming of immune responses in pre-weaned calves.
- Evaluate the activation of stress receptors in pregnant cows during EG and in pre-weaned calves.
- Assess impact of EG with or without supplement on Calf and dam performances.
- Understand the impact of EG with or without supplement on the activation of immune memory.

ADF Funding: $90,000.00

Evaluating manure management and treatment strategies in potential African Swine Fever outbreak in Canada (*20230209*)

Principle Investigator: Philip Soladoye, Agriculture and Agri-Food Canada
Objectives:

- Conduct exhaustive survey to explore manure management options generally employed in Canada and other ASF-infected jurisdictions.
- Evaluate and compare the efficacy, practicality, and economic feasibility of several ASF infected manure management strategies.
- Explore value added opportunity for manure slurry using thermal hydrolysis technology.

ADF Funding: $185,000.00

Olds College

Integrated breeding approaches to enhance grain and forage yield and quality of the triticale crop for Western Canada (*20230143*)

Principle Investigator: Mazen Aljarrah, Olds College
Objectives:

- Develop the next generation of awnless triticale genotypes, suitable for green forage and swath-grazing practices.
- Apply molecular marker techniques to improve the genetic resistance to Fusarium head blight (*F. graminearum*) and ergot (*Claviceps spp.*).
- Determine the potential of the new triticale varieties for forage and feeding value for poultry, swine, and cattle.
- Breeding high grain and forage yielding triticale lines that are climate resilient and adapted to the variable growing condition.
- Work to develop and diversifying the triticale grain market.

Co-funded by: Saskatchewan Cattlemen's Association, Saskatchewan Wheat Development Commission
ADF Funding: $150,653.00

Prairie Diagnostic Services

Validation of a rapid metagenomic diagnostic workflow to support *Salmonella* control and surveillance programs in egg farming (*20230106*)

Principle Investigator: Musangu Ngeleka, Prairie Diagnostic Services Inc.

Objectives:

- Establish a regional *Salmonella* sequences reference database.
- Validation and implementation of a novel *Salmonella* metagenomic diagnostic workflow in a laboratory setting.
- Laboratory diagnostic tests inventory, stakeholder engagement, and knowledge translation to inform policy changes.

ADF Funding: $245,000.00

Prairie Swine Centre

Finding the optimal loose lactation system and management for Canadian pig production (*20230250*)

Principle Investigator : Jen-Yun Chou, Prairie Swine Centre Inc.

Objectives:

- Evaluate sow and piglet performance in two loose lactation systems vs a conventional farrowing crate.
- Investigate the efficiency of loose lactation using a weaning age of 4 weeks and compare with 3-week weaning in Study 1.
- Determine if nesting materials and greater movement improve maternal behavior in sows.
- Understand how farrowing system and nesting materials influence piglets' adaptation postweaning.
- Explore the benefits and challenges of loose farrowing for farrowing staff.

ADF Funding: $196,000.00

Improving Sow Management and Performance Using Precision Feeding Records (*20230295*)

Principle Investigator: Jennifer Brown, Prairie Swine Centre Inc.

Objectives:

- Compare sow and gilt performance in group and stall housed herds.
- Evaluate relationships between ESF feeding patterns, sow performance and social dynamics.
- Evaluate three interventions designed to improve gilt acclimation and performance in ESF systems.
- Economic analysis of cost vs returns in group and stall housing.

ADF Funding: $195,000.00

University of Regina

Sensitive detection, source tracking, and typing of viruses, bacteria, and antibiotic resistance through progression of BRD (*20230329*)

Principle Investigator: Andrew Cameron, University of Regina
Objectives:

- Culture-independent identification of co- infecting bacteria, viruses, and antibiotic resistance genes in BRD.
- Epidemiological study to compare the detection of bacteria, viruses, and antibiotic resistance genes to morbidity and mortality.
- Identify novel and emerging viral pathogens in feedlots.
- Apply DNA Capture Sequencing technology to water bowl samples for infectious disease surveillance.

Co-funded by: Saskatchewan Cattlemen's Association
ADF Funding: $208,696.00

University of Saskatchewan

Development of new red clover cultivars for western Canada (*20230015*)

Principle Investigator: Bill Biligetu, University of Saskatchewan
Objectives:

- Evaluate seed yield potential of new red clover breeding lines in multiple red clover seed producing regions.
- Characterize diverse germplasm resources of red clover using genotype-by-sequencing (GBS) and Unmanned Aerial Vehicle (UAV).
- Assess genetic relationship of 'Common' red clover seeds to test genetic relatedness to single and double cut.
- Development of new red clover populations.

Co-funded by: Saskatchewan Forage Seed Development Commission
ADF Funding: $304,433.00

Genetic, genomic, and agronomic approaches to improve a non-bloat legume – Cicer milkvetch productivity and adoption in western (*20230016*)

Principle Investigator: Bill Biligetu, University of Saskatchewan
Objectives:

- Improve seed germination and stand establishment of cicer milkvetch.
- Development of a high-quality reference genome for cicer milkvetch.
- Genetic diversity analysis of cicer milkvetch populations.
- Genomic selection for seedling vigor.
- Agronomic studies to improve cicer milkvetch use in novel forage mixtures.

ADF Funding: $365,595.00

Development of an enhanced early life program (EELP) to improve health and productivity of beef cattle (*20230046*)

Principle Investigator: Nathan Erickson, Western College of Veterinary Medicine
Objectives:

- To identify optimal prime-boost vaccination programs that prime effective immunity (antibody responses, immune memory cells).
- To assess the impact of weaning method and viral challenge on calf immune fitness when an optimized vaccine protocol is used.
- To understand the impact of EELP (optimized vaccination, weaning) on production efficiency and economic benefits.

ADF Funding: $157,672.00

Known unknowns: macrolide resistance at beef cattle feedlots (*20230048*)

Principle Investigator: Antonio Ruzzini, Western College of Veterinary Medicine
Objectives:

- Characterization of a new family of macrolide esterases.
- Screen for new enzymes capable of hydrolyzing macrolides with 15-membered rings.

ADF Funding: $240,000.00

Evaluation of stocking rate, grazing duration and recovery times on native grassland (*20230063*)

Principle Investigator: Breeanna Kelln, University of Saskatchewan
Objectives:

- Identify effect of stocking rate, grazing duration on beef cattle diet selection, forage preference, and grazing behavior.
- Identify the effect of stocking rate, grazing duration, and rest recovery on forage production & livestock performance.
- Conduct an economic analysis of grazing practices to generate best management practices for grazing native grassland to increase.

ADF Funding: $109,737.00

Cereal-pea polyculture for silage: effect on forage production, ruminal fermentation, GHG emission and economics (*20230078*)

Principle Investigator: Breeanna Kelln, University of Saskatchewan
Objectives:

- Compare monoculture, binary and polyculture cereal-pea blends for silage production.
- Identify silage blends that increase silage digestibility, microbial protein synthesis and reduce methane production.
- Conduct a competitive and economic analysis of cereal-pea monoculture, binary and polyculture silage blends.
- Provide agronomic recommendations to producers to benefit silage productivity, livestock performance, and farm profitability.

ADF Funding: $129,854.00

Addressing high sulfate water for cattle and sheep (*20230110*)

Principle Investigator: Gregory Penner, University of Saskatchewan

Objectives:

- Risk for polioencephalomalacia in cattle: Is it feed, water, or the combination?
- Risk for polioencephalomalacia in cattle: Does water temperature affect risk?
- Risk for polioencephalomalacia in cattle: What plants and plant parts accumulate S and is this affected by S and Se?
- What dose of inorganic copper is required to maintain adequate liver copper?
- What dose of chelated copper is required to maintain adequate liver copper?
- Establishing water quality standards for breeding, pregnancy, and lactation.
- Understanding the impact of water sulfate concentration and copper supplementation post-weaning growth.

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: $596,463.00

Improving forage barley and oat varieties through novel traits and UAV-based phenotyping (*20230113*)

Principle Investigator: Aaron Beattie, University of Saskatchewan

Objectives:

- Develop UAV-based predictions of forage yield and quality.
- Evaluate the effect of the orange lemma trait on forage barley quality.
- Produce improved forage barley and oat varieties.

ADF Funding: $494,500.00

Genomic association analysis of forage efficiency in beef cows (*20230131*)

Principle Investigator: Mika Asai-Coakwell, University of Saskatchewan

Objectives:

- Identification of cow-calf producers with detailed records of calving and ability to score efficiency/productivity on their cow.
- Identification of genomic regions associated with forage efficiency in Canadian beef cows.
- Screening cattle population for forage efficiency associated SNP.
- To train one graduate student in bovine genetics and genomics.

Co-funded by: Saskatchewan Cattlemen’s Association

ADF Funding: $147,992.00

Impacts of cow-calf operations on water resources (*20230138*)

Principle Investigator: Terry Fonstad, University of Saskatchewan

Objectives:

- Characterize the quality of runoff from various sizes of beef cattle wintering and calving sites in Saskatchewan.
- Determine the site variables and their effect on the quality of run off from cow-calf overwintering sites.
- Determine the various options available to control runoff from beef cattle wintering and calving sites to comply with the Act.
- Determine a safe distance from water resources based on a site with these variables.
- Evaluate the effectiveness of several implemented beneficial management practices (BMPs) in Saskatchewan.

ADF Funding: $293,000.00

Evaluation of perennial forages under grazing for enhanced environmental sustainability and animal health (*20230145*)

Principle Investigator: Bart Lardner, University of Saskatchewan

Objectives:

- Characterize forage persistence & associated traits of cicer milkvetch (CMV) and alfalfa as monoculture/mixtures under grazing.
- Evaluate performance of an experimental grazing tolerant alfalfa population and CMV-alfalfa mixtures under grazing.
- Evaluate grazing animal performance and bloat incidence from grazing legume forage pasture systems.
- Assess the effect of including CMV in mixture with novel graze tolerant alfalfa on enteric CH_4 emissions.
- Determine soil characterization and economic analysis of forage systems.
- Development of new CMV populations adapted for grazing tolerance.

ADF Funding: $319,600.00

A decade on: How have the 35 ranchers under 35 fared? (*20230148*)

Principle Investigator: Kathy Larson, University of Saskatchewan

Objectives:

- Determine RMP and BMP adoption among the original U35 operations.
- Determine use of business risk management programs among original U35 operations.
- Assess associations between financial performance of original U35 and rancher/ranch attributes and practices.
- Review the strategies used to capture/manage previously stated opportunities/threats.
- Develop policy recommendations to support young cattle producers.

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: $69,566.00

Reduction of odour and bioaerosol emissions in swine barns using cold plasma (*20230155*)

Principle Investigator: Lifeng Zhang, University of Saskatchewan

Objectives:

- Evaluate and demonstrate the performance of cold plasma in reducing odour and bioaerosol concentrations in a lab-scale setup.
- Evaluate the effectiveness of cold plasma in reducing odour and bioaerosol concentrations in a pilot-scale pig production room.
- Evaluate the effectiveness of cold plasma in reducing odour and bioaerosol concentrations in a large-scale pig production room.

ADF Funding: $280,000.00

A novel vaccination strategy to control *Enterococcus - E. coli* disease syndrome in broiler chickens at the hatchery (*20230167*)

Principle Investigator: Susantha Gomis, University of Saskatchewan

Objectives:

- To control *E. coli* disease syndrome in broilers by a live *E. coli* vaccine delivered by a novel intrapulmonary delivery technique.
- Utilizing the concept of gut-lung-axis (GLA) in broilers for intrapulmonary (IPL) vaccine delivery to control *E. coli* infections.

ADF Funding: $190,000.00

Dust filtration device for improving air quality in poultry and swine barns (*20230184*)

Principle Investigator: Huiqing Guo, University of Saskatchewan

Objectives:

- To develop and evaluate a dust removal device to attach to the existing recirculation fans in poultry and swine barns.

ADF Funding: $82,000.00

Improving consistency of swine dysentery vaccine (*20230229*)

Principle Investigator: Matthew Loewen, University of Saskatchewan

Objectives:

- Increase the solubility of the Pr2 vaccine subunit to produce a consistent immune response.

ADF Funding: $108,000.00

New perennial forages selected for improved yield, environment resilience, nutritional value, and carbon hoofprint (*20230326*)

Principle Investigator: Gabriel Ribeiro, University of Saskatchewan

Objectives:

- Determine the yield and nutritional quality of three new perennial grasses, one new alfalfa variety, and their grass-legume mixtures.
- Screen new forage varieties and mixtures for improved digestibility, ruminal fermentation profile, and low methane production.
- Evaluate 4 treatments selected based on batch culture results in the Rusitec system (ruminal in vitro semi-continuous culture).

Co-funded by: Saskatchewan Forage Seed Development Commission

ADF Funding: $113,898.00

Development of a co-extruded canola meal and pea starch product to replace dietary soybean meal (*20230364*)

Principle Investigator: Rex Newkirk, University of Saskatchewan
Objectives:

- Optimization of pelleting and extrusion parameters.
- Determination of chemical composition and digestibility of a processed air classified pea starch / canola meal product.
- Determination of the impact of an air classified pea starch / canola meal product on growth performance and feeding behavior.
- Determination of the effects of an air classified pea starch / canola meal product on egg production.
- Economic evaluation of the new processed product using least cost formulation modeling.

Co-funded by: Saskatchewan Canola Development Commission, Saskatchewan Pulse Growers
ADF Funding: $187,298.00

Pathogen survival in mortalities management (*20230386*)

Principle Investigator: Terry Fonstad, University of Saskatchewan
Objectives:

- Determine the low temperature conditions required for viral pathogen (AI, PEDv, ASF) destruction in the laboratory.
- Measure virus survival in mortalities, compost, and manure in a laboratory setting.
- Verify that mortalities composting strategies are creating the conditions required for pathogen destruction in SK climates.

ADF Funding: $310,000.00

VIDO

Development of a customized RNA vaccine platform for rapid response to animal disease outbreaks (*20230005*)

Principle Investigator: Aneesh Thakur, VIDO
Objectives:

- Formulation of saRNA vaccines targeting antigenic proteins of influenza A virus.
- Formulation and characterization of thermostable candidate saRNA vaccines.
- Evaluate the immunogenicity of the candidate saRNA vaccines.
- Analyze the protective efficacy of the saRNA vaccines following influenza challenge.

ADF Funding: $264,000.00

Bioengineered yeast to provide antimicrobial peptides and functional amino acids to preserve and improve gut health in piglets (*20230031*)

Principle Investigator: Heather Wilson, VIDO
Objectives:

- Bioengineer *Saccharomyces cerevisiae* to deliver antimicrobial peptides, zinc, and essential amino acids.
- Characterize effect of feeding siYz-AMP/EAA yeast strain on pig growth and intestinal health.
- Characterize effect of supplementing feed with siYz-AMP/EAA yeast on protection against Salmonella challenge.

ADF Funding: $300,000.00

Oral vaccine for pigs against PRRSV and PEDV (*20230056*)

Principle Investigator: Heather Wilson, VIDO

Objectives:

- Bioengineer *Saccharomyces cerevisiae* yeast to use as an oral vaccine against pig viral diseases PEDV and PRRSV.
- Define optimal dose/timing of oral vaccine to trigger immunity to PEDV and PRRSV.
- Perform vaccine protection studies against PEDV and PRRSV.

ADF Funding: $300,000.00

Development of an efficacious *Histophilus somni* subunit vaccine for beef cattle (*20230112*)

Principle Investigator: Jose Perez-Casal, VIDO

Objectives:

- Characterize various strains of *H. somni* isolated from healthy cattle and fatal cases of various forms of *Histophilosis*
- Purify antigens previously reported to confer protection.
- Calibrate IV challenge model.
- Test formulations for humoral and cell-mediated immune responses in young beef steers.
- Conduct Proof-of concept studies.

Co-funded by: Saskatchewan Cattlemen's Association

ADF Funding: $212,835.00