

CHAPTER 9

INFORMATION SYSTEMS AND RESEARCH

The view that the Panel's recommendations should be based on science and sound information was heard frequently at the hearings. The term "scientific research" was often used in discussions about the management of ILOs and their impacts on the environment. The phrase seems to reflect a consciousness that intensification carries with it new risks which are likely to be incurred to both the sustainability of resources and the well-being of Manitobans. The phrase also seems to carry a certain unease - that we are now dealing with "unseens" and "unknowns" which, while always present in agriculture, had now better be measured and contained. In the minds of many citizens, all cannot necessarily be deemed well, even if the animal gains weight!

The Panel identifies some research priorities below, which follow from its deliberations. What follows is not strictly research in an academic sense of the term. It includes the collection and assembly of information and data upon which research can be based or action taken, some development suggestions, demonstration possibilities, and scientific investigation under strict protocol. The interested reader is referred to the Panel's separate technical report that includes Ross Bulley's detailed summary of the research round tables and more specific research suggestions. We appreciate the generous help we received from the organizations that undertake major research efforts, as well as the helpful views expressed at the research round tables

Information Systems and Database

One of the Panel's first surprises was learning that a centralized database detailing the location, scale, and history of livestock operations in rural Manitoba does not exist. The information contained in manure management plans has not been used to its potential for providing useful trends.

Throughout the public hearings, presenters with widely differing views called for the establishment of such a database, perhaps in a GIS (Geographic Information System) format. This database might contain detailed information on each production unit, and include monitoring and compliance data on production units specifically, and its effects on the surrounding area. In addition, it should contain all available data on the province's geography and resources, such as groundwater and soils. Several presenters asked that such a database be openly available. We were also told that the results from monitoring or compliance inspections are typically not being sent to either the concerned parties or to municipalities.

An information system is necessary to provide Manitobans with a means for more accurately tracking the environmental effects of present and future livestock operations (as well as other industrial operations that might impact on water quality), and should build public confidence in the ability of livestock operations to function in a sustainable manner. It should also include, or be run in tight conjunction with, the openly accessible database to track the safety of the province's drinking water as recommended by the Drinking Water Advisory Committee.

Much of the data necessary for the construction of such a system is currently being collected and held by a number of agencies. For example, the federal and provincial governments hold environmental monitoring information, as do Manitoba's universities. The Canadian Science Centre for Human and Animal Health in Winnipeg, in cooperation with Manitoba Pork, has gathered some information on the location of pork production sites, primarily to monitor the potential spread of animal diseases. PFRA is working with a number of municipalities to assemble local databases to plan for the best possible location of future livestock operations. The Riding Mountain Biosphere Reserve is currently mapping livestock operations in the

municipalities surrounding Riding Mountain National Park for the purposes of livestock disease tracking. GIS data, including recent aerial photography and satellite imagery, and soil, surface water and groundwater maps, are also held by the Surveys and Mapping Branch of Manitoba Conservation.

The challenge is to rise above “turf and ownership” issues and for organizations to cooperate in putting together an effective information system.

Recommendation:

- **The Government of Manitoba should accumulate all relevant data concerning livestock operations in a central openly available information system in a GIS format to provide Manitobans with a realistic assessment of the sustainability of current operations and their effect on both the local and provincial environments.**

Environmental Stewardship Research

Based on what we have learned from our observations during the course of this review, the Panel offers a tenuous perspective on research and its application to ILOs. There is risk that we may be perceived as “instant experts”!

Market forces drive the improvement of breeds, the improvement of feed and weight gain, the number of piglets per sow, the health of animals and the minimization of losses, and similar effects in a fairly direct manner. It can be expected that a tight, interactive link will be maintained between operators and researchers, backed up by industry organization without much intervention by a third party such as government. There are exceptions – such as the use of antibiotics and the persistence of pathogens, for example - which seem to call for control on public health grounds. In general, however when one is focused on the animal and the bottom line, the industry needs little prodding to support and adopt new techniques, as will certainly be the case as the consumer exerts

pressure to change the method of housing of hogs.

This is not necessarily the case, however, in the environmental stewardship component of sustainable livestock development. Despite the research done by PAMI and others, and what appears to be a keen sense of the need for precise nutrient control, the task of spreading manure is often done in an inaccurate manner, employing outdated methodology. In our view the skills and knowledge associated with soil testing, metered delivery, knowledge of nutrient residuals, crop needs, timeliness of application, and mechanical ability warrant consideration for specialized training and formal trade certification.

Government, which has prime responsibility to assure safe environmental performance, has the propensity to rush to economic benefits, and then struggles to catch up and mitigate impacts. We are scaling up the potential insults to Manitoba’s environment. We should no longer rely upon its vastness and abundance to protect us. Government needs to speed up its investigative capability, and become intimately acquainted with all the research in the ILO arena, financially encourage research on topics where greater knowledge is needed, and tune up its environmental control.

Recommendation:

- **Government should maintain a pro-active role and sustained leadership in mounting research related to environmental stewardship. It should be prepared to read signals (such as the consequences of climate change) and “blue-sky” and “what if”. It should have strong regard for the precautionary principle.**

How Much Manure?

The Intent of manure management is to apply manure to the field at a rate that will result in the nutrient being taken up by the subsequent growing crop. At the same time, in an ideal situation, the residual run-off would be non-existent or, at worst, minimal. However, to be effective, knowledge is required about the

nutrient content of the manure to be spread, the nutrient level in the receiving soil, and the needs of the crop. Undoubtedly, there is a lot of averaging and estimating, and relatively few soil tests, because current testing methods are time consuming and inconvenient in the regime of the production unit. As well, notwithstanding agitation of the manure in storage, the consistency and nutrient content of the product being delivered is variable.

Clearly, there is a pressing need for accelerated development of portable nutrient measurement tools. One can visualize the farmer with a device to be plunged into the soil, providing instant read-out, rather than a vehicle full of drilling equipment, core storage and instrumentation to test the cores. This would be a further step forward. Near infrared spectroscopy can provide a continuous measure of nutrient content in hog slurry. There are prospects for its use in precision farming when coupled with Global Positioning System (GPS) technology.

Recommendation:

- **Research should be encouraged into the development of portable manure nutrient measurement equipment.**

How Safe Are Earthen Manure Storages?

The Panel shares the view of several presenters that we should not assume that earthen storages are safe and will perform well for many years. This is not to say that carefully constructed pits should be replaced by other structures. Rather they concentrate our attention on the “newness” of the infrastructure that accompanies ILOs. Regular inspections and monitoring are essential.

Recommendation:

- **Research into the application of electromagnetic spectrometry (EMS) to detect leakages in manure storages, already being tested in the field by PFRA, should be extended to support a strong monitoring and inspection effort.**

Further, an EMS profile of each new manure storage facility should be obtained as a baseline before its initial filling.

Can Odor be Measured?

Setback distances, particularly between a hog operation and its neighbors as suggested in the *Farm Practices Guidelines*, are designed to meet the practicalities of the Manitoba landscape rather than the results of a careful study of odor as a nuisance to neighbors. Indeed, an odor meter that is wholly objective (i.e. avoids human opinion on how much stink is generated) is not likely to be developed because of the chemical complexity of odor. Improvements to siting criteria that aid municipalities are likely to come from studies such as that of DGH Engineering and the University of Laval which involves interviews of large numbers of people living around many barns as to their experience with odors. Our recommendation ties back to the collection of information — in this case, the documentation of experiential data applicable to the Manitoba environment.

Recommendations:

- **A systematic study should be made of the experience of Manitobans living near ILOs with a view to improving the criteria upon which municipalities base siting decisions.**
- **The Farm Practices Guidelines should strongly stress the uncertainties in general recommendations on setbacks and the need for very careful on-site assessments.**

Do We Have a Handle on Run-off?

We believe that not enough is known about the real effect of the application of manure to soils or the quality of water that leaves the field during spring run-off or floods and arrives at the receiving waters. In parallel with the suggestion that a state-of-the-art hog production facility be developed for providing information and familiarity with research findings, and new techniques, the Panel also feels that the quality of runoff

water from fields with and without manure application should be studied.

Recommendation:

- **A long-term study should be initiated on the behavior and quality of water (including nutrients and pathogens) running off fields in a natural state and those fertilized with livestock manure and/or inorganic fertilizers, and that this research be tailored to demonstrating the results to the public.**

Health of Animals

In Chapter 6, research is recommended on pathogens and pathogen control, and continued examination of the ways in which the in-barn environment impacts workers. In Chapter 7, we point to the need to accelerate research into animal welfare, making the point that customers are watching the methods of production.

Recommendations:

- **Research should be conducted on the impact of air quality on animal health and production to indicate the financial benefits of maintaining clean air and less odor through nutritional management and different feeding strategies.**
- **Research should be conducted into animal housing in ILOs, with a view to more closely matching the inclinations of the animal to enhance the acceptability of animal confinement in the public mind.**

You Can Take a Horse to Water, AND You Can Make Him Drink!

The Panel visited several livestock operations at the generous invitation of their managers. These visits provided valuable insights for the preparation of this report. The Panel is genuinely impressed with the many operators who keep abreast of new developments in research and its practical application. We have become advocates of demonstration projects that are managed by researchers, and with opportunities arranged for participants in industry to meet face-to-face with those operators who have tested research findings in their day-to-day programs. It is important that hard-nosed scientific opinion is always available to critique field applications.

Recommendations:

- **The livestock industry and provincial government should re-examine and increase their communication and extension efforts with a view to heightening the awareness of improved technologies and management approaches derived from research and development.**
- **Government, having eased the means by which data is accessed, should organize its tasks in such a way that competent specialists are on call to consult with both ILO and smaller operators, or point them in useful directions. Such a service should be particularly useful to new entrants to the livestock industry.**