

Project Update: Information and Science to Support Ecosystem Services on Agricultural Lands

Submitted by InnoTech Alberta

On April 1, 2015, Alberta Innovates –Technology Futures (AITF) launched the three year project “Development of Information and Science to Support the Provision of Ecosystem Services on Agricultural Lands” funded by Alberta Innovates, and the Alberta Livestock and Meat Agency.

The South Saskatchewan Regional Plan identifies opportunities for agricultural producers to supply ecosystem services on agricultural lands. To better understand these opportunities we need to understand the costs of providing ecosystem services, who benefits from these services and what they are worth to society, and the impact of Beneficial Management Practices (BMPs) on specific ecosystem service outcomes.

AITF along with its partners at University of Alberta, University of Guelph, and the Alberta Biodiversity Monitoring Institute is developing the information and science required to develop ES programs and markets. Key objectives include:

- Understand the potential supply of ES from the livestock and meat sector including:
 - Water quality
 - Biodiversity/species
 - Carbon
 - Wetlands
- Understand the cost of supplying ES
- Understand how contract terms for BMPs and wetland restoration affect Business Risk Management and participation rates of producers
- Determine the beneficiaries and value of ES to the public
- Develop recommendations on how ES markets for agriculture could work

The project will be complete in December 2018.

Economics of BMP Adoption by Beef Producers in Southern Alberta

Society receives many benefits from ecosystem services from natural and managed ecosystems. Agricultural practices have a wide range of impacts on ecosystem services which include water quality, pollination, nutrient recycling, soil retention, carbon sequestration and biodiversity conservation. In order to implement effective policy, it is necessary to know something about public and private costs and benefits from agricultural land use decisions that affect ecosystem service production.

What Do BMPs Really Cost?

Currently, researchers at the University of Alberta’s Department of Resource Economics and Environmental Sociology are assessing the economics of BMP adoption for water quality improvement.

Using a representative mixed crop-beef farm in Southern Alberta, researchers are looking at questions such as:

- What are the direct costs and benefits to the beef producers of implementing relevant BMPs?
- What is the impact on business risk for the representative operation?
- What is the effect of participation in public business risk management programs?

BMPs of interest include rotational grazing, crop residue management, conservation and sustainable use of natural areas, plant species in tame pasture, and manure management. To-date, the base economic model has been developed and parameters developed for a representative farm model. The next step is to fully develop these parameters, and to validate the representative farm economic model. From this model, researchers will run BMP and risk management scenarios to estimate the change in producer wealth from BMP adoption.



Public Willingness to Pay for Ecosystem Services

What are the public benefits of water quality and wildlife habitat to citizens in the South Saskatchewan River Basin? Dr. Peter Boxall, Dr. Marian Weber, and Zhaochao (Liam) Lin are developing a survey which will be administered to residents in the spring of 2017 to assess their willingness to pay producers for BMPs that generate water quality improvements and wildlife habitat. We will be holding focus groups in the South Saskatchewan Region in February 2017 and implementing the survey in March 2017. We look forward to sharing the results in late fall 2017.

Linking Costs and Benefits of BMP Adoption to Water Quantity and Quality Effects of Livestock BMPs

In order to understand whether ecosystem service programs and markets are feasible, costs of BMP adoption and the public willingness to pay for ecosystem services need to be linked to actual changes in ecosystem services from adopting BMPs.

Researchers at the University of Guelph are developing a “user friendly livestock BMP Simulation on system which will be based on the fully distributed (site-specific) IMWEBS model and open source GIS.”

IMWEBS is fully distributed watershed modelling system, which will simulate the effects of livestock BMPs on water quality and quantity. The system uses free and open source GIS interface which will allow citizens to compare BMP scenarios as well as the cost effectiveness of different BMP program designs. Currently, a total of 21 livestock BMPs in 5 categories are being incorporated into the model, including:

- Manure and nutrient management
- Riparian and surface water management
- Wintering site management
- Pasture management
- Marginal crop land management

We have just completed compiling data for the model. Alberta Biodiversity Monitoring Institute will contribute biodiversity and carbon components to the model over the next year. Once the model is fully developed we will be able to better understand the synergies between different ecosystem services and BMPs, and how producers might engage in multiple markets and programs through stacking credits for different ecosystem services.

Biodiversity Management Survey

The Alberta Biodiversity Monitoring Institute has initiated a telephone survey of approximately 200 producers, to obtain information about management history at rangeland and pasture sites previously monitored by the ABMI between 2007 and 2015. The survey, completed in March 2016, will be used by researchers to better understand how management practices contribute to biodiversity.

Farm Site Visits

Researchers met in July 2016 in Lethbridge with scientists and government staff from Agriculture and Agri-food Canada, Alberta Environment and Parks, and Alberta Agriculture and Forestry. The team visited several BMP sites and which has given us a better understanding of how these practices contribute to ecosystem services such as water quality, carbon and biodiversity. On July 26, the project team hosted a BBQ luncheon and meet and greet at the Bloomin’ Inn Ranch

Country Inn in Pincher Creek, AB. The Luncheon provided an opportunity for producers in Indianfarm Creek who have been working with Alberta Agriculture and Forestry to implement BMPs on their lands to meet with the research team and to learn more about the work being done to translate those BMPs into ecosystem service credits that could be used in developing cost share, market or other programs for supporting ES.



Spring 2017 Workshops

We will be working with our partners at the Agri-Environmental Partnership of Alberta to develop a mini-conference in late spring 2017 where we will demonstrate our models and work with producers and government to understand how these tools can be used to design ecosystem service programs, and build opportunities for ecosystem service markets on agricultural lands.

What's in a Name?

On November 1, 2016 Alberta Innovates Technology Futures officially became InnoTech Alberta, a fully owned subsidiary of Alberta Innovates. Nothing has changed, but from now on you will be hearing from us with our new name!

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