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Arguably, true sustainability in production of food, feed, fibre or fuel is vital for the long term well-being and health of our people and planet. Yet, while the importance of this principle is easily recognized, the means by which we achieve long term sustainability in agriculture is not.

Understanding, developing and implementing long-term environmentally sustainable agricultural practices requires a whole-system integrated approach which takes into account the opportunities for synergies between individual parts of the entire production system. The National Centre for Livestock and the Environment (NCLE), based at the University of Manitoba, embodies this whole-system approach to research, extension and education, with specific focus on the long-term environmental and economic sustainability of livestock production systems. This holistic approach strengthens linkages between livestock and crop production to develop solutions and to capture opportunities which ultimately improve the efficiency of the entire production system.

It takes a team effort

Embracing a “potluck” mentality, partners from a variety of backgrounds come together, each bringing their own contribution or “dish” to the collaborative effort. The end result is a pooling of complementary skills, expertise and resources conducive to producing more comprehensive outcomes, while at the same time limiting redundancy and overlap that can result when operating in “silos”. A multi-disciplinary, whole-system approach to research also facilitates integration between soil-plant-animal interfaces, providing more complete assessments than investigations within individual disciplines. Consider greenhouse gas emissions from cattle and soil—soil and animal scientists operating independently can quantify nitrous oxide emissions from soil and enteric methane emissions from cattle, but working together yields net emissions for the whole cattle production system. There are additional benefits as well—trained students for employment in the agriculture and agri-food industry, peer-reviewed research used for public benefit and policy development, and the most effective utilization of human and financial resources.

Building on a strong base

Strong partnerships and ongoing dialogue between the research community, industry and multiple levels of government are key to successful whole-systems research. Partners from Continued on page 16
industry and government are engaged at the early stages, usually beginning with NCLE asking, “How can we help you?” Continued dialogue from project design to completion ensures the relevance of our research to industry and provides a conduit for transferring useful information quickly into the hands of end-users. By operating along this horizontal partnership platform, the multi-disciplinary, multi-organization teams maintain strong linkages between the various stakeholders along all phases, from R&D through technology transfer and training.

Early partnership building efforts at NCLE focused on engaging University of Manitoba researchers from a variety of disciplines, strengthening relationships with various producer and government organizations within Manitoba and bringing them together to address common interests. As our network continues to expand, partnerships are extending beyond both provincial and national borders; joining national networks such as the Linking Environment and Agriculture Research Network led by Peter Boxall at the University of Alberta is but one example.

PARTNERSHIPS AT WORK

As an example of partnerships at work, the NCLE joined forces in 2009 with a variety of industry and government partners to develop and deliver a stakeholder workshop to tackle the phosphorus balance issue in Manitoba. Regulations in Manitoba will shift all livestock producers from managing manure on a nitrogen basis to a phosphorus basis, effective 2013. This change will challenge producers to use a variety of management tools to comply with the new regulations and still continue operating at a profit.

To address this challenge, the workshop identified critical research and extension gaps in the areas of feed, field, manure and whole-system management that needed to be addressed (http://pworkshop2009.com). At the workshop, NCLE was identified as a lead research partner and is actively implementing research projects in all identified areas (http://umanitoba.ca/afs/ncle/MPBalance.html). For example, researchers Jim House, Juan Caroles Rodriguez-Lecompte, Martin Nyachoti, Kim Ominski and Kees Plaizier are leading teams to identify dietary modifications and feeding systems that minimize phosphorus excretion, while at the same time maintain animal health and reduce costs. At the opposite end of the in-yard management system, Nazim Cicek and Francis Zvomuya are investigating manure treatment options that remove and concentrate phosphorus from liquid manure into a separate stream. In the field, long-term studies led by Don Flaten, Kim Ominski and Mario Tenuta are showing responses to various in-field manure, crop rotation and grassland management strategies.

This strategy of bringing together stakeholders and having all parties engaged from the beginning has been successful in the past as well. The La Broquerie Long-Term Pasture and Manure Management Study, now in its seventh year, has brought together 13 researchers to date, spanning expertise in economics and food, plant, soil and animal sciences (http://umanitoba.ca/afs/labroquerie). This study has also engaged pork, beef and dairy producers and capitalized on the extension role served by provincial and federal partners such as Manitoba Agriculture, Food and Rural Initiatives (MAFRI) and Agriculture and Agri-Food Canada’s Agri-Environment Services Branch (AESB). To date, this partnership has generated over 40 extension and outreach events, five peer-reviewed publications (with more on the way) and has produced six trained graduate students. Armed with diverse skill sets, these young men and women were readily employed by both industry and government. With planning for the latest phase well underway, these statistics are sure to grow.

Taking a similar approach, Kim Ominski, Don Flaten and Luciano González are working with cattle producers, livestock and nutrient management specialists from provincial and federal departments, and other researchers across western Canada to identify environmentally sustainable cattle overwintering strategies. The research team is leading a multi-disciplinary comparative evaluation of extensive and confined overwintering systems for beef cattle, drawing on the hands-on expertise of their colleagues from AESB, MAFRI and producer partners.

WHAT DOES THE FUTURE HOLD?

A new initiative of Manitoba Pork and NCLE will expand research, development and demonstration capacity. In September, the Governments of Canada and Manitoba announced funding through the Canada-Manitoba Western Economic Partnership Agreement for an Agricultural By-products Processing Research and Demonstration Facility to complement the existing equipment and facilities used by NCLE and its partners. The new facility will enable research and development supporting on-farm processing and utilization of liquid and solid agricultural by-products, adding value to materials that are otherwise viewed as “waste”. The facility will support multiple users and a full range of activities from basic and applied research to technology transfer and training.

The nearly completed Bruce D. Campbell Farm and Food Discovery Centre, located at the same site as the National Centre for Livestock and the Environment, is anticipated to attract upwards of 30,000 visitors a year. The Discovery Centre will provide a hands-on interactive experience addressing all aspects of food production from farming practices to healthy choices-healthy living. Early on dubbed the “sister centre” to NCLE, the two centres will collaborate in programming and activities to mutual benefit.

The National Centre for Livestock and the Environment is gaining momentum and is well situated to become a hub where a variety of interested parties converge and connect, facilitating the development and flow of information and technology. Fostering a close working relationship between industry, government and researchers in this centralized fashion will streamline the connections between research and development, technology evaluation and information transfer and education & training, to capitalize on new opportunities. The common goal is long-term economic growth of the agriculture sector, environmentally sustainable agriculture production and healthy, stable communities.

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