

Expanding Intensive Livestock Operations in Saskatchewan: Environmental and Legal Constraints



Center for Studies in
Agriculture, Law
and the Environment



Final Report to
the Saskatchewan Agricultural Development Fund
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Prepared by
The Centre for Studies in Agriculture, Law and the Environment (CSALE)
University of Saskatchewan, Saskatoon, Saskatchewan

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Part I - Executive Summary

The production of hogs is changing rapidly in Saskatchewan. There is a move from small hog operations (20-30 sows) to large operations (600+ sows). The larger units are more efficient and, therefore, profitable, but do have some potential negative effects in terms of pollution. This trend toward larger hog operations is occurring in all provinces with the same potential problems.

Canada is an exporter of pork and hogs. With a total domestic production of 17 million hogs, exports are 340,000 tonnes. It is anticipated that Canada will increase its production and exports because: i) world demand for pork and population are increasing and ii) Canadian feed grains costs are relatively low.

This report discusses the system of approval for expansion and development of intensive livestock operations (ILOs) in each of Alberta, Manitoba, and Saskatchewan; the Saskatchewan process of approval is provided in much greater detail than the others. Each of the provinces has legislation in place that spells out how ILOs get approval and which government departments are responsible for enforcing the legislation.

In Saskatchewan, the central piece of legislation is the Agricultural Operations Act (1995). This legislation is structured to provide "upstream" and "downstream" controls of ILOs. By "upstream" controls, it is meant that the Agricultural Operations Act sets in place a permitting process with which ILOs must comply to get into business. By "downstream" controls, it is meant that the Agricultural Operations Act provides protection to intensive livestock operators (and all farmers) from a nuisance or pollution law suit if normally accepted agricultural practices are followed.

Saskatchewan Department of Agriculture and Food (SDAF) have the main responsibility for monitoring and enforcing environmental standards on farmers. In some specific cases, the Saskatchewan Department of the Environment and Resource Management (SERM) may request an in-depth environmental assessment of a project.

One of the components of this project was a survey that was sent out to rural municipalities RMs and to large hog producers in Saskatchewan. Most (RMs) are aware of the Agricultural Operations Act. According to the Saskatchewan Association of Rural Municipalities (SARM), of the 298 RMs in Saskatchewan, 171 do not have any planning or zoning bylaws that would affect ILOs. For these RMs, the only requirements for project approval are the provincial guidelines. Less than 50% of the survey respondents stated that they have some sort of bylaw that would, at least, affect an ILO. Most of these bylaws are either zoning bylaws or bylaws that control development, generally; such as, set backs from road allowances. When asked about bylaws that would affect ILOs, specifically, only 26.5% of respondents stated that they have additional planning statements to use when considering approval for ILOs.

Saskatchewan land has many different characteristics which depend on geographical location, within the province and, in fact, land quality can change within one quarter section. These differences affect the ability of the soil to absorb manure, which is a major byproduct of intensive hog production. This report provides a summary of the important land characteristics.

A conclusion can be made that, due to the increase in world food demand and the necessity to add value to products leaving the prairies, there is a place for ILOs in Saskatchewan. And, there are

many locations in the province that would be appropriate sites for them. This project has researched the environmental, legal and social conditions involved in the location of favourable sites for ILOs. The land base required for manure application and the soil types which would have higher potential for receiving applications have been investigated closely with the help of the Saskatchewan Land Resource Unit, Department of Soil Science, College of Agriculture, University of Saskatchewan. The RM and producer surveys have given an idea of where preferred social conditions exist which would foster the development of large hog operations.

Social factors (survey results) were combined with information on environmental factors provided by Saskatchewan Land Resource Unit to form an integrated and innovative look at ILO development and its potential in Saskatchewan.

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Introduction - Locating Intensive Hog Operations*

The hog industry in Saskatchewan has changed dramatically in the last few years. Gone are the days when prairie farmers kept a few cattle, a few hogs, and cropped a section of land. Today, there is a trend toward larger and more concentrated livestock farms, in particular, hog farms. Typically, new hog operations in Saskatchewan are 600 to 1200 sow operations with some barns significantly larger. A 600 sow hog barn will produce approximately 11,000 to 12,000 market hogs per year. This is a far cry from family operations of a decade or two ago where a family might raise 10 sows and produce 200 market hogs a year.

There are two main reasons for this trend toward larger hog barns. First, farmers now realize that value-added activities are both practical and beneficial to themselves and the province's economy and social fabric. Since the phasing out of the Crow benefit, prairie grain is significantly more costly to transport. However if farmers increase the value of the commodity being transported, the freight costs become relatively less significant. Thus, value-added activities are intensifying across the prairies and present an economically attractive alternative to straight grain production. Throughout the prairie provinces, hog production has doubled in the last decade despite the fact that the numbers of hogs produced in Saskatchewan is half of that produced in each of Manitoba and Alberta, and Saskatchewan hog producers enjoy the lowest feed costs in Canada (Ernst & Young Management Consultants of Saskatoon, 1994).

A second reason for the trend toward larger hog barns is that large hog barns tend to be more efficient than smaller enterprises. These operations can realize economies of scale and increase productivity because of better management practices, better genetics, and better disease control.

But large operations are seen by many as a mixed blessing. Clearly, they provide for increased production, employment and investment opportunities in the communities where they are located. Financing intensive hog operations often involves local individuals, who may or may not otherwise be involved in agriculture, with the opportunity to participate in a new community venture. However, instead of overwhelming support for the venture, there is often substantial opposition to the proposed hog venture. Area residents have fears about noise and odour from these large operations, their long-term impact on the local environment, and the effect of these large operations on air and water and on local roads and the threat these operations pose to the viability of the family farm.

These interests and concerns need to be weighed against the promised economic returns of an ILO. Almost every province and state in North America has been faced with this issue. Several jurisdictions have attempted to introduce a policy and legislative framework to work a balance between economic interest of developers and the concerns of local residents most likely to be affected directly by the new ILOs. The present study examines this issue as it has been raised and resolved in the Prairie provinces of Canada, although the in-depth focus is on the regulation of ILOs in Saskatchewan. The study is divided into three main parts: the executive summary, the report itself and the supporting appendices, maps and references for the report.

The study documents five dimensions of hog production in Saskatchewan in order to present conclusions on the viability and regulation of future growth of intensive hog operations. Chapter 1 presents an overview of the Saskatchewan pork industry and its export potential. Chapter 2

examines the general policy and legislative framework used by each of the prairie provinces to regulate intensive livestock operations. Chapter 3 delves into the intricacies of the regulatory regime facing Saskatchewan intensive livestock operators. Chapter 4 reports on the attitudes of Saskatchewan rural municipalities and of Saskatchewan intensive livestock producers toward the further expansion of ILOs in the province. Finally, Chapter 5 looks at the capacity of Saskatchewan soils to carry increased waste application from intensive livestock operations.

The study concludes with a picture of how the environmental factors and the social factors exposed in earlier chapters of the report can point to locations in Saskatchewan which would maximize environmental soundness and general social acceptability. Given that ILOs face significant regulatory control, it makes good sense to locate in rural municipalities which have a more favourable view of intensive livestock production and are more likely to approve an operation in their jurisdiction. As well, ILOs can avoid nuisance suits by being proactive and locating in areas which are best suited, environmentally, for ILO manure management; that is, where favorable soil and water conditions exist. Potential intensive livestock operators and investors will find this information useful in their planning process.

*Throughout this report, we use the acronym ILO for 'intensive livestock operation' and, while the report focuses on intensive hog production, much of the report, especially its legal aspects, apply to all ILOs. Thus, we will often use ILO as shorthand for all operations, whether they relate to hogs or to other animals.

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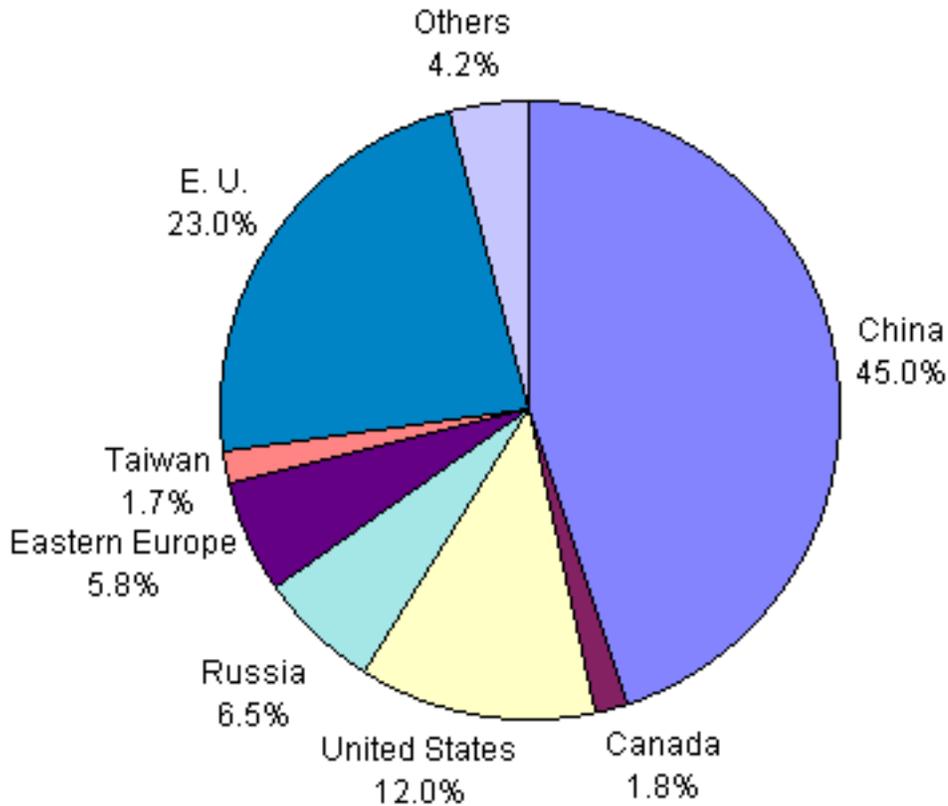
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CHAPTER 1 - Overview Of The Hog Industry

I. The Global Market

Canada is an exporter of pork. This makes the global pork industry of great interest to Canadian producers. Worldwide in 1994, the pork industry produces annually about 68.3 million tonnes of meat. Of this production, about 2.3 million tonnes are traded internationally. World production has been projected to grow to between 80 and 90 million tonnes by the end of the decade. Annual trade is forecast to increase to about three million tonnes.

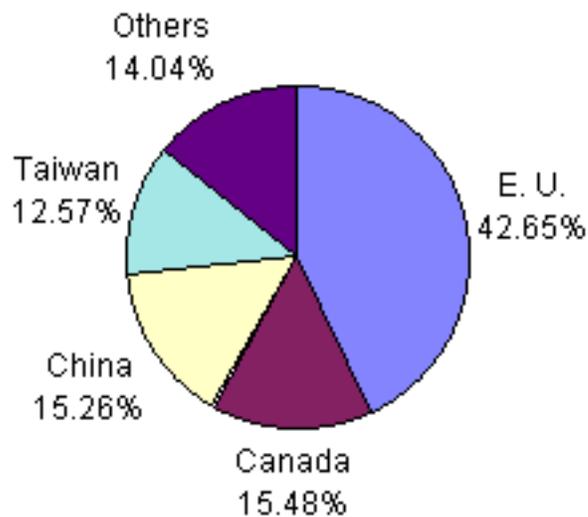
Global Pork Production



Source: SPI Marketing Group 1996 Annual Meeting Conference Proceedings Reports.

Globally, the three largest pork producers are China, the European Union, and the United States. Within the European Union, Denmark and The Netherlands are the largest producers and exporters of pork. Both The Netherlands and Denmark have very high hog densities within their borders. Denmark produces 20 million animals per year with a land base of 43,069 square kilometers. The Netherlands produce between 21 and 22 million animals per year with a land base of 41,160 square kilometers. In Canada, 17,092,700 hogs are produced with a land base of 9,922,330 square kilometers. Saskatchewan produces 1.1 million hogs on a land base of 651,900 square kilometers (Saskatchewan Pork International Marketing Group, 1996). While it is true that much of the land area in Canada is not suitable for hog production, Canadian hog densities in primary production areas are still much lower than those in Europe.

Exports by major Pork Producing Countries

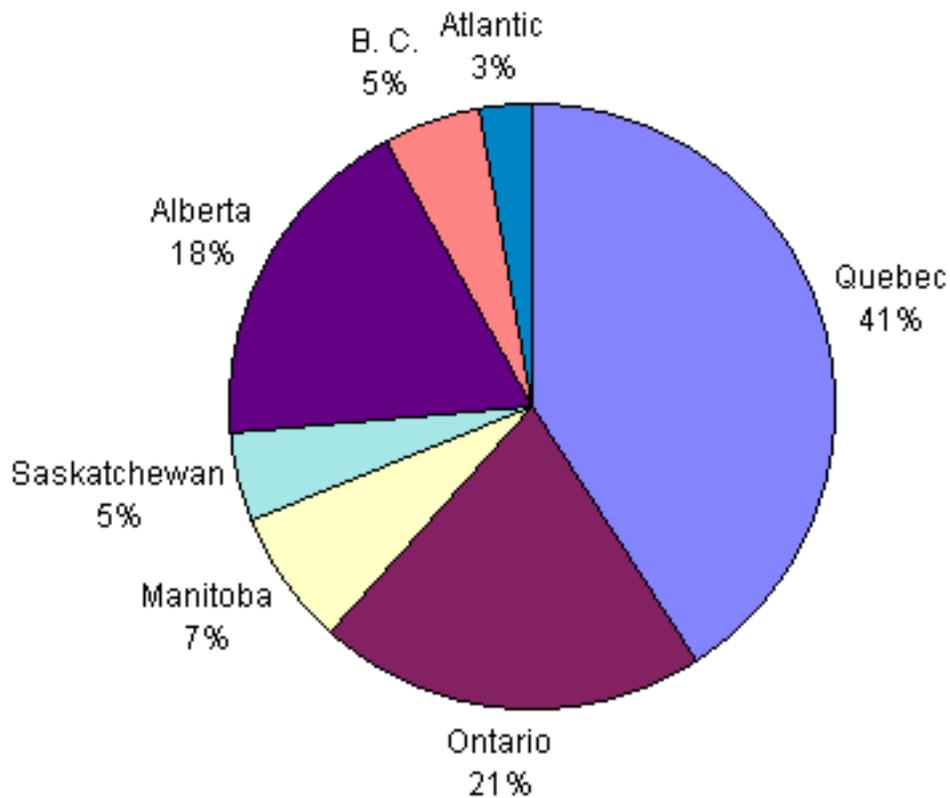


Source: SPI Marketing Group 1996 Annual Meeting Conference Proceedings Reports.

II. Canadian Exports of Pork

Canada is the second largest exporter of pork after the European Union (Saskatchewan Pork International Marketing Group, 1996). In 1995, Canada exported 339,870 tonnes of pork. Canadian exports have been increasing since the mid-eighties. Between 1992 to 1995, Canadian exports have increased by 66,000 tonnes. Canadian pork is exported to over fifty countries around the world. Based on 1995 dollar values, the three largest importers of Canadian pork were the United States, Japan, and Russia. These importers vary year to year because of changes in exchange rates, prevailing market conditions, and Russia's supply of hard currency. The provinces of Quebec, Ontario, and Alberta are the three largest exporting provinces within Canada. These three provinces have about 80 percent of Canada's export business. Saskatchewan has about five percent of Canada's total export business (Agriculture and Agri-Food Canada, 1996).

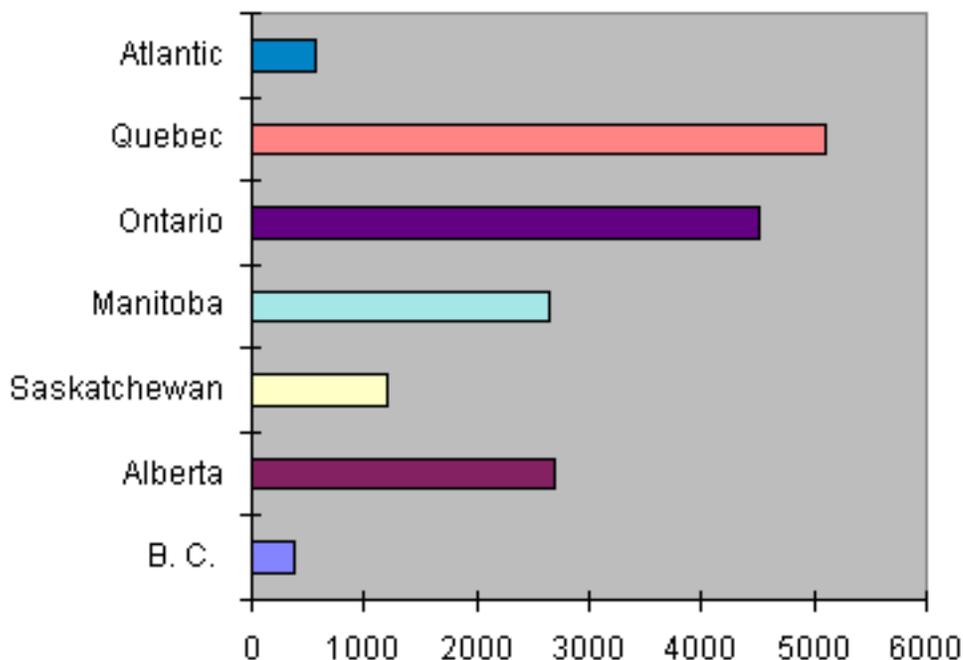
Canadian Pork Exports by Province



Source: International Markets Bureau, Market and Industry Services Branch, Agriculture and Agri-Food Canada, 1995.

Exports are pivotal to the continuing success of the Canadian hog industry. The majority of expanded hog production will have to be exported because Canadian domestic consumption is fairly static whereas pork consumption is increasing in developing countries in the Far East where per capita incomes are rising and there is an increase in consumer demand for meat, especially pork.

Canadian Production of Live Hogs (in thousands)



Source: Statistics Canada, 1994

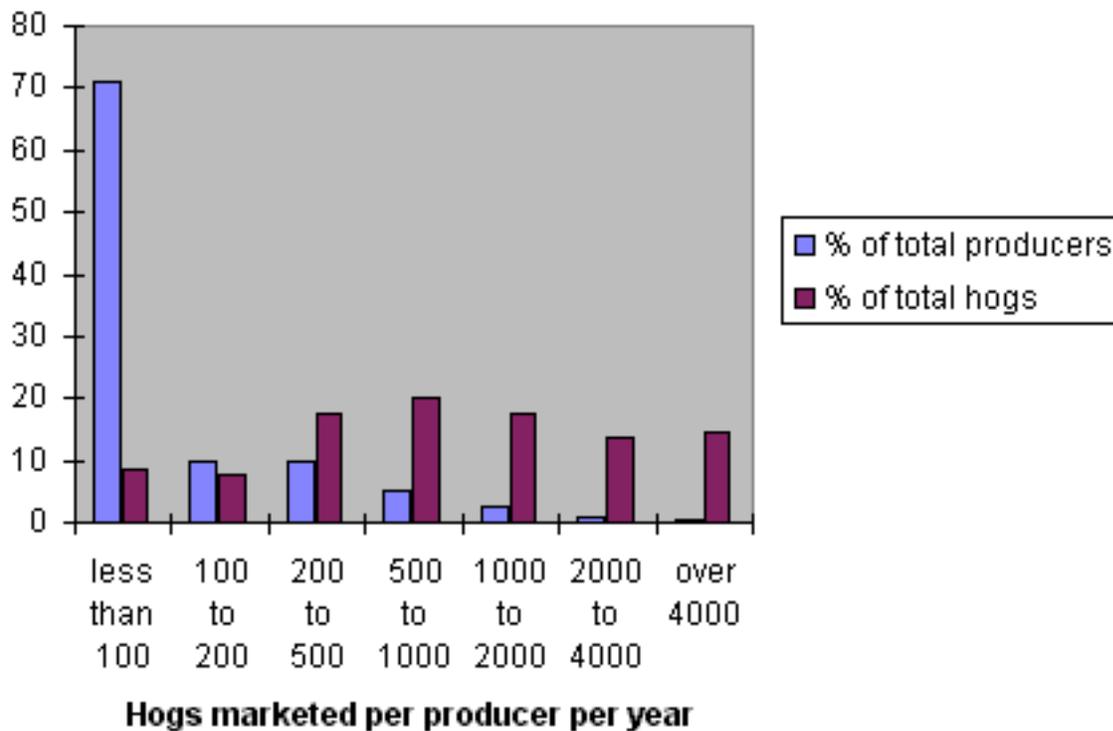
III. The Changing Face of Hog Production in Canada and Saskatchewan

The hog industry in Canada has undergone significant changes in the past decade. There has been a trend toward an increase in large producers and, correspondingly, a dramatic drop in the number of small producers. Canadian hog production for 1994 numbered 17,092,700 hogs (Pork Implementation Team, 1995). Ontario and Quebec have the largest per province production in Canada. These two provinces produce 56.2 percent of the total Canadian hog production. The prairie region has approximately 30.5 percent of this total, with the rest of the hogs being produced in the Atlantic provinces and British Columbia (Pork Implementation Team, 1995).

Alberta and Manitoba each produce slightly over two million market hogs annually while Saskatchewan produces about 1.1 million hogs per year (Saskatchewan Pork International Marketing Group, 1995). All three provinces have roughly doubled their production over the past decade. (Alberta Pork Producers Development Group, 1994, Manitoba Pork Est., 1994).

The producer profile in Saskatchewan has changed alongside the national trend. Over the past ten years, the percentage of small producers has decreased while the number of large producers has increased substantially. In 1985, small producers (those marketing less than 100 hogs per year) made up approximately 72 percent of the Saskatchewan producer population. These producers sold only 8.7 percent of the hogs marketed in Saskatchewan. At the other end of the scale, large producers (those marketing over 4000 hogs per year) made up one half of one percent of the total number of producers and marketed 14.5 percent of the hogs in Saskatchewan (Saskatchewan Pork Producers Marketing Board, 1985).

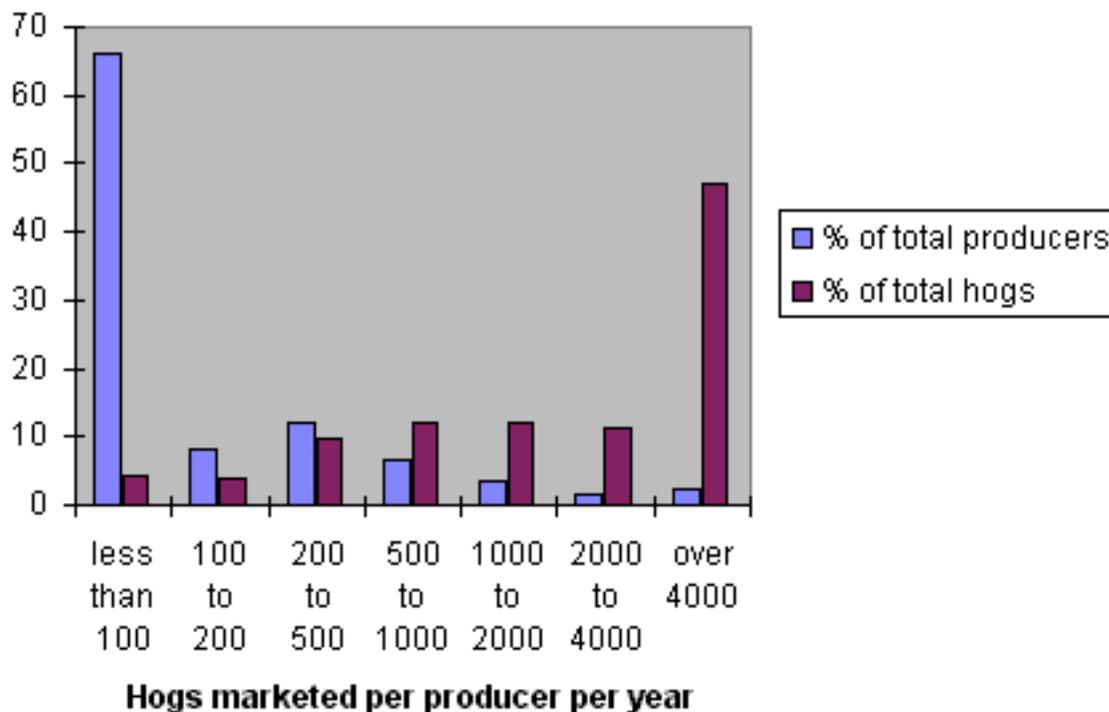
1985 Saskatchewan Hog Production Profile



Source: Saskatchewan Pork Producers' Marketing Board "Hog Sales by Size Category of Production Unit for 1985."

By 1995, small producers made up 66 percent of the producer population. These producers sold 4.1 percent of all hogs marketed in Saskatchewan. On the other hand, large producers made up 2.3 percent of the entire number of Saskatchewan producers, but these producers sold 47.2 percent of all hogs sold in the province (Saskatchewan Pork International Marketing Group, 1995). Clearly, the trend in Saskatchewan is toward fewer producers marketing an increasing number of hogs.

1995 Saskatchewan Hog Production Profile



Source: SPI Marketing Group 1995 Annual Report Statistical Summary.

The trend toward fewer hog producers in Saskatchewan is not short term. According to Statistics Canada, the number of Saskatchewan farms raising hogs has been decreasing steadily since the 1940s (Statistics Canada, 1973). Similar movements have been occurring in both Alberta and Manitoba over the past decade.

This progression toward large hog operations in Saskatchewan reflects what has happened in the United States and Europe. However, there is potential for even more impressive growth in Saskatchewan. Saskatchewan has a significant comparative advantage in that it enjoys the lowest feed costs in Canada and perhaps in the rest of the world and Saskatchewan produces a lot of feed grains. Without the benefit of export subsidies (most notably the Crow benefit), Saskatchewan feed grain, producers will be looking to local markets to sell their produce. Increased livestock production is an alternative choice and one which will be of benefit to the people of Saskatchewan and to their communities through employment and local markets for feed grain.

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CHAPTER 2 - Regulating Intensive Livestock Operations In The Prairie Provinces - A Comparative Prespective

World demand for meat is increasing and, as a result, livestock operations are becoming larger and more central to the farm economy (White, 1996). Thus, the provincial governments, Saskatchewan in particular, are promoting more pork production. As part of "The Partnership for Growth" strategy, the Saskatchewan Department of Economic Development wishes to enable Saskatchewan to almost double production of hogs (to two million) by the year 2000 (Saskatchewan Economic Development, 1996). In its report "Agriculture 2000: A Strategic Direction for the Future of Saskatchewan's Agriculture and Food Industry", the Saskatchewan Department of Agriculture and Food (SDAF) has endorsed a new strategy for the expansion and further development of the pork industry in Saskatchewan (Saskatchewan Agriculture and Food, 1994).

At the same time, however, increased livestock production is faced with opposition and concern. In general, the public and, specifically, those located adjacent to intensive livestock operators have voiced their concerns to the media and to the government. The main issues are odour and waste management. Odour is usually a local issue but waste management can have damaging regional effects. This can occur where the land base of an ILO is inappropriate for the application of large amounts of manure which could result in contamination of aquifers and other water sources.

Therefore, environmental concerns and regulation must be a primary concern of government policymakers and intensive livestock operators. Policies and laws have been drafted in all three prairie provinces to balance the environmental, economic and social concerns arising from intensive livestock operations. Below, each province's policy framework for the regulation of ILOs is examined with the next chapter devoted to a detailed review of Saskatchewan's regulatory regime.

I. Alberta

A. Regulations

In the province of Alberta, existing or developing ILOs are regulated primarily by municipalities and, in a more limited way, by various departments of the provincial government (Farmers Advocate of Alberta, 1995). For example, an ILO developer must get approval from the local municipality in which the ILO will be located but there are no "upstream" environmental approvals required for the establishment of ILOs under the Environmental Protection and Enhancement Act (EPEA) even if "downstream" compliance with provincial regulations under the Act is necessary (Alberta Environmental Protection, 1995).

A developer of an ILO must look to the local municipality to establish or expand an existing ILO, as the municipality has primary jurisdictional control over the development of such enterprises. The developer has to approach the municipality and fill out a standard evaluation permit explaining what type of operation he or she is going to build. It is in the best interest of the municipality to make the application as detailed as possible to ensure all areas of concern are available for review. Technical support for the ILO operator (e.g., water tests, soil tests, engineering plans) may be

offered by the municipality but it often proves to be too costly. As a result, the Alberta Agriculture and Food and Rural Development (AFRD) will lend its expertise or provide information on how an ILO operator might contact private individuals for technical support if requested by the RM or operator, however, in some cases, no review is requested or completed.

B. Guidelines

The AFRD offers a model ILO application permit to the municipalities in order to maintain some consistency across the province in the permit process. This model ILO application arose from the work of the Farmers Advocate, an Alberta farm group looking into concerns, issues and complaints in the agriculture industry. The Farmers Advocate was able to develop a successful permit process for ILOs. Eventually, the AFRD adopted this process as the model code it offers to municipalities and, while it is not mandatory, many municipalities use it as their application permit.

The Alberta Department of Environment has adopted the Farmers Advocate's code of practice for ILOs. Now, through Alberta Environment's "Code of Practice for the Safe and Economic Handling of Animal Manures", ILO developers have a detailed guide for choosing a proper site for an ILO. The guidelines outline, for example, where an ILO should be situated so as to allow gravity to control the flow transfer of waste. Foreign water (or water coming from upslope) should be diverted around the feedlot, manure storage and run-off collection facilities. The operation should be constructed so that run-off from the confinement area would remain on the operator's property. This would prevent water contamination and nuisance to neighbours which could have legal implications. According to the Alberta Department of the Environment, experience has demonstrated that pollution hazards are the direct result of manure mismanagement. These occurrences are usually due to: 1) no access to sufficient land for application; 2) no separation between confined animals and neighbours; 3) insufficient storage capacities; or 4) manure that is left on the land and has insufficient soil cover to control odour (Alberta Environmental Protection, 1995).

C. Dispute Resolution

When people complain about ILOs, their complaints are usually made to health officials or to the municipality. These complaints may be investigated by government authorities but are usually then forwarded to local advisory boards (Farmers Advocate of Alberta, 1995). These local advisory boards have been established with industry "peers" to deal with particular fields of expertise and will refer matters to the industry peer for an initial opinion. Thus, if a ratepayer has a land-use or other legal concern with a hog operation in his or her municipality, the peer representing the hog industry will look into the matter. If there is a concern with the beef industry, the peer representing the beef industry will investigate the issue further. The local advisory boards will examine the views of the "peer" before rendering their decisions on the dispute between the complainant and the ILO. The local advisory boards operate in a similar fashion to the Regional Advisory Councils in Manitoba and prove to be an effective tool working at the local level (Sokolowski, 1996).

More rarely, when complaints relate to municipal matters and involve actual pollution by an ILO, the provincial government investigates. If there are complaints about manure storage seeping in to a nearby stream or river, it is up to the Alberta Department of the Environment to investigate. If there is a health concern, Alberta Health would be notified.

D. Public Consultation

The Alberta government is convinced that there is a tremendous amount of pressure on developers to consult with the public about their intentions of any agricultural operation. Aside from having extensive consultation prior to start-up, public involvement should continue throughout the implementation of the operation. The key to the public involvement process is to prove that interested parties can continue to provide input throughout the development of the entire project.

Alberta Environment came to these conclusions, in part, from their experience with public meetings involving the Water Conservation Management Act (WCMA). The Act went through several developmental stages and then into public hearings administered by the Water Management Review Committee (WMRC). Significant public comment was received. Even though there was a tremendous amount of public involvement, people still felt left out of the decision making process. Thus, the more public involvement in the decision making process, the better (Alberta Environmental Protection, 1995).

II. Manitoba

The Manitoba pork industry is facing similar environmental and regulatory issues as Alberta and Saskatchewan. However, more specific complaints are coming from the Interlake region of the province, where ILOs are relatively new. On the other hand, the Steinbach area is a region already familiar with ILOs and the pork industry is seen as the backbone of the community so area residents have become quite comfortable with ILOs.

A. Regulations

In Manitoba, ILOs are primarily regulated by municipal zoning by-laws. However, regulations are in place for the use, management and storage of livestock waste to ensure that it is handled in an environmentally responsible manner (Manitoba Agriculture, 1995). Established under the Control of the Environment Act, the Livestock Waste Regulations prescribes how the storage and use of livestock waste and the disposal of carcasses will be handled. This means that Manitoba Environment is responsible for the "upstream" approval of the development and construction of earthen manure storage. However, this type of storage is required only for large hog operations where the amount of manure accumulated exceeds the capacity of underground storage tanks (Manitoba Agriculture, 1995).

B. Guidelines

Manitoba Agriculture has printed several Farm Practice Guidelines pamphlets to help ILO producers operate both efficiently and within the bounds of the law.

C. Dispute Resolution

Manitoba brings all ILO stakeholders to the table for discussion through the establishment of Regional Advisory Committees (RACs) which are made up of representatives from provincial government departments (environment, agriculture, health, and natural resources), municipal governments, pork industry representatives, and environmental groups. These committees oversee livestock operations, gather public input, and, essentially, form the basis for a link between the ILO developer and the general public. Although RACs have been around for only a short period of time,

both the industry and public have been receptive toward them (Sokolowski, 1996). As the biggest obstacle for the ILO developer is often an adequate communication plan, RACs can clearly help. The more the public is aware of what is happening, the more receptive people are toward development. The RACs can accomplish much of the public consultation process simply by acting as a tool for public involvement.

When there is conflict between a hog operator and a land owner, there is protection for the producer not unlike that offered in Saskatchewan. The Farm Practices Protection Act was established in order to protect producers from nuisance lawsuits. When nuisance suits do occur, the farmer is protected from immediate court proceeding in that the complainant must make his or her case in front of a farm practices review board. It is up to that board to determine whether the farming practice is acceptable or whether the plaintiff has a legitimate complaint. The ruling of that board can be appealed by either party to a court of law (Manitoba Agriculture, 1995).

D. Public Consultation

Manitoba Environment feels that contacting the public about the planning, funding and development of any project is vital before the application for a permit or construction even begins (Sokolowski, 1996). Manitoba Agriculture has developed the following list that a potential ILO developer should follow to ensure the project implementation runs smoothly:

1. Become familiar with the planning process and requirements of the municipality.
2. Determine whether local planning documents will permit future growth. Inform local area residents about the project and respond to concerns and ensure no misconceptions exist.
3. Have a manure management plan to demonstrate the operation will not be a source of trouble in the future.

III. Saskatchewan

In April of 1994, the Saskatchewan Association of Rural Municipalities (SARM) developed a survey regarding Livestock Management Legislation, and administered it throughout their membership. In particular, they asked questions concerning the proposed provincial Agricultural Operations Act to find out if it was adequate or if it would be necessary to regulate the livestock industry in Saskatchewan, in some other way.

On the basis of this survey, 80% of the municipalities responding felt it would be necessary to have a regulatory board in place. Of the 80% in favour, 57% felt existing committees should be used, 21% felt a new board should be developed, and 22% felt an existing board could handle regulatory control as long as the members were aware of the issues surrounding agricultural operations. With these results the new Act was seen as having a broad base of support and many of the conclusions of the survey were incorporated in the substance of the Agricultural Operations Act, an Act that significantly changes the way in which ILOs are regulated in Saskatchewan.

A. Regulations

The regulatory scheme developed under the Agricultural Operations Act and the permit process administered by rural municipalities and the Saskatchewan Department of Agriculture and Food regulate ILOs in Saskatchewan. Each of these is explored in detail in the next chapter. In limited

other cases, the Saskatchewan Departments of Highways and Transportation, Health, the Environment and/or SaskWater may be involved in the regulation of an ILO.

B. Guidelines

Saskatchewan Agriculture and Food has a recommended checklist for the establishment of an Intensive Livestock Operation in the province. It reads as follows:

1. Agricultural Operations Act - be familiar with part II which protects agricultural producers from nuisance lawsuits and part IV, which applies only to ILOs and deals with issues of regulating waste management ILOs.
2. Development Plan - Prepare a development plan which will outline details of the proposal and provide as much information as possible to the public.
3. Location - Document all of the research done on choosing a location. Show why the particular site was chosen and what other sites are available. Show the rationale why the sites were chosen or discarded.
4. Community Involvement - Form a co-operative relationship with the local community and surrounding area. Do this before starting any major plans or before rumors develop about the project which could become misunderstandings. If possible, contact and get written consent from neighbours, within the minimum recommended separation distance in order to show that the project is being undertaken with public consent.
5. Testing - Hire an independent consultant to conduct soil, water, and manure storage tests. This will show there has been independent review and assessment. The consultant provides technical expertise to evaluate properly hydro-geological site conditions.
6. SDAF Permit - Contact SDAF staff to review the permit application and information required. Then complete and submit application to Saskatchewan Agriculture and Food.
7. Municipal Approval - Contact the local municipality to ensure your site requirements and plans follow any bylaws regulating ILOs within that jurisdiction.

C. Dispute Resolution

The Agricultural Operations Act sets out a detailed process for handling disputes between complainants and ILO operators. This process is examined in depth in the next chapter.

D. Public Consultation

Public consultation prior to establishing an ILO is essential (Farrer, 1996). New projects in any area of Saskatchewan will always interest neighbours. Before construction begins, it is imperative that the ILO operator discuss the project with neighbours, local municipal authorities, agricultural engineers with Saskatchewan Agriculture and Food, and any other interest group which may be affected. The key is to give people the opportunity to review and understand the ILO plans so questions can be answered directly before any serious misunderstandings develop. Aside from answering all of their questions, it is important to explain what the positive impacts of the ILO will be for the area (Farrer, 1996).

When dealing with larger proposals, the applicant may be asked by the municipality to hold a public meeting. This method may prove to be easier than talking to each individual stakeholder. At

such a meeting, a development plan should be presented for all to view and discuss. That plan should include the size and type of facility; the number and type of animals; plans for manure storage and disposal; plans for disposal of carcasses; reasons for site selection (why alternate sites are not suitable); and the social and economic benefits to the area.

Government departments in each of the three provinces regulate certain aspects of ILOs. Alberta is the least interventionist as it only proposed a common application form to be used by rural municipalities when ILOs apply for a development permit. Only when actual pollution from an ILO occurs does the provincial government get involved directly in regulating ILOs.

Both Manitoba's Department of the Environment and Saskatchewan's Department of Agriculture and Food require ILO operators to seek approval for waste storage and management plans before construction or expansion of an ILO.

Still, in all three provinces, much of the task of regulation of ILOs falls to the rural municipality in which the ILO is to be located. As each rural municipality has a significant latitude to develop by-laws to regulate land-use, the regulation of ILOs from RM to RM may vary greatly depending on the attitudes of council members, local pressures and traditions, and the vociferousness of local individuals for or against ILOs. Consequently, it is important, on an RM by RM basis, to discover what these attitudes, and hence regulatory structures, are for each RM. The results of this exercise for Saskatchewan are contained in Chapter 4.

All provinces, developers and interest groups agree strongly that public consultation is the key to the successful development of any ILO. Consultation should start prior to the application of a permit and prior to any serious planning. Any public input will prove to local residents, regulators or industry stakeholders that the public was involved in the decision making process (Farrer, 1996). Combining the public consultation steps for the three prairie provinces gives an extensive but valuable checklist when planning an ILO development and points out the basic steps to follow when establishing an ILO:

1. Become familiar with the planning process and rural municipality in which the ILO will be situated. Contact the Rural Municipality to research the planning process.
2. Determine whether local planning documents will permit future growth.
3. Inform local residents of the project, respond to concerns and address any misconceptions.
4. Have a manure management plan to show how disposal will be handled.
5. Prepare a development plan to outline all of the details of the project. It should include: i) size and type of facility; ii) number and type of animals; iii) manure storage and disposal; iv) disposal of carcasses; v) reasons for site selection; vi) socioeconomic benefits to the area.
6. Explain why and how the location and alternative sites, etc. were chosen.
7. Hire an independent, qualified consultant to conduct the appropriate tests.
8. Form a co-operative relationship with the community.

In summary, the following table sets out the similarities and differences that the three provinces take in their regulation of ILOs:

Table 1. Comparative Aspects of ILO Regulation in Western Canada

Control or Regulation	Manitoba	Saskatchewan	Alberta
"Upstream"	Department		
1.Environmental Permits, Waste Storage and Management Plans	Manitoba Environment	SDAF	none
2.Land Use Approvals or Permits	RMs	RMs (draft bylaw available from SDMG)	RMs (draft bylaw available from AFRD)
3.Other Approvals or Permits	N.R.*	SaskHighways, SaskHealth, SaskWater, SERM	N.R.
"Downstream"	Department		
1. Water Pollution	N.R.	SDAF and SERM	Alberta Environment
2. Right to Farm and Nuisance	Farm Practices Review Board	Agriculture Operations Review Board	none
Participatory Dispute Resolution and Public Consultation	Regional Advisory Committees (RACs)	may form part of RM, SDAF or SERM approvals	Local Advisory Boards and Industry 'Peers'

* N.R. = not researched

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CHAPTER 3 - Legal Aspects Of Saskatchewan Intensive Livestock Operations

I. Introduction

The continuing expansion of Saskatchewan's livestock industry has been accompanied by increasing legal constraints on the way facilities are established and run. The development of ILOs in traditional grain-farming areas combined with 'urban sprawl' in rural areas has led to conflict over manure management and its potential effect on the environment. This conflict is intensified by changes in the scale and technology of operations. As a result, there is a need to balance environmental regulation, nuisance law, and land use controls with the realities of agricultural production.

The Agricultural Operations Act attempts to provide this balance by empowering Saskatchewan Agriculture and Food to regulate livestock operations. However, the regulation of ILOs is not confined to SDAF, and may involve numerous other provincial governmental bodies and municipal bodies (*e.g.*, RM councils) under The Planning and Development Act. This chapter examines the legal constraints on intensive livestock operations in Saskatchewan with regard to:

- a. the permit process for establishing or expanding new facilities ("upstream" constraints); and
- b. environmental review and liability of existing operations ("downstream" constraints).

II. Legal Constraints to Establishing an ILO

A. Environmental Permits

Environmental permits regulating intensive livestock operations are designed to protect public health and safety by preventing the release of pollutants or contaminants into water systems. Most permits operate by identifying the public resource to be protected and then placing restrictions on what can be discharged into it.

1. Saskatchewan Agriculture and Food (SDAF)

The Agricultural Operations Act defines an intensive livestock operation as any operation which confines animals to an area of less than 370 square metres per animal unit. Prescribed animals include poultry, hogs, sheep, goats, cattle, horses, elk, deer or bison. Under the regulations of the Act, departmental approval is required for intensive livestock operations that have between 20 and 300 animal units if they are located within a specified distance to water sources not controlled by the operator. Approval is always required for operations of more than 300 animal units and for earthen manure storage.

Prior to The Agricultural Operations Act, several permits were required when establishing an ILO facility; for example, one by SDAF, others by SaskWater, the RM, and so on. Permit application information included:

- a. distance to nearest watercourse;
- b. maximum number of animals and type of operation; and

- c. whether construction is new or existing.

In contrast, the Act now requires two approved plans, one for waste storage and one for waste management. A waste storage plan is required for management of earthen manure storage areas, holding ponds, or liquid manure storage tanks based on:

- a. physical specifications and dimensions of storage site;
- b. soil analysis; and
- c. records of water wells, water table depth, test holes, and any existing monitoring programs.

A waste management plan is required for managing manure according to:

- a. soil analysis, extent and location of application area;
- b. written agreements to spread manure on lands not controlled by the operator; and
- c. frequency, intensity, duration, offensiveness and method of manure application.

A waste management plan for dead animals is required, also, based on method and frequency of disposal. Intensive livestock operations which are established without approval of either plan are liable to a fine of \$1,000 each day of a continuing offence to a maximum of \$50,000.

The permit process has been revised under the Act to compel operators to conduct initial site analysis and evaluation. The intent is to ensure comprehensive development plans are prepared that consider environmental issues prior to departmental approval, and that proactively minimize the potential for pollution and nuisance conflicts. In order to assist operators evaluate their facilities and adopt appropriate management policies, SDAF has prepared the Guidelines For Establishing and Managing Livestock Operations.

When reviewing applications, Saskatchewan Agriculture and Food will always refer plans to the Saskatchewan Department of Municipal Government and the local rural municipality for examination. Under some circumstances, SDAF may request the Saskatchewan Department of Environment and Resource Management (SERM) or the Saskatchewan Department of Health to provide comments or technical assistance on an application if:

- a. the proposed ILO is over 1000 animal units;
- b. significant public outcry to the development exists; or
- c. potential water pollution or public health problems exist.

Any comments made by these agencies are recommendations only which Saskatchewan Agriculture and Food is not obliged to follow. However, SDAF will closely scrutinize all suggestions, and may subsequently impose them as terms of plan approval. Saskatchewan Agriculture and Food may also refuse to approve a plan if either pollution of ground or surface water would occur or inadequate provisions have been made for waste management.

The Agricultural Operations Act contains, however, a 'grandfather clause' whereby permits issued previously under The Pollution (By Livestock) Control Act are deemed to be a plan approved pursuant to the new Act.

2. Saskatchewan Environment and Resource Management (SERM)

Applications referred to SERM by SDAF are directed to the Environmental Assessment Branch for

commentary and review under The Environmental Assessment Act. The Act requires approval of a development that will:

- a. have an affect on any unique, rare or endangered feature of the environment;
- b. involve a new technology that may induce significant environmental change;
- c. have a significant impact on the environment;
- d. substantially utilize a provincial resource (i.e., water) so as to pre-empt its use for any other purpose;
- e. cause widespread public concern because of potential environmental changes; or
- f. cause the emission of any pollutants which require handling and disposal in a manner that is not regulated by any other Act or regulation.

Where a development is subject to the Act, the developer may be required to conduct an environmental assessment of the project and submit an environmental impact statement to SERM for approval. Upon review of the environmental impact statement, the Department may also hold a public hearing with respect to the development or may request the developer to provide documentation that adequate public participation has already occurred. SERM may then impose any terms or conditions to an approval or may refuse to approve the environmental impact statement. Developments subject to the Act that proceed without Departmental approval are liable to a fine of \$1,000 each day of a continuing offence to a maximum of \$5,000.

In practice, intensive livestock operations will rarely require approval under The Environmental Assessment Act. It is doubtful whether an ILO could be characterized as promoting significant environmental change so as to satisfy the first three criteria above. Second, according to one source, an intensive livestock operation would have to approximate one million animals in order to substantially utilize a provincial resource such as water supply (Hanley, 1996). Third, 'widespread public concern over potential environmental changes' does not include social or nuisance issues. Finally, the application process for an environmental impact statement greatly overlaps the permit process under The Agricultural Operations Act, which is far more specific to intensive livestock operations. Therefore, it is unlikely that an environmental assessment of an ILO could ever be supported under the last of the above criteria.

3. Saskatchewan Health

Under the Sanitation Regulations of The Public Health Act, no feedlot can locate within one mile (1.6 km) of a city, town or village without the approval of the medical health officer for that area. Thus, Saskatchewan Health can in some instances regulate separation distances for the establishment of an ILO. In practice however, the general criteria for a medical health officer approving an intensive facility within the one mile stipulation is whether the operation meets the recommended separation distances set out by SDAF guidelines and RM bylaws.

B. Land Use Permits

Land use controls pertaining to intensive livestock operations are designed to place reasonable controls on the use of land so that over time the goals of a long-term comprehensive plan can be realized. A typical land use ordinance will prescribe how and for what purposes a particular property may be used.

1. Saskatchewan Agriculture and Food

Prior to The Agricultural Operations Act, SDAF could regulate locational siting of facilities by requiring a permit for ILOs within 305 metres of a dwelling not owned by the operator. This overlapped directly the zoning powers of RMs to set separation distances between an ILO and the nearest population. Theoretically, this conflict could have been resolved through negotiations between the RM and SDAF or by the developer applying the more stringent of the two standards. In reality, however, this statutory power was never applied, owing to an apparent uneasiness by SDAF to regulate an area already sufficiently controlled by municipalities. The Agricultural Operations Act remedies this situation by omitting all statutory reference to siting. Although the draft Guidelines outline minimum recommended separation distances for intensive operations, these are recommended only and are not binding.

2. Rural Municipalities

Under the provisions of The Planning and Development Act, a rural municipality can address general policy issues concerning ILOs by adopting either a basic planning statement or development plan. A basic planning statement contains:

- a. stated objectives for future development of the municipality;
- b. stated objectives to be accomplished by zoning bylaws; and
- c. it incorporates any applicable provincial land use policies.

A development plan is more specific, and serves:

- a. as a framework to guide the R.M. in making development decisions;
- b. to identify critical problems and opportunities concerning land development and its social, environment and economic effects;
- c. to set out the desired timing, patterns and characteristics of future development; and
- d. to outline methods whereby development in adjacent municipalities and areas may be coordinated.

An RM will implement either type of plan by adopting zoning bylaws which control land use.

a. Zoning Bylaws

Approximately fifty per-cent of Saskatchewan RMs have zoning bylaws concerning intensive livestock operations. In municipalities with no bylaws in place, approval of a waste storage and waste management plan by SDAF may be the only permit required for establishing an ILO. Where there are no relevant bylaws and a provincially approved facility has begun construction, an RM Council cannot pass interim bylaws affecting or prohibiting development as this would be retroactive and in bad faith. In order to assist municipalities that are implementing new zoning bylaws or modifying existing ones, Saskatchewan Municipal Government has prepared a draft basic planning statement and bylaw (complimentary to The Agricultural Operations Act) for councils to consider. The draft bylaw: a) defines minimum separation distances; b) requires a development permit as a discretionary use; and c) specifies the maximum number of animal units as a condition for issuing a development permit.

A rural municipality may adopt a zoning bylaw that designates an ILO as a permitted or

discretionary use. A permitted use is a form of development allowed as of right within a particular zoning district for which no permit may be necessary. In regulating a permitted use an RM assumes an administrative role only in that it simply monitors existing bylaws. A discretionary use is a form of development which may be allowed following application to and approval of the Council which assumes a more legislative function. In RMs that designate ILOs as discretionary forms of development, an operator must apply for a development permit before establishing a facility.

A council may issue a development permit subject to special conditions or developmental standards. The assignment of standards may depend upon: a) the technical and engineering expertise available to a municipality; b) a council's fiscal and personnel capacity to enforce the provisions; and c) whether a matter is more effectively dealt with by another regulatory agency. Theoretically, municipal development standards could be adopted that parallel those required by SDAF under a waste storage or management plan. Nevertheless, SDAF will approve plans based on the standards set out in the Guidelines and not those of the municipality. An operator must still satisfy any municipal standards required to obtain a development permit.

Zoning bylaws pertaining to ILOs will be based on a number of considerations such as local soil characteristics and water supply; concentration of existing ILOs in the municipal area; and most importantly, population base and number of urban centres. A bylaw must also address public concerns regarding odour, acceptable separation distances, and whether an intensive facility will impact the traditional family farm. In developing zoning bylaws conducive to the establishment of ILOs, an RM may take two approaches, and either create a matrix of special conditions, where if all are met, a development permit will be issued and a facility can be established; or draw a map outlining geographic locations for which a development permit will be approved. Conversely, a Council may be adverse to the establishment of an intensive operation within the municipality and may adopt a 'banana' approach to zoning: 'build absolutely nothing anywhere near anything'.

b. Development Levy Bylaws

When an operator applies for a development permit for an intensive facility, an RM Council may require the operator to pay development levies. Through levies, the municipality may transfer the capital costs of providing services and facilities to a new ILO site directly to the operator. In this way, the RM will recoup its costs for providing water or drainage works, and more importantly, road access and maintenance, which constitutes the primary capital expenditure for most rural municipalities.

c. Heavy Hauling Bylaws

Intensive livestock operations, as with any value-added industry, require more heavy trucks to transport feed, manure, and livestock. RM Councils may choose to regulate traffic-related aspects of an ILO by requiring road use permits for heavy vehicles.

d. Public Process

When an RM council proposes the adoption or amendment of an ILO-related zoning bylaw, it is required under The Planning and Development Act to give prior public notice in a local newspaper or periodical. It may also hold a public hearing to receive and consider any representations concerning the proposal. In cases where a bylaw proposal or permit decision encounters significant public outcry, a council may choose to either respect public opinion or hold a ratepayers vote to

settle the matter. Finally, the zoning bylaw must be approved by the provincial Minister of Saskatchewan Municipal Government in order to be effective.

e. Appeals Process

Where an intensive livestock operation is designated a discretionary use, the decision to refuse a development permit cannot be appealed, however, a council's decision to attach any special conditions or development standards to an approved permit can be appealed to a local Development Appeals Board. Moreover, third parties other than the operator can appeal a decision to issue a development permit if they can prove to be 'directly affected' by the decision. After holding a public hearing over the appeal, the Board will render a decision confirming, revoking, or varying the council's decision. Decisions of the Development Appeals Board may be further appealed to the Saskatchewan Municipal Board. In light of the complexity and duration of the appeals process, the establishment of an intensive facility can be substantially delayed by such proceedings.

f. Judicial Review of Permit Decisions

Administrative tribunals such as municipal councils, the Development Appeals Board and the Saskatchewan Municipal Board have no inherent powers and are limited to the jurisdiction and powers conferred to them by legislation. In contrast, a superior court (such as the Court of Queen's Bench) has an inherent jurisdiction at common law to review the decisions of these statutory bodies. This is referred to as the 'supervisory jurisdiction' of the court, which can be used to consider whether a Board's decision was made in fairness, in accordance with law, with proper jurisdiction, and in accordance with the Charter. The legality of a decision may be reviewed but not the decision itself. When using its supervisory jurisdiction, a court may apply certiorari, the power to set aside a decision that has already been made; prohibition, the power to prevent an administrative tribunal from making a decision; or mandamus, the power to order a tribunal to perform its statutory duties.

A court's supervisory jurisdiction may only be ousted by clear statutory language. While no such language is contained in The Planning and Development Act with regards to councils and Development Appeals Boards, the Saskatchewan Municipal Board is protected by a broad privative clause under The Municipal Board Act. Nevertheless, The Saskatchewan Municipal Board will still be subject to judicial review if it acts entirely without jurisdiction.

3. Saskatchewan Water Corporation

Pursuant to The Water Corporation Act, the Saskatchewan Water Corporation regulates all matters concerning waterworks and drainage works. While its mandate also includes sewage works, SaskWater will defer to SDAF in all matters concerning animal sewage. Prior to construction of an intensive livestock facility an operator must obtain approval from SaskWater to:

- a. drill test wells;
- b. construct and operate wells and use ground water; and
- c. alter drainage so as to affect lands not controlled by the operator.

SaskWater may issue the approval subject to any terms or conditions, or it may refuse approval.

4. Saskatchewan Department of Highways and Transportation

Since intensive livestock facilities require heavy trucks to transport raw products and byproducts, adequate road access is an essential factor when establishing a facility. The Saskatchewan Department of Highways and Transportation under The Highways and Transportation Act requires a permit for an ILO constructed within 90 metres of a provincial highway. The granting or refusal of a permit is at the discretion of Saskatchewan Highways and Transportation and may be issued subject to terms or conditions.

C. Public Process

There is no formal legal requirement under The Agricultural Operations Act for an operator to hold a public hearing regarding the project. Moreover, while an RM must hold a public meeting over an ILO-related zoning bylaw, this may or may not be relevant to a specific site. Finally, although The Environmental Assessment Act may require a public hearing, ILOs will only rarely be subject to the Act. In spite of this, the SDAF Guidelines strongly emphasizes the need for communication and consultation between the developer and local public in order to foster community participation and avoid potential misunderstandings. This should be achieved prior to obtaining any permits through informal personal consultations with key stakeholders; such as, the RM council and immediate neighbours; open houses; response publications; planning workshops; reference centers; and public meetings. This public process may be considered part of a 'normally accepted agricultural practice' with regards to "downstream" operational nuisance disputes and a developer who foregoes this process may... the protection from liability in nuisance provided by the Agricultural Operations Act.

IV. Environmental Review and Liability

A. Water Pollution

Concentrated livestock manure contains nutrients (e.g., nitrogen and phosphorus) and bacteria which can adversely affect the quality of surface and groundwater. The potential for water pollution by an intensive facility may exist at several points; such as, through overflow or seepage of an earthen manure storage area or holding pond; spillage during the transportation of manure; or discharge or seepage into a water system during manure application.

1. Saskatchewan Agriculture and Food

The Agricultural Operations Act provides the opportunity for intensive facilities to be inspected by an agent of Saskatchewan Agriculture and Food. Where an inspector suspects an operation is being conducted in a manner that creates a danger of surface or ground water pollution, the department has the power to issue an order to remedy unsanitary conditions and correct or abate any danger of pollution within a specified time. Depending on the seriousness of the matter, SDAF may also request SERM to investigate the site. If an operator fails to comply with an order or an approved plan, the department can suspend or cancel the approval of a plan, closing the facility. The operator will also be fined under The Agricultural Operations Act for \$1,000 each day of a continuing offence to a maximum of \$50,000. Given the substantial financial penalties in both fines and lost revenues while closed, coupled with preventative monitoring by SDAF, it is highly unlikely many such infractions will occur for very long.

2. Saskatchewan Environment and Resource Management

Saskatchewan Environment and Resource Management directs all initial complaints of water pollution by ILOs to SDAF. If SDAF suspects a serious pollution problem exists, it may request SERM to jointly investigate the site and the extent of its effect on the environment. Pursuant to The Environmental Management and Protection Act, SERM may order the operator to take any measure necessary in order to protect or restore the environment, when water pollution is detected. Failure to comply with an order is a criminal offence under the Act punishable by a maximum fine of \$1,000,000 and/or imprisonment up to three years. In practice however, the Act will rarely be enforced against an intensive livestock operation, because:

- a. SERM will defer to SDAF as the lead regulatory body overseeing intensive livestock operations;
- b. water pollution provisions are far more specific to intensive livestock operations under The Agricultural Operations Act than under The Environmental Management and Protection Act; and
- c. SERM, in recent years, has shifted away from a regulatory role to a more policy-making based role.

3. Rural Municipalities (RMs)

When issuing a development permit an RM may set out conditions or standards that have an ancillary impact on the environment. Nonetheless, while a rural municipality may use its zoning authority to administer land use, it cannot directly regulate pollution as this is technically a provincial power not a municipal one. It is equipped to manage how and for what purposes manure may be used on particular property, but not the environmental and health effects of manure contamination in a local water supply.

4. Civil Liability

Notwithstanding statutory liability, the operator of an intensive livestock facility that causes water pollution may be subject to civil action by any person adversely affected by manure contamination. The operator may offset this risk by acquiring liability insurance.

a. Negligence

An ILO operator has a common law duty to conduct an operation in a manner so as not to cause harm to others. Where an operator's conduct falls below the required standard of care, he or she may be liable for any material losses which occur. As such, an operator must store, handle, and apply manure in a reasonable manner according to standards established by the industry or by statute. If an operator negligently allows manure to seep, overflow, spill or discharge onto neighbouring land, liability may incur for:

- a. personal injury, and
- b. property damages.

Once in court, the onus lies on the plaintiff to prove the defendant acted negligently.

b. Common Law Strict Liability

In some instances an operator who contaminates a water supply with manure may be liable for damages caused to others even if he or she did not act negligently. Where a person brings or accumulates on his land anything that may cause damage to his neighbour if it escapes and the dangerous thing escapes and causes damage, then he or she is liable for all damages which are a natural consequence of its escape, regardless of whether the person acted with due care and caution and was not negligent. Nevertheless, this rule only applies where the use of the land is non-natural, a special use bringing with it increased danger to others, and must not merely be the ordinary use of the land.

A plaintiff seeking to apply the rule could claim that, unlike in smaller operations, the accumulation of manure by an ILO in extremely concentrated amounts is inherently dangerous and poses too great an environmental threat to qualify as 'natural'. Alternatively, it could be argued that if manure per se is a natural use, then the location or method employed to store and apply it may constitute a non-natural use. On the other hand, an operator could claim that the storage and application of manure is a customary, standard practice of intensive operations throughout the industry, and is done for the ordinary and necessary purposes of husbandry. Moreover, it can be contended that the doctrine has no application to situations where the storage and management of manure is permitted under statute. Finally, in the case of manure application, it could be argued that the doctrine has no application in situations involving intentional discharges rather than fortuitous escapes. In any case, the characterization of manure as 'natural' or 'non-natural' is controversial and will depend not only on the nature of the substance itself, but also on the place and manner in which it is maintained and surrounding circumstances. At least one court to date has applied the doctrine to manure management.

c. Statutory Strict Liability

The Environmental Management and Protection Act creates a statutory basis of compensation for any person who suffers personal or property damages as a result of pollution by a development without proof of fault, negligence or willful intent. Once in court, the plaintiff must only prove he or she suffered damages from pollution caused by the defendant. However, a developer will not be liable if it can be established that all reasonable steps were taken to prevent the discharge of the pollutant. To date, this mechanism has not been used against an intensive livestock operation.

B. Nuisance

Nuisance is defined as any activity, legal or otherwise, that causes unreasonable and substantial interference with another's quiet use and enjoyment of property. In terms of intensive livestock operations this primarily refers to the odour generated by manure during storage, transport and application. Other agricultural nuisances include dust, flies, noise and rodents, but does not include air or water pollution. An example of a nuisance would be the significant curtailment of outdoor activities, or having to keep windows closed for long periods of time due to the presence of odours from a neighbouring intensive operation.

1. Saskatchewan Department of Agriculture and Food

Previously, SDAF regulated nuisance issues in the same manner as water pollution. Where an ILO was found to constitute a nuisance upon inspection, the department could issue an order stipulating corrective measures to be taken by the operator. If the order was not complied with, SDAF could

prosecute under the Act and levy a fine, but it could not collect damages. Neighbours affected by the nuisance still had to resort to the civil process to claim damages.

This process is altered vastly under the right to farm provisions of The Agricultural Operations Act, which protects intensive livestock operators from unwarranted lawsuits, establishes a mechanism for resolving nuisance disputes between ILO operators and their immediate neighbours, and divests regulation of nuisance issues from Saskatchewan Agriculture and Food to an Agricultural Operations Review Board.

a. Agricultural Operations Review Board

Under the provisions of The Agricultural Operations Act, a person with a nuisance complaint against an ILO must first apply to the Agricultural Operations Review Board for a determination of whether the disturbance arises from a 'normally accepted agricultural practice', and if not, what action should be taken by the operation to comply with these practices. As a deterrent against frivolous complaints, a fee of \$100 is required for each person making an application. No civil action in nuisance can be initiated against the operation until 90 days after the application has been filed with the Board. As well, if the Board arranges for mediation between parties, the 90-day clock is stopped. The Board may then dismiss the complaint if the subject-matter of the application is trivial or frivolous or if the applicant does not have a sufficient personal interest in the matter.

For all legitimate complaints the Board will endeavour to determine whether the disturbance rises from a normally accepted agricultural practice, defined in the Act as any practice:

- a) conducted in a prudent and proper manner that is consistent with accepted customs and standards followed by similar agricultural operations under similar circumstances, including the use of innovative technology or advanced management practices in appropriate circumstances;
- b) conducted in conformity with any standards established pursuant to the regulations, i.e., standards are currently recommended but could potentially become regulations under SDAF; and
- c) that meets accepted standards for establishment and expansion, i.e., established through the public process and having obtained all necessary permits.

To further clarify a 'normally accepted agricultural practice', the Board will:

- a. refer to the Guidelines although it is not bound by this document;
- b. examine applicable municipal development standards, although it is not bound by them; and
- c. take local conditions into account by conducting public hearings and inspecting the site.

The practical result is that 'practices' will be reviewed on a discretionary, case-by-case basis rather than by regulation or precedent. The Board will also refer the matter to mediation to assist both parties in resolving the dispute.

If the Board is unable to resolve the dispute between the complainant and the operator through mediation, it will issue a decision. If the operation is found to comply with 'normally accepted agricultural practices', the complaint will be dismissed. If the operation is found to contravene 'normally accepted agricultural practice', the Board will recommend that the operator, by specified

date, either cease the practice causing disturbance or modify the practice in a recommended manner. While the Board does not have the power to enforce its orders, operators that fail to comply with its recommendations will not be protected from civil liability in nuisance.

2. Rural Municipalities

Rural municipalities are not directly involved in nuisance disputes and will refer all complaints to the Agricultural Operations Review Board. Nonetheless, when issuing a development permit an RM may assign nuisance-related development standards, as they may often have 'nuisance' by-laws, that may be used by the Board when determining a 'normally accepted agricultural practice'.

3. Civil Nuisance Action

a. ILO Liability

If either party does not accept the decision of the Agricultural Operations Review Board, the matter may proceed to court after the prescribed period of 90 days. Normally, when determining a nuisance action a court may consider several factors such as the character and reasonableness of the complained activity; the nature, frequency, duration, and intensity of the interference; the gravity of the harm; any abnormal sensitivity of the plaintiff; the utility of the defendant's conduct; the character of the neighbourhood; the priority of location between parties; and the effect of issuing an injunction against the defendant.

In addition to these factors, a court is statutorily bound to give primary consideration to, but is not ultimately bound by, the decision of the Agricultural Operations Review Board. As a result, an intensive livestock operation found to follow 'normally accepted agricultural practices' cannot be held liable in nuisance. However, an ILO is not protected if it fails to follow 'normally accepted agricultural practices' or if it fails to comply with any recommendations made by the Board. Once in court, the onus of proving that an ILO is causing nuisance from practices that are not consistent with 'normally accepted agricultural practices' lies with the plaintiff. If an operation is found to constitute a nuisance, a court may order remedies such as damages for past and future interference or an injunction to cease the complained of activity. A court will not grant an injunction on the basis that the construction of an intensive livestock operation that constitute a future nuisance.

b. Judicial Review of the Agricultural Operations Review Board

As the Agricultural Operations Review Board has no inherent legislative powers, it is limited to the administrative and discretionary prerogative conferred by legislation. Moreover, there is no privative clause within The Agricultural Operations Act which ousts the supervisory jurisdiction of a superior court. Thus, it is possible that a decision of the Board may be overturned by a court where it is found to have operated in bad faith; based a decision on extraneous matters; failed to take relevant matters into account; overstepped its proper jurisdiction; or failed to comply with the Charter.

c. Municipal Liability

A public authority is liable for loss or injury caused by the negligent acts or omissions of its employees. In particular, a municipality may owe a duty to an operator to provide correct zoning

information and to ensure a development permit for an ILO is lawfully issued. Thus where an R.M. issues a development permit, the conditions of which deviate from a 'normally accepted agricultural practice', it could possibly be liable to an ILO that relies on the permit and is subsequently found liable in nuisance. The RM may be liable to the ILO operator for general damages, such as, loss of income or for special damages (losses sustained as a result of having to either move the operation or modify the way in which the operation is carried out).

V. Conclusion

Under The Agricultural Operations Act, Saskatchewan Agriculture and Food is the primary regulator of intensive livestock operations in the province. The Department's role is largely environmental in that it takes a proactive approach to manure management in order to prevent water pollution and nuisance disputes between neighbours. Operators establishing an intensive facility must submit a waste storage and waste management plan to SDAF for approval.

Once in operation, an intensive facility may be subject to regular "downstream" inspection and environmental review by the agency. While this substantially overlaps the jurisdiction of SERM, intensive livestock operations are conventionally regarded as an agricultural matter, and SERM generally defer on ILO-related issues to Saskatchewan Agriculture and Food. A second source of overlap occurs with rural municipalities. Under The Planning and Development Act, RMs possess primary jurisdictional control over land use matters. Where an RM has adopted ILO-related zoning bylaws, an operator may require a development permit from the council before establishing a facility. A permit may be issued subject to development standards similar to those required or recommended by SDAF. However, since each RM may adopt its own bylaws, municipal jurisdiction over ILOs in the province is highly variable from one locale to another. SaskWater also regulates land use by requiring approval of any waterworks, sewage works or drainage works. Finally, depending upon the location and details of the facility, an operator may require approval of either Saskatchewan Health or Saskatchewan Highways and Transportation.

Statutory regulation of ILOs notwithstanding, an operator may also be civilly liable to his neighbours in negligence or under the doctrine of strict liability for any manure contamination of water. With regards to nuisance disputes however, no civil action can commence before an application is made to the Agricultural Operations Review Board for a determination on whether the operation complies with a 'normally accepted agricultural practice'. Operations which are found to comply with such practices will be protected from liability in a nuisance action. After a prescribed period, a nuisance action may be commenced. In this case, court will give primary consideration to any recommendation made by the Board but it is not bound by its decision in rendering final judgment in the case.

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CHAPTER 4 - Saskatchewan Rural Municipality and Producer Survey Responses

Given the importance of RMs in determining the regulation of ILOs in Saskatchewan, the research team felt that it was necessary to establish, quantitatively and qualitatively, the attitudes of Saskatchewan RMs concerning ILOs. In order to obtain a balanced response, large producers were surveyed, as well. As a result, two different survey questionnaires were mailed out both of which are contained in Part III of this report. One questionnaire went to all Saskatchewan rural municipalities and the other to all large hog producers within the province. There are 298 rural municipalities and 104 large hog producers (large being defined as those operations that produce more than 2000 market hogs, annually) in Saskatchewan. Surveys were sent out at the end of May, 1996 and accepted until July 31, 1996. There were 162 of the 298 RM surveys returned, a response rate of 54.4% and 32 of 104 producer surveys returned for a response rate of 30.8%. The returned surveys were analyzed to determine what trends are occurring in the province's rural municipalities amongst its large hog producers.

I. Rural Municipality Surveys

Our survey findings showed that most RMs were aware of the Agricultural Operations Act. According to the Saskatchewan Association of Rural Municipalities (SARM), of the 298 rural municipalities in Saskatchewan, 171 do not have any planning or zoning bylaws that would affect intensive livestock operations at all. For these rural municipalities, the only requirements for project approval are the provincial ones through SDAF. Less than 50% of the survey respondents stated that they have some sort of bylaw that would affect, generally, an intensive livestock operation. Most of these bylaws are either zoning bylaws or bylaws that generally control development; such as, set backs from road allowances. When asked about bylaws that would specifically affect intensive livestock operations, only 26.5% of respondents stated that they had such bylaws. A few rural municipalities (less than 15%) stated that they have additional planning statements to use when considering approvals for ILOs.

The rural municipalities were asked if their municipality was in the process of bringing in new bylaws that would affect intensive livestock operations and about 24% stated that they were. Most rural municipalities did say, however, that there would be a process in place to appeal these new regulations. Three rural municipalities stated that these new regulations will affect the growth of existing operations because the new bylaws restrict the size of intensive livestock operations. One rural municipality said that existing operations would be limited to doubling their current size. Almost two thirds of rural municipalities said that they approve intensive livestock operations on a case-by-case basis as opposed to using a precedent when deciding upon approval. Most of the rural municipalities that do not have their own bylaws for intensive livestock operations have no experience with intensive livestock operations as there are not any intensive livestock operations in their jurisdiction. Some of these municipalities stated that if a project were to come under consideration in their jurisdiction, it would likely cause the municipal council to look at bringing in some regulations aimed at intensive livestock operations. These RMs simply do not see a need to act in this area, at present.

Most of the RMs that responded to the survey stated that they would want to be in contact with a new or expanding intensive livestock operation. The rural municipalities that do have regulations that would affect intensive livestock operations stated that information about these regulations is available from the municipal office. Most wanted a presentation to council from the potential investor to discuss plans of the investor to make sure that the potential investor is familiar with any bylaws or regulations that the rural municipality has in place that may affect the project. The municipal council wants to meet with the investor to gain an understanding about and become familiar with the project. This is important because in most rural municipalities, a intensive livestock operation is a discretionary use of farm land. That is, it is in council's discretion whether to issue a development permit or not.

When asked about municipal revenue and costs from the rural municipality's perspective, most said that they felt intensive livestock operations did not bring any additional revenue to the municipality. When asked if changing the municipal tax structure to allow municipalities to gain additional revenue from an intensive livestock operation would make intensive livestock operations more attractive to the municipality, just over a quarter of respondents said this would make intensive livestock operations more attractive to them. The majority of respondents (over 40%) were unsure about whether this would make ILOs more attractive or not.

The rest of the respondents said that a change in the taxation scheme would not make an intensive livestock operation more attractive to them. When asked if intensive livestock operations increase infrastructure costs, just over half of the respondents said that infrastructure costs do increase, while 13% said that infrastructure costs do not increase. The remainder were unsure whether costs increased or not. An interesting point to note is that none of the respondents stated that intensive livestock operations decrease infrastructure costs. A question was asked about whether a road maintenance agreement with an intensive livestock operation would be appealing. Only half of the respondents said that it would be. Some rural municipalities said these agreements can be difficult to enforce and this would make them reluctant to enter into such an agreement. There are at least a couple of instances in Saskatchewan where such agreements are in place.

With regard to economic development, most rural municipalities in Saskatchewan stated that they see a need to be involved in economic development. In fact, over 65% said that they feel a need to be involved in economic development. However, about 75% of the respondents stated that their municipality did not have its own economic development plan. When asked if their rural municipality is involved in a economic development group (such as Rural Economic Development (RED) or Rural Development Co-operative (RDC)), slightly over half of the respondents said they were not involved in such a group.

When asked if the municipality saw a need to make itself more attractive to intensive livestock investors just over one in five municipalities said that they saw such a need. The municipal councils that did feel that it was necessary to make their rural municipalities more attractive to intensive livestock investors held this opinion very strongly. There were two reasons cited frequently as to why increased intensive livestock investment is important. The first was that increased intensive livestock production would give rural Saskatchewan more employment opportunities. The second most common reason was that 'activity attracts activity'. These respondents feel that if an intensive livestock operation were to locate in their municipality, more people would live in the area, and these people would spend more money at local businesses. This

would benefit the entire community. Conversely, some respondents stated that they feel their rural municipality has some natural advantages such as a sparse population, and therefore, do not need to actively promote intensive livestock operations. These municipal councils feel that intensive livestock investors should approach them and the municipality should not have to approach the potential investor. Generally, if a rural municipality feels a need to make itself more attractive to intensive livestock investors, it sees a need to be involved in economic development. The reverse is not necessarily true. If a municipality sees a need to be involved in economic development, it may not see a need to make itself more attractive to intensive livestock investors.

When asked their opinions about livestock and then hog production both within Saskatchewan and their municipality, the answers varied significantly. Slightly over 70% of respondents stated they were in favour of increased livestock production within Saskatchewan. However, this number dropped to just under 60% when the question was asked about increased livestock production within their municipality. When asked about increased hog production within Saskatchewan, just under two thirds were in favour of this. Once the respondents were asked about increased hog production within their municipality, 54% were in favour of increased production. There was, however, only one rural municipality which stated that it was opposed to increased hog production of any type. The respondents were least in favour of increased numbers of large intensive hog operations. Almost 55% were in favour of increased numbers of intensive hog operations in Saskatchewan. The number of respondents in favour of increased numbers of large intensive operations within their respective rural municipalities fell to just under 43% in favour. One rural municipality stated that it was opposed to increased intensive hog operations anywhere in the province while two others said they were opposed to increased intensive hog production only within their municipal boundaries and were still in favour of increased intensive hog production in other areas of the province. One municipality in northern Saskatchewan stated that it has a bylaw in place which prohibits the keeping of any livestock within its boundaries. Another municipality was opposed to any type of livestock production. As the question was worded to ask if the rural municipalities were in favour of increasing intensive hog production, one of the municipalities was opposed only to increased production because there are already quite a few operations located in this rural municipality. The council felt the municipality was simply running out of suitable locations for more intensive hog operations. However, this RM was not opposed to operations already located within its own boundaries.

II. Producer Surveys

A second survey was sent out to large hog producers in the province to get their opinions about their construction or expansion experiences. The producer survey was sent out to 104 producers that marketed 2000 or more market hogs in 1995 in Saskatchewan. These producers were then divided into two groups. The first group numbered 43 and marketed 2000 to 4000 market hogs in 1995. The second group numbered 61 and consisted of those producers who marketed over 4000 hogs in 1995. The large producers were surveyed in two groups to see if there were different concerns and opinions based on producer size. After tabulating the results, it was determined that there were no significant differences in the answers provided by the two groups of producers. There was however a significantly larger number of surveys returned by the producers who marketed over 4000 hogs per year. Of the 61 producers that market over 4000 hogs per year, 23 responded to the survey, giving a response rate of 37.7%. The 43 producers that market between 2000 and 4000 hogs per year returned 9 surveys. This gives a response rate for this group of

20.9%. Overall, the producer survey had a return rate of 30.8% with 32 of the 104 surveys returned.

Of the producers that returned surveys, most were located either in the west, south west or central areas of the province. The average size of operation for the respondents is about 540 sows with an average land base of 4440 acres. Seven of the larger producers that responded to the survey indicated that they produce significantly more than 10,000 market hogs per year. Most large producers have only one operation. However, a few of the very large producers have their operations located in more than one location, sometimes even in different RMs. Almost 60% of the respondents said their operation ownership structure was a corporation or Hutterite colony. The remaining responses were split between a partnership agreement (25%), and a sole proprietorship (15%). Roughly 70% of the respondents said they were the only large producer within their rural municipality.

Large producers hire additional labour to work for the operation. The average large hog operation in Saskatchewan has 6.8 full time employees. The number of employees varies widely between operations, however. The respondents answers ranged from 1 to 45 employees. This is related, in part, to the size of the operation and to the amount of work that is contracted out as custom work. Custom work was identified as one of many benefits the community receives from ILOs, according to survey respondents. Some of the other benefits are: grain purchases, purchases from suppliers, and increased employment opportunities.

With regard to waste management, most of the respondents use an earthen manure storage area to store the manure. About 3 out of 4 respondents have an earthen manure storage area on their farm. A few use under barn storage pits while a significant number use concrete walled storage tanks. Approximately one in five of the respondents have a concrete walled tank on their farm. Some respondents (about 15%) indicated that they have more than one type of manure storage facility on their farm. For emptying the storage facility, the respondents were split almost equally between injecting or broadcasting the manure. Broadcasting was slightly more common with about 38% saying they broadcast at least some of their manure. About 34% said they inject at least some of their manure and 25% of respondents stated that they apply the manure with irrigation water. About 3% of respondents said they use a combination of broadcasting, injecting, and irrigation water to dispose of their manure. Almost 65% of the respondents stated that they apply the manure to their own land, exclusively, and 28% said they apply the manure to their own land and to other people's land. Only three respondents stated that the manure was applied to another land owner's land, exclusively. This occurred where the operator was located on a very small land base and could not spread any manure on his or her own land. The rate at which the manure was applied to the land varied but between 4,000 to 10,000 gallons per acre was the most common response by ILO operators surveyed.

The survey posed then a number of questions to the producers about their most recent construction or expansion project. When asked about their last expansion or new construction, almost 80% of respondents had either constructed new facilities or expanded existing ones since 1990. When asked about opposition to and getting approval from their local rural municipality and government agencies for their projects, about 22% of respondents stated that they received some objections to their project. In most, but not all, cases objections were raised against projects that were undertaken after 1990.

Producers were then questioned about any opposition and concerns raised by neighbours. Most respondents, 50% of those answering the question, stated that there were no significant concerns raised about their project. Of the remaining 50% who stated that there was some objection, a lot of the objections raised about a new project were concerned about possible air quality problems. There were also a significant number of concerns raised by neighbours about potential air and water quality problems.

The producers were also asked if they were familiar with the Agricultural Operations Act and 56.3% said they were while 34.4% said they were not. The remaining 9.4% declined to answer the question. When asked about the permitting process, most respondents stated that the rural municipality and Saskatchewan Department of Agriculture and Food were the only two parties involved. Two respondents stated that the Saskatchewan Water Corporation was also involved to a degree when either potential water sources for the operation were being located or for the spreading of manure on the surrounding farm land. About 80% of the respondents said that they did not feel constrained by their rural municipality. Some commented that the RM was helpful in the permitting process, as well as providing encouragement and support to the producer. Two of the respondents said they felt at least somewhat constrained by their local RM.

When the question was asked to producers about how difficult the permitting process was overall, the answers varied greatly. Almost twenty-two percent said they found the permitting process very easy while 31.3% found it fairly easy. About 6.3% rated the process as neither difficult nor easy, while 12.5% of respondents said the process was somewhat difficult and 3.1% rated the process as very difficult. Of all the respondents, 21.9% did not offer an opinion. In looking at the various responses and comments, there seems to be a relationship between the number of different regulatory bodies involved and how difficult the producer thought the approval process was. The more provincial agencies that had input into the approval process, the more difficult the process was, according to producer opinion.

The last part of the survey posed a few questions about possible taxation issues to producers. These questions were aimed at finding out if rural municipalities were experiencing more costs because of intensive livestock operations and if they would be able to recoup some of these costs by taxing intensive livestock operations in a different manner than crop land is taxed. This might make rural municipalities more willing to have an intensive livestock operation locate in their jurisdiction. The producers were asked for their opinions about this issue, also. When asked if they would be interested in seeing this idea studied further, over 60% said that they would not be interested in this idea at all. Only 25% said that they would be interested and the remainder were either unsure or did not answer the question. A question was asked of producers about their opinion on the possible bases for such a taxation scheme for livestock. Most of the producers that replied to the question said that the basis should be either the number of sows or sow farrowing spaces or the operation size. Two other responses that were indicated were animal units or number of animals and annual production level.

The question was also asked about whether production efficiencies should be encouraged; 15.6% of respondents said yes, 40.6% of respondents said no and 43.8% were unsure or declined to answer the question. Finally, producers were asked about what the changed taxation scheme should apply to; for example, should it apply to all types of livestock, only to operations above a certain size limit, only to intensive operations, or should it be applied based on some other criteria. Only

56% of respondents answered this question and the answers were fairly evenly split between the following two answers: to all types of operations and only to operations above a certain size limit. The majority of producers feel that they pay enough tax to their rural municipality and there were many comments stressing this point.

III. Conclusion

To summarize, most rural municipalities in the province are either in favour or neutral towards increasing intensive livestock operations in their jurisdictions. However, most rural municipalities do not want to actively seek new ILOs to locate within their boundaries. The majority of respondents, both producer and rural municipality, felt that there was no need to change the current taxation structure. Generally, RMs said that changing the tax structure will not make intensive livestock operations more attractive to them. The producers thought that it could make their tax burden higher. Some rural municipalities may want large operations to enter into some kind of a road maintenance agreement to help defray increased infrastructure costs that rural municipalities are incurring. There are at least two similar agreements already in place between producers and their local municipalities. One of these agreements is similar to a heavy road haul agreement that resource exploration companies frequently use based on road traffic and the other is a fixed dollar value based on the number of sows. Other RMs may start to look to similar agreements.

As there were no significant differences between the large and very large producer survey responses, a conclusion could be that the relative size of the intensive hog operation is not an important consideration in obtaining approval from municipal or provincial authorities. The potential new investor should remember that relatively few rural municipalities are strongly opposed to new intensive livestock operations whereas many are very much in favour with most municipalities between the two extremes. The majority of producers do not feel that the approval process for expansion is too difficult, although some stated the process may be quite lengthy. This is not to say that there are not some areas where a potential investor may run into difficulty. Communicating with municipal council will go a long way toward determining how council and members of the community feel about a potential project. Both producers and rural municipalities agree that communication is very important between all involved parties. Such communication involves the RM council, neighbours, government agencies, and the potential investor. The more open the investor is to the other people who may be involved in the project, the less likely conflicts and misunderstandings will develop. Based on RM survey results, rural municipalities seem to be, generally, exercising their regulatory powers over intensive hog operations rationally, fairly and in the spirit of improving the overall health of local economies of Saskatchewan. From the producer surveys results, most intensive hog operations in the province would tend to agree.

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CHAPTER 5 - Environmental Risks In Waste Management From ILOs

I. Introduction

Manure produced by livestock operations is a by-product that may contaminate surface and groundwater in the immediate vicinity and even beyond the limits of the livestock operation. An important objective of any ILO must be to minimize this environmental hazard. In that manure is a valuable source of nutrients, especially nitrogen and phosphorus, and organic matter for crop production and maximizing the conversion of these nutrients into crops will minimize the environmental hazard, it is important that each ILO develop a management strategy that will ensure the maintenance of the integrity of the environment through efficient use of the manure resource. Such a strategy involves the consideration of a number of factors related to the nature of the land resource base and the associated operational waste management methods. It is the purpose of this chapter to present these factors and indicate the extent to which they become constraints to ILOs.

II. Factors that Determine the Environmental Constraints

Several factors must be taken into consideration when determining environmental risks in waste management from ILOs. They include the following:

1. Nitrogen and phosphorus are the main plant nutrients in manure.
2. Enrichment of water by nitrogen or phosphorus can lead to accelerated eutrophication of surface water or contamination of groundwater.
3. Nitrogen is very mobile in soil solution and easily leached through the root zone. Phosphorus is normally fixed to organic matter and clay in the soil and, hence, not susceptible to leaching.
4. Erosion by wind or water can transport nitrogen and phosphorus to nearby water bodies or to gullies that may eventually carry these nutrients to water bodies.
5. Manure may contain appreciable amounts of salts, especially if salt-levels in livestock water are high. It may, also, contain micronutrients such as boron, copper and zinc and non-nutrients such as bacteria and detergents.
6. Soil texture and structure largely determine the rate that water and dissolved solids move into and through the soil, as well as the soil's potential for denitrification and volatilization (see Table 1).
7. The greater the nutrient use by the crop the higher the potential rate for manure application. In general, nutrient use by the crop is dependent upon plant- available water, which is determined by climate and soil texture.
8. A number of factors, including the steepness of the topography, length of slope, soil texture and cover, and climate, determine the amount of runoff and erosion that may occur. Runoff water and associated sediment are often confined to local basins or sloughs but the development of a gullied pattern facilitates the transfer of runoff beyond the local landscape area to rivers and lakes.
9. The highest rates of manure can be applied to soils with the highest yield potential (and

hence nutrient requirement) combined with the lowest potential for nutrient losses from leaching, denitrification and runoff.

10. The effectiveness of the applied manure depends on the season of application, soil moisture at application time, nutrient levels in the soil, and the method of application and extent of incorporation of the manure into the soil.

Table 2. Soil characteristics affecting manure application rates.

Texture*	% clay	Estimated Hydraulic Conductivity (cm/hr)	Estimated Percolation (min/inch)	Denitrification and Volatilization coefficient**
S - LS	5-7	30 - 40; rapid	3 - 5	1.05
SL	8-12	10 - 30; moderately rapid	5 - 15	1.05 - 1.18
FL - VL	16-20	5 - 8; moderately rapid	20 - 30	1.18
VL - L - SIL	20-25	3 - 6; moderate	5 - 50	1.18
CL - SICL	27-35	1 - 3; moderate	50 - 150	1.18 - 1.33
C - SIC	40-50	0.5 - 0.8; slow	200 - 300	1.33 - 1.67
HVC	50-60	0.2; slow	750	1.67

*Textures are as follows:

S -Sandy; LS - Loamy Sand; SL -Sandy Loam; FL -Fine Sandy Loam; VL -Very Fine Sandy Loam; L -Loam; SIL -Silty Clay Loam; CL - Clay Loam; SICL -Silty Clay Loam; C -Clay; SIC -Silty Clay; HVC -Heavy Clay.

** These values are derived from USDA, (1978) report on Animal Waste Utilization. The coefficients are used to demonstrate potential nitrogen losses based on soil texture. They may not, however, exactly reflect Saskatchewan moisture and temperature conditions.

III. Rating the Environmental Constraints

Yield of stubble crops, soil texture, water erosion potential and the development of external drainage were selected as indicators that reflect kind and level of constraint to waste management in ILOs. These indicators were evaluated using the 1:1 million scale Soil Landscapes of Canada map series (Agriculture Canada, 1992) in conjunction with Saskatchewan Crop Insurance and 1991 Census of Agriculture databases. It must be appreciated that the small map scale is appropriate only for regional assessments as it is possible to have inclusions of areas of different soils that are important at the farm level. In other words, an area delineated on any of the maps may have inclusions of soils that have higher or lower ratings than those specified for that area. A more thorough evaluation of any particular area is possible by utilizing more detailed soil survey information available at the Land Resource Unit of Agriculture and Agri-Food Canada or the Soil Survey Unit of the Saskatchewan Centre for Soil Research at the University of Saskatchewan.

Nitrogen was used as the critical factor in rating the soils because of its concentration in manure and its mobility in the soil environment. Although it is the only constituent discussed in the following section, the environmental impact of other nutrients and salts should always be considered whenever manure is applied to land.

IV. The Interpretive Maps

Six maps have been prepared to rate the lands in the agricultural region of the province for intensive livestock operations. In effect, the first five of these maps simply reflect the potential of the land to accept manure without damaging the environment within and beyond the boundary of the operation. The sixth map combines Maps 1-5 with the survey results from Chapter 4 showing RMs which support ILO development in their jurisdiction. This sixth map shows roughly areas in the province where environmental and social conditions merge to favour the development of ILOs.

Map 1. Average Stubble Yield

The Average Stubble Yield map identifies areas where soil and climatic conditions are most favourable for growing crops, as exemplified by stubble wheat yields. Such areas have the greatest potential to utilize nutrients present in manure for plant growth, hence eliminating or minimizing potential environmental contamination. In essence, attaining high yields often requires supplemental fertilization. Manure can supply some or all of these nutrients. Areas with higher rainfall and other favourable growing season conditions will produce higher yields, assuming optimal soil fertility levels exist. In order to achieve maximum yields, soil fertility levels must be high and, consequently, manure application rates may be higher than in drier, lower-yielding areas. Higher densities of livestock can be accommodated on a suitable landbase. Furthermore, a smaller landbase is needed to produce feeds for livestock and potentially shorten haul distances that are required to obtain feed and dispose of manure.

Caution must be exerted in the application of this map as it relates to the extensive areas of sandy soils that are potentially high-yielding. High stubble yields areas are associated with higher rainfall and, hence, with relatively higher leaching potential. As discussed below, sandy-textured soils have a higher leaching potential than finer-textured soils, necessitating lower manure application rates to minimize leaching of nutrients below the root zone and to the groundwater. Fall application of manure on sandy soils should be avoided.

Map 2. Soil Texture Groups

Soil texture indicates permeability, or the ability of a soil to transmit water. Permeability decreases with increasing clay content. Coarse-textured soils are those with low clay and high sand contents and have a high permeability (Table 2). Those soils tend to have high infiltration rates and, consequently, a low water erosion hazard. However, water readily leaches soluble nutrients through the rooting zone. Coarse-textured soils, therefore, have a high risk for groundwater contamination. As a result, manure application rates should be lower on these soils.

Fine-textured or clayey soils have relatively high clay contents and, therefore, a lower permeability. They are the opposite of coarse-textured soils in that they may have a high water erosion potential, if they occur on sloping landscapes. Fine-textured soils resist the leaching loss of nutrients and therefore are unlikely to result directly in groundwater contamination. If fine textured soils occur on sloping or dissected landscapes, the possibility exists for surface water flow and erosion. This occurs when the rate of precipitation exceeds infiltration. When this occurs there is a high risk of surface water contamination from overland water flow carrying eroded soil and manure. This may result in particulate, nutrient or microbial enrichment of surface waters. Fine-textured soils are also subject to compaction. Generally as the clay and moisture content of a soil increases, so does its susceptibility to compaction. Wet clay soils are more subject to compaction than dry clay soils and coarser-textured soils.

Recommended rates for manure application usually increase on soils with increasing clay content. Finer-textured soils have a higher moisture retention and drought tolerance than coarse-textured soils. Crops are therefore potentially more efficient at using the nutrients in manure and are more likely to achieve target yields. Denitrification losses, however, tend to increase with increasing clay content. Therefore, additional manure may need to be applied to account for denitrification losses. Wet clay soils have the highest levels of denitrification.

Map 3. Water Erosion Rating

The Water Erosion Rating map indicates the potential risk for surface water contamination. The water erosion rating is predicted with the use of the universal soil loss equation. The predicted water erosion rate is calculated for a bare soil using rainfall and snowmelt erosivity factors, slope length and steepness factors and soil erodibility factors based on physical soil properties such as soil texture, organic matter content, soil structure and soil permeability.

Areas with low erosion ratings, and hence low potential for surface water contamination, are the most suitable for high manure application rates. Areas that are susceptible to erosion can receive a great deal of benefit from the application of manure, however the higher the water erosion potential, the less suitable a soil area is for high rates of manure application. Application rates should be reduced on erodible areas unless measures are undertaken to prevent erosion. For example eroded knolls in a knob and kettle landscape are often low in nutrients and organic matter. Manure applied to knolls in a continuous cropping situation would greatly enhance the productivity of these areas.

Map 4. Risk of Surface Water Contamination Beyond the Target Area (External Drainage)

The External Drainage map depicts areas where a livestock operation can potentially contaminate gullies, rivers and lakes that lie beyond the boundaries of the livestock operation. Areas at risk are dissected by streams and shallow gullies that potentially may carry surface water out of the area. Manure applied to these areas have a higher risk of surface water contamination outside of the local area than internally drained areas. The greater the proportion of an area that is externally drained, the higher the risk of surface water contamination. These dissected areas can be used successfully for intensive livestock operations and manure disposal providing appropriate buffers exist to separate the gullies and streams from the livestock facilities and areas where the manure is applied.

Map 5. Manure Application Capacity

Soil and landscape characteristics shown on maps 1 to 4 have been ranked to indicate the general suitability of soil areas for intensive livestock operations. Table 2 shows the criteria used to classify each soil area. Manure application rates can be higher on areas with few constraints. Areas with moderate to severe constraints may still be suitable for manure application, but at lower rates.

Table 3. General Land Suitability Criteria

Suitability	Constraints	Yield (bu/ac)	Texture	Water Erosion	External Drainage
Good	Few	> 20	loamy to clayey	none to low	no
Fair	Moderate	16-20	loamy to clayey	moderate	yes
Poor	Severe	<16	sandy	high to severe	--

GOOD - Soil with few constraints to ILO. Soils are high yielding, have low water erosion potential, and are loamy to clayey textured. Landscapes are generally not externally drained.

FAIR - Soil areas with some moderate constraints to ILO. Soils areas have moderate erosion potential, or are externally drained.

POOR - Soil areas with serious constraints to ILO. Soils may singly or in combination be low yielding, have high to severe erosion susceptibility, or have sandy textures.

Map 6. Locating Intensive Livestock Operations (Social and Environmental Considerations)

The Manure Application Capacity map (Map 5) was combined with the survey results to show areas in the province where RM councils have shown a favourable attitude to ILOs and where the environmental capacity for manure application is good. These areas would be ideal places for producers to pursue the establishment or expansion of an ILO.

V. Manure Application Rates

The following section discusses the rates that manure can be applied to meet cereal crop nitrogen needs in the major soil zones of Saskatchewan. They are based on manure rate of application formulas used by Larson (1991) and general fertilizer recommendations (Table 3) by Saskatchewan Agriculture (1987). Table 4 shows the amounts of manure needed to provide nitrogen for each soil zone assuming no loss of applied nitrogen. These calculations are intended to demonstrate approximate amounts of manure that can be applied to medium to moderately fine textured soils.

Application rates are based on the nitrogen levels of manure and on cereal crop soil nitrogen requirements. Nutrients are assumed to be applied for yields of cereals that are appropriate for the soil zone (Saskatchewan Agriculture, 1987). Denitrification losses are assumed to be low and constant across the soil zones, although they are more likely to be higher on some soils in the north.

Table 4. Nitrogen requirements for cereal crops grown on stubble in Saskatchewan.

Soil Zone	N, (lb/ac*)
Brown	40
Dark Brown	60
Black	85
Gray	95

Liquid hog manure is used in the calculations to determine the values shown in Table 4. Poultry manures tend to have higher nutrient levels than hog manure, and cattle manures tend to be lower. Because of the variability of manures and soil fertility each must be determined for every operation.

Average nitrogen content of liquid hog manure is extremely variable as reported by Kruger (1993), ranging from 14 to 71 lb. nitrogen per 1000 gallons with an average of 30 lb per 1000 gallons. In Saskatchewan, the average amount of liquid manure produced by hog operations is 9.2 gallons per

day per sow unit. A sow unit is the sow plus piglets raised to market weight. Over a one year period, a sow unit produces on average 3358 gallons of manure.

Application rates in the first few years may be up to 2 times that indicated in the above table. Also, rates assume all other nutrients are in balance for maximum yield of cereals, and that salt loads are acceptable. Application levels will be lower for coarse-textured soils where risk of leaching and ground water contamination is high. Volatilization and denitrification losses of nitrogen are not accounted for in these calculations. Volatilization and denitrification losses should be considered when determining actual target yields and crop nitrogen needs. For example if a heavy clay soil requires 45 lb/ac of nitrogen, the applied manure will need to contain about 75 lb/ac of nitrogen to supply the crop with adequate levels of nitrogen [45 lb/ac N x 1.67 (Table 1 denitrification coefficient for hvc from USDA,1978)= 75.15].

Table 5. Long term annual application rates of liquid hog manure.

Soil Zone	Low N Manure		Average N Manure		High N Manure	
	Application Rate (gal/ac)	acres/sow unit	Application Rate (gal/ac)	acres/sow unit	Application Rate (gal/ac)	acres/sow unit
	14 lb N/1000 gallons		30 lb N/1000 gallons		71 lb N/1000 gallons	
Brown	2857	1.2	1333	2.5	563	6.0
Dark Brown	4286	0.8	2000	1.7	845	4.0
Black	6071	0.6	2833	1.2	1197	2.8
Gray	6786	0.5	3166	1.1	1338	2.5

VI. Conclusions

Manure can supply adequate levels of nitrogen to crops. Higher rates of manure can be applied in the high yield areas as compared to the drier southern region of Saskatchewan. Higher rainfall areas, however, have a greater risk of ground- and surface- water contamination through leaching and erosion. Coarse-textured soils, especially in the high yield areas, should have lower application rates because of the high potential for groundwater contamination. Application rates should also be lower on low permeability (high clay) soils that are susceptible to compaction, water erosion, or are externally drained. A larger landbase will be needed to dispose of manure in areas where application rates are lower.

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Conclusions

When the first settlers came to Western Canada, they homesteaded on a quarter section of land and grew enough grain and raised enough livestock to take care of their families. These were small mixed operations and no one could have predicted that prairie agriculture would one day be one of the most complex industries and produce would be exported all over the world. As horses were replaced by tractors and the export market in grains grew, cattle, hogs and poultry disappeared and farming operations became more specialized; that is they became focused on the production of one commodity (*e.g.*, grain or livestock). The Farm Crisis of the 1980s altered this as producers looked for ways to diversify and spread risk on their farms. The demise of the Crow benefit intensified this trend.

Specialty crops, off-farm employment, on-farm businesses, and value-added processing are some diversifying activities Saskatchewan farmers are undertaking. Although ILOs are a way to specialize within the production of a commodity, they are part of the movement to diversifying on the farm by adding value to produce before it is exported off the farm. ILOs consist of operations which produce large numbers of animals for market on small areas of land, utilizing large barns, modern technology and locally produced feed grain, taking advantage of low feed prices in the province. There is also a movement toward sustainable agriculture which promotes the reduction of chemical inputs and negative influences on the environment.

Producers and developers in Saskatchewan enjoy the lowest feed grain prices in Canada. World demand for pork has increased and hence, the number of hogs produced in Saskatchewan has doubled in the last decade, rising to a million hogs and expectations are that this could rise to two million hogs before the year 2000. Much of this increased production has been made possible by the development of intensive hog operations. But the complexity of the agriculture industry and society means that not everyone has heralded the addition of large hog barns to the prairie landscape. An increase in concern for the environment and the effect ILOs may have on the survival of the family farm has made for lively discussion about the expansion of ILOs.

In Alberta and Manitoba, the issue of odour is sometimes thought to be a product of rural/urban conflict. Odour is unacceptable in areas where urban people have country homes or where cities have expanded out toward an existing ILO. Rural people seem to be more accepting of odour as they see it as a component of farm life. On the other hand, Saskatchewan has seen opposition based, for the most part, in rural areas where the conflict seems to be in neighbour vs. neighbour. This conflict may be further fuelled by the fears of small producers being overwhelmed and driven out of business by large operators.

Manure from ILOs can be used as valuable fertilizer but because such large amounts are accumulated, a large land base is needed for application. Certain soil textures are more amenable to manure application than others and this must be taken into consideration when planning an ILO and choosing a site. Many indicators should be used to determine which locations in Saskatchewan would be more ideal for intensive livestock production. These indicators include: wheat stubble yield, soil texture, manure application rates, topography for drainage, and human population and attitude.

Alberta and Manitoba have provided a formal local body to look into conflicts involving ILOs. In

Alberta, there are advisory boards set up consisting of industry peers. When a conflict arises, the industry peer on the board will look into the situation. Regional Advisory Committees (RACs) in Manitoba are made up of local representatives and these committees will deal with community complaints, as they emerge. Saskatchewan has chosen to handle community-based complaints in a more informal but effective manner. As an ILO operator seeks to obtain provincial and local governmental approvals, the ILO operator is encouraged, at times even required, to seek public input into the project. In all three provinces, public consultation is highly encouraged and considered prudent practice by the ILO operator in any new or expanded hog operation. In all three provinces, there are government regulations that exert "upstream" or "downstream" (or both) controls over ILOs.

In Saskatchewan in particular, the Saskatchewan Department of Agriculture and Food (SDAF) is involved closely in the development process of an ILO. The Agricultural Operations Act both regulates and protects ILO operators. Other provincial agencies may also regulate certain aspects of an ILO, including Saskatchewan Department of Health, Saskatchewan Water Corporation, and Saskatchewan Department of Highways and Transportation.

SDAF shares regulatory control of ILOs with local municipalities. RMs have the discretion to require ILO compliance with RM bylaws and may require operators to secure RM approval for ILO development or expansion. There has been some movement to public consultation but Saskatchewan governments need to assure open lines of communication. In both the RM and producer surveys, the opinion was that this public input is a necessary step in the development of ILOs in this province. Survey responses tended to show, however, that most ILO developers did not feel overly constrained by RM requirements.

Information from the RM and producer surveys was used in combination with the soil and environmental indicators to form a picture of the province's potential for ILO development. The RM surveys were designed to find out which RMs were favourable to locating ILOs as an economic development strategy in their jurisdictions and which were not. As the survey results show, some RMs have shown reluctance to large hog operations and some RMs look at them more favourably. Other opinions were gathered on bylaws that may be in place that would affect existing and potential ILOs, possible tax benefits, generally increasing livestock and/or hog numbers in the RM and the province, and overall awareness of the Agricultural Operations Act. Producers were consulted to reveal their experience during expansion or development of an ILO. They were asked about waste management systems, benefits to their area or community, problems encountered and sources of those problems and their opinion about potential change in the tax structure.

The CSALE project team felt that it was important to go to the RMs and to producers in order to document their experience regarding ILO development. The survey results show that most RMs are in favour of, or are neutral toward, ILO development in their boundaries. It must be kept in mind, however, that there are a few RMs definitely opposed to having ILOs. Most RMs will not actively seek developers for their area but will meet with potential developers for purposes of seeing their plans, getting information about waste disposal, and inform them of existing or proposed bylaws that would govern development. Some concern was raised about infrastructure cost, mainly road systems. Clearly, producers are not in favour of tax levies and RMs are wondering how they will deal with the extra cost. Although a new tax schedule may not be feasible, a road maintenance agreement could be possible to defray costs from extra trucking traffic and provide an acceptable

middle ground between the RMs and producers.

A formalized public consultation process may be necessary and both RM councils and producers stress the undeniable need for a public communication/consultation plan. The public must have access to all information facilitated by a combination of public meetings, informal communication (neighbour-to-neighbour), workshops, and printed materials. The public must feel that it has participated in the process and be informed of all aspects of an ILO development. This would include plans for the building, management of waste, investment opportunities, and the economic and social benefits to the community (employment and local markets for feed grain).

Two components of this project which, when combined (the surveys and the soil indicators) produce an interesting insight into locating ILOs in the province. These are aggregated in Map 6 (Chapter 5) to show where favourable local environmental and social conditions co-exist that would sustain ILO development or expansion. It would be ideal for developers to have access to this information and that guidance be provided by the government indicating better to optimal locations for development in order to maintain the sustainability of agriculture in Saskatchewan.

This project has researched the environmental, legal and social conditions involved in the location of favourable sites for ILOs. The land base required for manure application and the soil types which would have higher potential for receiving such applications have been investigated closely with the help of the Land Resource Unit, Department of Soil Science, College of Agriculture, University of Saskatchewan. The RM and producer surveys have given an idea of where preferred local conditions exist which would foster the development of large hog operations. As there is an increase in world food demand and the necessity to add value to products leaving the prairies, there is a place for ILOs in Saskatchewan. Moreover, there are many locations in the province that would be appropriate sites for them.

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Conclusions

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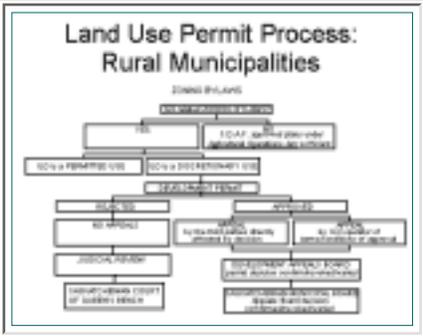
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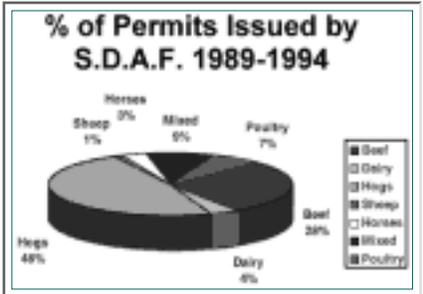
Appendix 1

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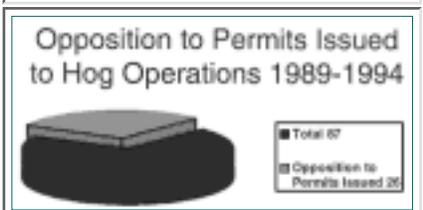
Land Use Permit Process: Rural Municipalities



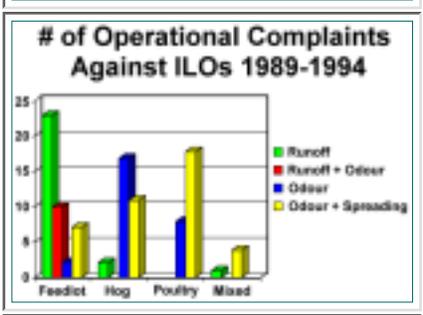
of Permits issued by SDAF, 1989-94



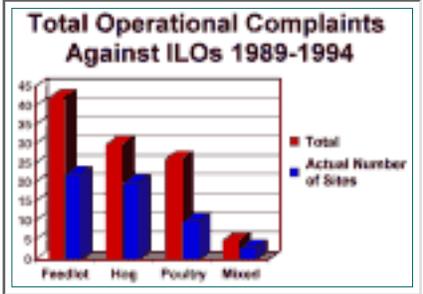
% of Permits issued by SDAF, 1989-94



Opposition to Permits Issued to Hog Operations, 1989-94

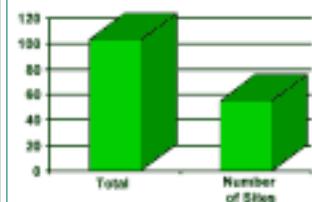


of Operational Complaints Against ILOs 1989-94



Total Operational Complaints Against ILOs 1989-94

Total Operational Complaints Against ILOs 1989-1994



Environmental Review: The Agricultural Operations Act

Environmental Review: The Agricultural Operations Act



Nuisance: The Agricultural Operations Act

Nuisance: The Agricultural Operations Act



Permit Process for Establishing ILOs

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Appendix 2. RM and Producer Surveys and Cover Letters

Administrator Cover Letter

Dear Administrator,

We, the Centre for Studies in Agriculture, Law and the Environment, are working on a research project at the University of Saskatchewan. The purpose of this project is to look at intensive livestock operations in Saskatchewan. In particular we are studying environmental and legal constraints faced by intensive livestock producers when they wish to expand their current operation or construct a new operation. As part of this study, we are surveying all rural municipalities in Saskatchewan. We are looking for information about municipal bylaws and other regulations that potential hog producers may encounter when either expanding or building a new intensive livestock operation.

We will also survey large hog producers within Saskatchewan to find out about their expansion plans and the opportunities and impediments for such expansion.

This information from both rural municipalities and hog producers will be compiled to form a data base which permits livestock producers and rural municipalities to determine what could be encountered when trying to build or expand a hog operation in the province. The data base will contain information on everything from municipal bylaws to soil and water conditions for a particular area. This information should be useful in the planning phases of any new project under consideration.

We ask that you please, with council's input, take the time to fill out the enclosed questionnaire. Please feel free to write on the back of the page if you need more room to answer a question. You can return it in the enclosed postage paid envelope. If you have any questions about the questionnaire, please feel free to call me, Brian Morris at the University of Saskatchewan at 966-4066. We would ask that you please return the completed survey by July 15.

We sincerely thank you for your co-operation.

Administrator Survey

1. What is the name and number of your R.M.?

2. Is your R.M. aware of the Agricultural Operations Act?

Yes

No

3. Does your R.M. currently have any zoning bylaws in place that would affect intensive livestock operations but which are of a general nature?

Yes

No

4. Does your R.M. currently have any bylaws or regulations specifically regulating large or intensive livestock operations? i.e.: restrictions for size, location, separation distances, etc.

Yes

No

5. Does your R.M. currently have any guidelines or planning statements other than those referred to in the last two questions to guide it when considering approvals for intensive livestock operations?

Yes

No

6. Is your R.M. in the process of imposing new bylaws or regulations?

Yes

No

7. Will there be a process to appeal the new regulations once they are in place?

Yes

No

8. Will these new regulations affect existing operations?

Yes

No

9. Does your R.M. rely on a fixed set of rules for approving projects or is each project approved on a case by case basis? That is, do new projects have a precedent to follow?

Yes, there is a precedent to follow

No, each project has to go through the approval process on a case by case basis.

Comments: _____

10. Does your R.M. receive any tax benefits from intensive livestock operations?

Yes

No

Unsure

11. Would the ability to receive tax revenue through a change in provincial tax rules on intensive livestock operations make these operations more favorable to your R.M.? That is, if intensive livestock operations were taxed differently than, for example, farm land.

Yes

No

Unsure

12. Do large livestock operations cause increased costs to your R.M.? That is, do infrastructure costs increase from increased road traffic, etc.?

Yes, infrastructure costs do increase.

No, infrastructure costs do not increase.

Large livestock operations actually decrease infrastructure costs.

Unsure

13. Do tax revenues from area surrounding intensive livestock operations decrease?

Yes

No

Unsure

14. If infrastructure costs increase, would the ability to enter into an agreement similar to a heavy road haul agreement similar to agreements between some governments and exploration companies make intensive livestock operations more attractive to your R.M.?

Yes

No

Unsure

Comments: _____

15. Does your R.M. see a need to be involved in economic development?

Yes

No

16. Does your R.M. have its own economic development strategy?

Yes

No

17. Is your R.M. presently involved in a economic development group such as R.E.D. or R.D.C.?

Yes

No

18. Do you see a need to make your R.M. more attractive to intensive livestock investors?

Yes

No

Please explain why or why not.

19. Please describe how R.M. council interacts with intensive livestock investors. How do new investors approach council about a new operation? How do existing producers approach council about any expansion plans? How would individuals obtain information about R.M. bylaws?

20. How does the R.M. council feel about increased livestock production within:

Saskatchewan

In favor

Neutral

Opposed

Don't know

Your R.M.

In favor

Neutral

Opposed

Don't know

21. How does the R.M. council feel about increased hog production within:

Saskatchewan

In favor

Neutral

Opposed

Your R.M.

In favor

Neutral

Opposed

Don't know

Don't know

22. How does R.M. council feel about increased numbers of large or intensive hog operations in:

Saskatchewan

In favor

Neutral

Opposed

Don't know

Your R.M.

In favor

Neutral

Opposed

Don't know

Please attach a copy of your bylaws, regulations, guidelines or planning statement which are used to assess and approve intensive livestock operations in your rural municipality.

Thank you for your co-operation.

Producer Cover Letter

Dear Producer,

We, the Centre for Studies in Agriculture, Law and the Environment, are working on a research project at the University of Saskatchewan. The purpose of this project is to look at intensive livestock operations in Saskatchewan. In particular we are studying environmental and legal constraints faced by intensive livestock producers when they wish to expand their current operation or construct a new operation. The main focus of this study is to look at constraints that hog producers encounter. As part of this study, we are surveying larger hog producers in Saskatchewan. We are looking for information about their current operations as well as some information about their expansion plans.

We will also survey all rural municipalities within Saskatchewan to find out any restrictions that municipal governments place on intensive livestock operations. This will show which rural municipalities are more favorably disposed to welcoming intensive livestock operations.

This information from both hog producers and rural municipalities will be compiled to form a data base which permits livestock producers and rural municipalities determine both to where new operations can be more easily established and what potential obstacles could be encountered when trying to build or expand a hog operation. This information should be useful in the planning phases of any new project under consideration in the province.

We ask that you please take the time to fill out the enclosed questionnaire. If you have any additional comments about a question, feel free to use the back of the page to write on. You can return it in the enclosed postage paid envelope. All of your answers will be kept completely confidential. We will not be reporting any information on an individual basis. If you have any questions about the questionnaire, please feel free to call me, Brian Morris at the University of Saskatchewan at 966-4066. We would ask that you please mail the completed survey by July 15.

We sincerely thank you for your co-operation.

Producer Survey

1. How large is your operation? Please provide both the number of sows and the number of market hogs sold last year.

_____ Sows _____ Market hogs sold in the past year.

2. What is the land area owned by the operation? _____ acres.

In which R.M. is your hog operation located. If more than one, give all R.M.s. Please identify your R.M. by both name and number.

3. What type of operation do you use? For the purposes of this survey, a site is defined as a separate land location and not just separate buildings beside each other.

- One site
- Two site
- Three site
- Other (specify) _____

4. What type of ownership structure does your operation have?

- Sole proprietorship
- Limited or general partnership
- Corporation
- Other (specify) _____

5. Are there other hog operations that are either approximately the same size as your operation or larger within your R.M.?

- Yes If yes, please give the approximate number of such operations. _____
- No

6. What type of manure storage do you use?

- Earthen lagoon
- Concrete or metal walled manure storage tank
- Under barn pits
- Other (specify) _____

7. What is your method of disposing of the manure?

- Broadcasting (applied to land surface)

Injecting

Applying with irrigation water

Other (specify) _____

8. Whose land do you use to dispose of the manure? Check all that apply.

Own

Rented

On another land owner's property with an agreement in place to apply the manure

Other (specify)

9. What is the approximate average volume of manure applied per acre?

_____ gallons per acre.

10. How many people do you employ full time at your operation? (If your operation is in the process of expansion, how many people will you employ full time after the expansion? If there are two people working half time, please count this as one full time position.)

11. What benefits do you see flowing to the R.M. and the local community from your operation?

12. In what year was your most recent expansion of existing facilities or construction of new facilities? _____

13. When this expansion or construction was being planned, did you experience any constraints, restrictions, opposition, or objection to your project from your neighbors?

Yes

No

What were the nature of these objections?

14. When this expansion or construction was being planned, did you experience any constraints, restrictions, opposition, or objection to your project from the government agencies below?

from Saskatchewan Agriculture and Food.

from the R.M. in which the operation is located

from another provincial agency (such as Highways, Health, Rural Development, Environment, Water Corporation. Please indicate which ones) _____

Please explain what was the exact nature of the concern raised by each?

15. What processes were followed and what permits obtained to enable you to get approval for your project?

16. If there was any opposition to your most recent expansion or construction, what were the concerns of the people who were objecting to the project? Mark all answers that apply.

Air quality by whom? _____

Water quality concerns by whom? _____

Noise by whom? _____

Soil quality concerns by whom? _____

Other _____ by whom? _____

There were no significant concerns

17. Do you feel constrained by the actions or attitudes of your local R.M.?

Yes

No

Please explain.

18. Overall, but excluding financial concerns, how difficult would you rate getting any required approval for your project was?

- Very difficult
- Somewhat difficult
- Neither difficult nor easy
- Fairly easy
- Very easy
- No opinion

Please explain why.

19. Are you aware of the Agricultural Operations Act?

- Yes
- No

20. Would you be interested in a change in the way R.M.s assessed taxes for intensive livestock operations if it were to make R.M.s more receptive to intensive livestock operations. For example, if R.M.s were able to get some kind of additional revenue, within reason, from intensive livestock operations, they may more actively seek intensive livestock operations within their jurisdiction.

- Yes, I would be interested in seeing this studied.
- No, I would not be interested in such a change.

Comments: _____

21. Please answer the following questions even if you answered "no" to the previous question. Keep in mind that the reason behind the idea of changing the tax structure is to make R.M.s more in favor of attracting intensive livestock operations to their jurisdiction. This should simplify the approval process to build or expand an intensive livestock operation.

If the taxation scheme were to be changed, how would you like the changes to be made?

For example, would you want the municipal tax to be based on:

- Building or operation value
- Total number of animals
- Annual production level

Number of sows or farrowing spaces

Feeder barn capacity

Other (specify) _____

22. Would you be in favor of a taxation system where production efficiencies were encouraged? That is, if the municipality were to tax hog operations on the basis of the number of sows, a hog producer could lower the relative tax expense by increasing the number of hogs weaned per sow per year as opposed to increasing the number of sows.

Yes

No

Unsure

23. Do you feel that if the tax scheme were changed it should apply to: (check all that apply)

All types of livestock operations i.e.: hogs, cattle, poultry, etc.

Only intensive livestock operations i.e.: feedlots, hog barns, etc.

Only to operations above a certain size limit.

Other (specify) _____

Comments: _____

Thank you for your co-operation.

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Appendix 3 Survey Results and Data

R. M. Survey Results

Number of Responses: 162

Question Number	Answer	Number Responses	Percentage
2	Yes	144	88.9%
	No	16	9.9%
	N/A	2	1.2%
3	Yes	78	48.1%
	No	83	51.2%
	N/A	1	0.6%
4	Yes	43	26.5%
	No	118	72.8%
	N/A	1	0.6%
5	Yes	22	13.6%
	No	138	85.2%
	N/A	2	1.2%
6	Yes	38	23.5%
	No	122	75.3%
	N/A	2	1.2%
7	Yes	29	17.9%
	No	5	3.1%
	N/A	127	78.4%
	Unsure	1	0.6%
8	Yes	3	1.9%
	No	33	20.4%
	N/A	126	77.8%
9	Yes	21	13.0%
	No	107	66.0%
	N/A	33	20.4%
	Yes and No	1	0.6%
10	Yes	3	1.9%
	No	139	85.8%
	Unsure	10	6.2%
	N/A	9	5.6%

11	Yes	45	27.8%
	No	46	28.4%
	Unsure	67	41.4%
	N/A	4	2.5%
12	Yes	86	53.1%
	No	21	13.0%
	Unsure	40	24.7%
	N/A	15	9.3%
13	Yes	5	3.1%
	No	91	56.2%
	Unsure	51	31.5%
	N/A	15	9.3%
14	Yes	81	50.0%
	No	22	13.6%
	Unsure	47	29.0%
	N/A	12	7.4%
15	Yes	106	65.4%
	No	47	29.0%
	Unsure	4	2.5%
	N/A	5	3.1%
16	Yes	36	22.2%
	No	122	75.3%
	N/A	4	2.5%
17	Yes	79	48.8%
	No	82	50.6%
	N/A	1	0.6%
18	Yes	36	22.2%
	No	105	64.8%
	Unsure	15	9.3%
	N/A	6	3.7%
20 (Sask.)	In favor	116	71.6%
	Neutral	21	13.0%
	Opposed	0	0.0%
	DKNA	25	15.4%
20 (R.M.)	In favor	95	58.6%
	Neutral	29	17.9%

	Opposed	3	1.9%
	DKNA	24	14.8%
	Prohibited	1	0.6%
21 (Sask.)	In favor	106	65.4%
	Neutral	30	18.5%
	Opposed	0	0.0%
	DKNA	26	16.0%
21 (R. M.)	In favor	87	53.7%
	Neutral	40	24.7%
	Opposed	4	2.5%
	DKNA	30	18.5%
	Prohibited	1	0.6%
22 (Sask.)	In favor	88	54.3%
	Neutral	34	21.0%
	Opposed	6	3.7%
	DKNA	34	21.0%
22 (R.M.)	In favor	69	42.6%
	Neutral	41	25.3%
	Opposed	13	8.0%
	DKNA	38	23.5%
	Prohibited	1	0.6%

Producer Survey Results

Number of Responses: 32

Question Number	Answer	Number of responses	Percentage
1 (average)	540 sows		
2 (average)	4440 acres		
3	One site	31	96.9%
	Two site	1	3.1%
	Three site	0	0.0%
4	Proprietorship	5	15.6%
	Partnership	8	25.0%
	Corporation	15	46.9%
	Hutterite colony	4	12.5%
5	Yes	9	28.1%
	No	23	71.9%

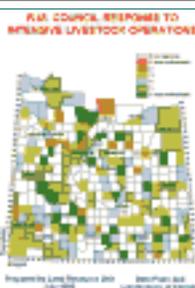
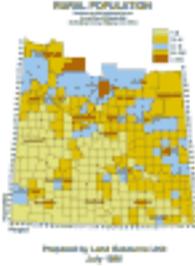
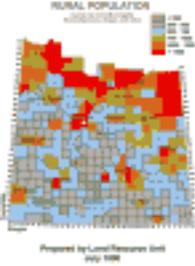
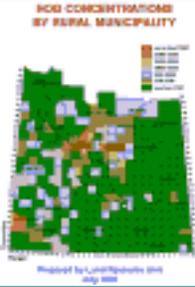
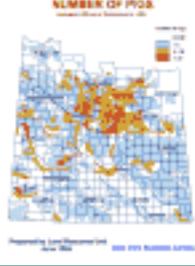
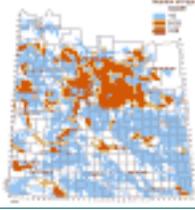
6	Earthen lagoon	20	62.5%
	Storage tank	5	15.6%
	Under barn pit	2	6.3%
	lagoon & pits	4	12.5%
	lagoon & tank	1	3.1%
7	Broadcasting	11	34.4%
	Injecting	8	25.0%
	Irrigation	8	25.0%
	Broadcast & Irrigation	1	3.1%
	Inject & irrigation	3	9.4%
	All 3	1	3.1%
8	Own land	20	62.5%
	Another person's land	3	9.4%
	Own land & another person's	9	28.1%
10 (average)	6.8 full time employees		
12	1990's	25	78.1%
	1980's	5	15.6%
	other	1	3.1%
	N/A	1	3.1%
13	Yes	25	78.1%
	No	7	21.9%
14	Yes	6	18.8%
	None	26	81.3%
16	No significant concerns	16	50.0%
	Air quality	4	12.5%
	Water quality	0	0.0%
	Air & water quality	3	9.4%
	N/A	9	28.1%
17	Yes	1	3.1%
	No	26	81.3%
	Yes & no	1	3.1%
	N/A	4	12.5%
18	Very easy	7	21.9%
	Fairly easy	10	31.3%
	Neither easy nor difficult	2	6.3%
	Somewhat difficult	4	12.5%

	Very difficult	1	3.1%
	No opinion	7	21.9%
	N/A	1	3.1%
19	Yes	18	56.3%
	No	11	34.4%
	N/A	3	9.4%
20	Yes	8	25.0%
	No	20	62.5%
	Unsure	1	3.1%
	N/A	3	9.4%
21	Building Value	3	9.4%
	Total number of animals	3	9.4%
	Annual production level	4	12.5%
	Number of sows	4	12.5%
	Feeder barn capacity	0	0.0%
	Number of animal units	1	3.1%
	Other	11	34.4%
	No answer	6	18.8%
22	Yes	5	15.6%
	No	13	40.6%
	Unsure	12	37.5%
	N/A	2	6.3%
23	All types of livestock	9	28.1%
	Only I.L.O.s	2	6.3%
	Only above a certain size	5	15.6%
	Other	4	12.5%
	No answer	12	37.5%

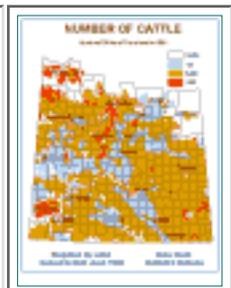
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Appendix 4 - Maps

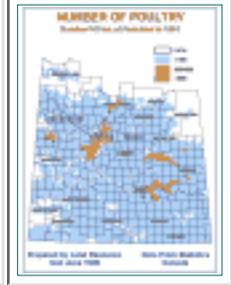
(click test link or thumbnail to see larger image)

<p><u>RM Council Response to Intensive Livestock Operations</u></p>	 <p>RM COUNCIL RESPONSE TO INTENSIVE LIVESTOCK OPERATIONS <small>Prepared by Land Resources Unit September 2001 Land Resources Unit</small></p>
<p><u>Rural Population - Number per 640 cultivated acres in each RM (excluding towns, villages, and cities)</u></p>	 <p>RURAL POPULATION <small>Prepared by Land Resources Unit July 1999</small></p>
<p><u>Rural Population - Number per RM (excluding town, villages, and cities)</u></p>	 <p>RURAL POPULATION <small>Prepared by Land Resources Unit July 1999</small></p>
<p><u>Hog Concentrations by RM</u></p>	 <p>HOG CONCENTRATIONS BY RURAL MUNICIPALITY <small>Prepared by Land Resources Unit July 1999</small></p>
<p><u>Number of Pigs (number/100 ha of farmland in 1991)</u></p>	 <p>NUMBER OF PIGS <small>Prepared by Land Resources Unit July 1999</small></p>
<p><u>Number of Pigs (number/100 ha cultivated land in 1991)</u></p>	

[Number of Cattle \(number/100 ha of farmland in 1991\)](#)



[Number of Poultry \(number/ 100 ha of farmland in 1991\)](#)



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Maps

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