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Introduction and Methodology

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Alberta Agriculture, Food & Rural
Development



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Science to
Social Issues

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Introduction

Effective use of manure nutrients is an essential component in the long-term success of Alberta's livestock industry. Optimum use of on-farm nutrients also helps to protect the health of our water, soil, air and ecosystems. As the livestock industry grows, there is a need to continue to make progress in improving manure management practices.

A remarkable amount of research has been done in recent years on topics related to manure management including feeding management, land application and handling of manure, nutrient and pathogen losses, odour and air quality, and social issues. This research is contributing to the creation of beneficial management practices (BMPs) for manure management. BMPs are options that are practical, environmentally sound, economically viable, and comply with existing regulations.

Nevertheless, some information gaps still need to be addressed to ensure that agricultural producers have the information they need for sustainable manure management. Therefore, the Alberta Livestock Industry Development Fund (ALIDF) funded this project to identify what manure-related research has already been done, what information gaps remain and which gaps most need to be addressed.

1.1 Project Objectives

The objectives of this project were to:

- prepare a literature review on manure-related research, including feed management, land application of manure, nutrient and pathogen losses, odour and gas emissions, and social issues;
- synthesize and peer review the evolving technologies and BMPs, and provide risk/benefit for current and future BMPs whenever the information is available; and
- determine and prioritize research gaps related to manure management based on the challenges facing the livestock industry.

This report includes the literature review, the results of the gap analysis, and recommendations for next steps for this project and other similar projects.

1.2 Organization of the Report

Chapters 2 to 9 of this report summarize the research to date, describe existing and promising beneficial management practices, and identify research and extension gaps for each of the following topics:

- nutrient management programs and policies
- feeding strategies to reduce nitrogen and phosphorus excretion in manure and greenhouse gas emissions from livestock and manure
- land application and handling of manure
- zoonotic pathogens in manure
- odour and air quality issues related to livestock production
- ammonia and hydrogen sulfide emissions from livestock production
- methane and nitrous oxide emissions from livestock production
- social issues related to livestock production

Chapter 10 summarizes the results of each step in the process to prioritize the gaps. The final result of the process is a set of eight top priority gaps for future research. The chapter also includes recommendations on the next steps for this project and other similar projects.

Methodology

This project was proposed by a team of researchers and professionals including: Dr. Mohamed Amrani, Alberta Agriculture, Food and Rural Development (AAFRD); Dr. Jeff Schoenau, University of Saskatchewan; Dr. John Feddes, University of Alberta; and Dr. Merle Olson, University of Calgary. After the project was granted funding by ALIDF, the following scientists and professionals joined the initial team members to allow the team to better address all the issues related to manure management: Dr. Erasmus Okine, University of Alberta; Dr. Atta Atia, AAFRD; Karen Haugen-Kozyra, AAFRD; Faye Banham, consultant; and Serecon Consulting.

To address the project's objectives, the team summarized the manure-related research conducted to date, identified research gaps, conducted a peer review of the draft report, and prioritized the gaps.

Each of the team members was responsible for a specific topic as follows:

Dr. Mohamed Amrani – nutrient management policies and programs
Dr. Erasmus Okine – feed management
Dr. Jeff Schoenau – land application
Dr. Merle Olson – pathogens
Dr. John Feddes – odour emissions
Dr. Atta Atia – ammonia and hydrogen sulfide emissions
Karen Haugen-Kozyra and Faye Banham – greenhouse gas emissions
Serecon Consulting – social issues

2.1 Literature Review

The team members conducted literature searches of scientific journals, peer reviewed papers, books and reports, farm news media, web documents and databases, and also obtained personal communications from other experts.

2.2 Peer Review

The peer review process involved professionals from a variety of agencies (see Reviewers). They provided comments to the authors to improve the final draft of this report. Some reviewers only reviewed selected chapters.

As part of the peer review process, a workshop was held in March 18-19, 2003 in Banff. Workshop participants were selected based on their expertise in the report's subject areas. The participants were:

Dr. Mohamed Amrani, Alberta Agriculture, Food and Rural Development
Dr. Atta Atia, Alberta Agriculture, Food and Rural Development
Darcy Fitzgerald, Alberta Livestock Industry Development Fund
Laura Horrigan, The Performance Group (Facilitator)

Jerry Lemunyon, USDA-Natural Resources Conservation Service, Texas

Bill MacMillan, Ontario Ministry of Agriculture and Food

Julie Popowicz, Alberta Agriculture, Food and Rural Development

Dr. Jeff Schoenau, University of Saskatchewan

Barb Shackel-Hardman, Alberta Agriculture, Food and Rural Development

Dr. Joyce Van Donkersgoed, agriculture industry

Barb Vanden Bosch, Alberta Agriculture, Food and Rural Development

Prior to the workshop, each participant was given a draft of the literature review and asked to provide input based on the following questions and considerations:

- Is there any important information that you think should be added to the draft report? Please provide the material and/or sources.
- Is there any information that you believe should not be included in the document?
- Based on your expertise and the information included in this document, what are the gaps for research, extension and regulations? Please give reasons and prioritize.
- Based on your expertise and the information included in this document, what are the short-, medium- and long-term challenges facing the industry? Please prioritize.
- Based on your expertise and the information included in this document, what are the recommendations to assist the livestock industry to grow in a sustainable manner?
- How we can add value to this document?
- Please prepare a 2- to 4-page overall analysis of the draft, including a discussion of how the issue was addressed and some solutions. Please deal with each section of the draft based on your expertise.

At the workshop, the participants discussed the draft and shared ideas for ways to improve it. Their input was incorporated into the next draft of the report.

2.3 Gap Identification and Prioritization

While preparing the first draft of the literature review, the authors developed preliminary lists of research gaps for their sections, based on their assessment of the existing research. At the Banff workshop, the participants discussed these preliminary lists and supplemented them.

To begin prioritizing the gaps, each author was asked to select the four most important research gaps for his or her section from the preliminary list and the gaps identified at the Banff workshop. This resulted in a set of 24 gaps. (The gaps for nutrient management policies, programs and social issues were not included in the prioritization process.)

Next, at a workshop in Edmonton on August 29, 2003, the authors began by merging some overlapping gaps in the list of 24 gaps to create a set of 15 gaps. From these 15, they were asked to identify the top priority gaps, using the following criteria:

- a. Is it a challenging issue for the industry?
rating scale of 1 to 9; 9 = if not solved, industry growth will be questionable
- b. What is the cost/benefit of the project?
rating scale of 1 to 9; 9 = all costs of producing, delivering and adopting the technology are very low compared to the anticipated benefits to producers and consumers
- c. How will the project contribute to the competitiveness of the industry?
rating scale of 1 to 9; 9 = will contribute significantly
- d. How will the project contribute to the environmental sustainability of the industry?
rating scale of 1 to 9; 9 = will contribute significantly
- e. Can we write a research proposal around the idea?
rating scale of 1 to 9; 9 = clear and very specific idea

The team included experts with a wide range of knowledge in manure management, so it was felt that they were an appropriate group to conduct this prioritization. However, individual team members did not have expertise in every single topic covered in the literature review. Therefore, when an individual team member was unfamiliar with a particular gap, he or she did not assign a rating to the gap.

The result of this rating process was to identify the top eight "critical few" gaps related to manure management. The lists of gaps generated by each step in the prioritization process are provided in Chapter 10.

2.4 Recommendations for Next Steps

Recommendations for the next steps for this project and other similar projects were developed based on the results of the Banff workshop and on an overall evaluation of the project.

The Banff workshop participants developed several recommendations based on their discussions of the research gaps and the challenges facing the industry with respect to manure management. The project evaluation was conducted through discussion at the Edmonton meeting and through individual interviews with team members and Darcy Fitzgerald, General Manager, ALIDE. The evaluation included feedback on the project management process that was analyzed against a "best practice" model.

The resulting recommendations include a process for identifying and addressing research gaps, steps for updating and upgrading this report, options for disseminating the information from the report, and a more effective project management process for similar open-ended, complex projects that involve authors from many agencies and disciplines.

