

## Feature Research

### Can we improve pasture management using information from space?

The endless star-studded night sky; inspiration for quiet contemplation, home of countless satellites and massive information databanks. Satellite information has been in use for years with precision agriculture, but its use has by and large centered on annual crop production. Animal scientist Luciano González sees great potential in applying the precision approach to livestock production systems by developing new pasture management tools.

“Satellites collect data which is suitable to monitor multiple components of pasture environments across time and space, in a remote and automatic fashion. This data can provide information about management, animal behavior and rangeland response on a whole-system basis,” says González. “The goal is to transform this information into pasture management decision-making tools to help cattle producers”.

Satellite images can be used to determine the quantity of forage available, forage quality and pasture growth rate as well as to help visualize conditions that might be more difficult to assess by direct on-ground monitoring across a large area. This information can be used in pasture planning and designing rotational grazing systems to, for example, optimize grazing and resting period lengths and to target selection of suitable forage species or placement of temporary fencing, water and supplements. Additional opportunities may exist for use in climate change impact assessments and adaptation strategies or for monitoring and management of sensitive landscapes such as riparian areas or saline soils.

By using satellites, producers and researchers have the potential to improve cattle profitability and productivity, forage productivity and utilization efficiency, and environmental sustainability. This potential was the driving force behind a recent research project conducted by Drs. González, Ominski and Wittenberg which was funded by the Manitoba Sustainable Agricultural Practices Program. In this project, satellite images of research and extension grassland/pasture study sites were compared with on-ground quality and quantity measurements to assign quantitative information to the image colour scales. The long term goal is to develop models for grasslands management. Models can be used to help producers directly as decision-making tools for on farm use, or indirectly for developing and testing beneficial management practices through research.

The potential for using satellite data goes beyond images of pastureland. For instance, using GPS collars to monitor grazing behaviour and landscape use by cattle wearing the collars may aid grazing management. A current Manitoba Conservation Districts Association study on off-stream watering systems uses GPS collars to track cattle movement. The GPS collar is a tool for making management decisions based on where the cattle choose to obtain water and the associated impact on stream bank health. Luciano, along with researchers Kim Ominski and Gary Crow are involved in the project. “The questions we’re asking are whether cattle prefer water from off-stream troughs or the stream when given the choice and whether or not a simple barrier using deadfall is enough to keep them out of the stream,” says Ominski. “Knowing how the cattle respond to choices will help in selecting a watering system which improves animal productivity as well as environmental sustainability. The GPS collars tell us what the cattle are choosing.”

Satellite imaging may also prove a useful decision tool for cattle overwintering system management. Satellite images may show how forage stand productivity and distribution over time can be affected by different systems such as bale or swath grazing, along with management within those systems such as site selection, bale density and stocking density. A large collaborative team from the University of Manitoba, along with partners at AAFC, Agri-Environment Services Branch and MAFRI are coming together to shed some light on this and many other aspects of extensive cattle overwintering systems in Manitoba.



Luciano González displays a satellite image of the La Broquerie Project site.

Visit our [website](http://www.umanitoba.ca/afs/ncle/) <http://www.umanitoba.ca/afs/ncle/> to learn more about this and other **NCLE research projects**.

## Instant Update

### New member of the NCLE team

Welcome **Trevor Fraser**, the new NCLE Technician! Trevor is a NCLE "graduate" – his MSc research with Dr. Brian Amiro focused on carbon loss from perennial land that had been converted to annual cropping. Trevor's new job will be to manage the NCLE long term field laboratory and the long term data and sample archive. Trevor replaces **Clay Sawka** who joined MAFRI as a Nutrient Management Specialist.



### Update - Achieving Manure Phosphorus Balance in Manitoba workshop priorities

- Priorities activities update May 2010. Visit the P workshop website (<http://pworkshop2009.com>) for the latest information. P website managed and maintained courtesy of NCLE.
- Reference material: **NCLE Research in Support of Achieving Manure Phosphorus Balance in Manitoba** – visit the NCLE [website](#) or download the [pdf](#) for the latest in feed, field and manure management plus economics research geared towards reducing and removing excess P and improving P use efficiency for the whole farm.

## Research Update

### New Project:

NCLE is pleased to be a partner with the Puratone Corporation on a new study examining the whole farm impact of including zero-tannin faba bean and dried distillers grain with solubles in swine diets. The study includes whole farm economic considerations such as balancing between savings on feed costs with potential extra costs from increased manure volume or reduced manure value as a result of different feed ingredients. The project team, led by Carole Furedi, includes U of M swine nutritionists Martin Nyachoti and Elijah Kiarie. To learn more, contact Carole Furedi ([cfuredi@puratone.com](mailto:cfuredi@puratone.com)) or Martin Nyachoti ([Martin\\_Nyachoti@umanitoba.ca](mailto:Martin_Nyachoti@umanitoba.ca)). This is an MRAC-funded project.

### New Reports:

**Agricultural Biofilters – Reflections on a Decade of Research** Contact: Danny Mann ([Danny\\_Mann@umanitoba.ca](mailto:Danny_Mann@umanitoba.ca)) [Download](#)

**Development of the Manure Gas Research Facility for modelling greenhouse gas emissions from stored manure: Phase I - evaluation of dietary manipulation effects.** Contact: Mario Tenuta ([mario\\_tenuta@umanitoba.ca](mailto:mario_tenuta@umanitoba.ca)). MSAPP funded. [Download](#).

**Soil organic carbon in long-term crop rotation and management studies in south central Manitoba and the Red River Valley.** Contact: Mario Tenuta ([mario\\_tenuta@umanitoba.ca](mailto:mario_tenuta@umanitoba.ca)). [Download](#). MSAPP funded.

**Development of models to quantify and monitor the distribution of vegetation biomass in Manitoba grasslands/pastures using satellite imagery.** Contact: Luciano González ([luciano\\_gonzalez@umanitoba.ca](mailto:luciano_gonzalez@umanitoba.ca)). MSAPP funded. [Download](#)

## Extension & Outreach Update

### Workshop:

**July 23 - Field Workshop on Soil and Manure Management** at the Glenlea Research Station & Richardson Kelburn Farm. With MAFRI as the lead, MAFRI, Agriculture and Agri-Food Canada, Richardson International and NCLE have joined forces to deliver an interactive learning session on a variety of soil and manure management topics in a field setting. **Featuring 6.0 CCA CEUs in Soil and Water Management.** Want to know more? Contact Mitchell Timmerman, Nutrient Management Specialist with MAFRI ([Mitchell.Timmerman@gov.mb.ca](mailto:Mitchell.Timmerman@gov.mb.ca)).

### Tours:

June 23 - **Christine Rawluk** and **Laurie Connor** will host the **Western Canadian Feed Innovation Network** Executive Committee on a tour of the National Centre for Livestock and the Environment and Glenlea Research Station. The group is looking to learn more about our research, as well as our approach to building connections and partnerships.

Earlier in June NCLE researchers also hosted the **Regional Working Group on Environmentally Sustainable Agriculture** representing Ontario, Manitoba, Saskatchewan and Alberta, as well as over 140 delegates of the American-based **Farm Foundation** on two separate tours.