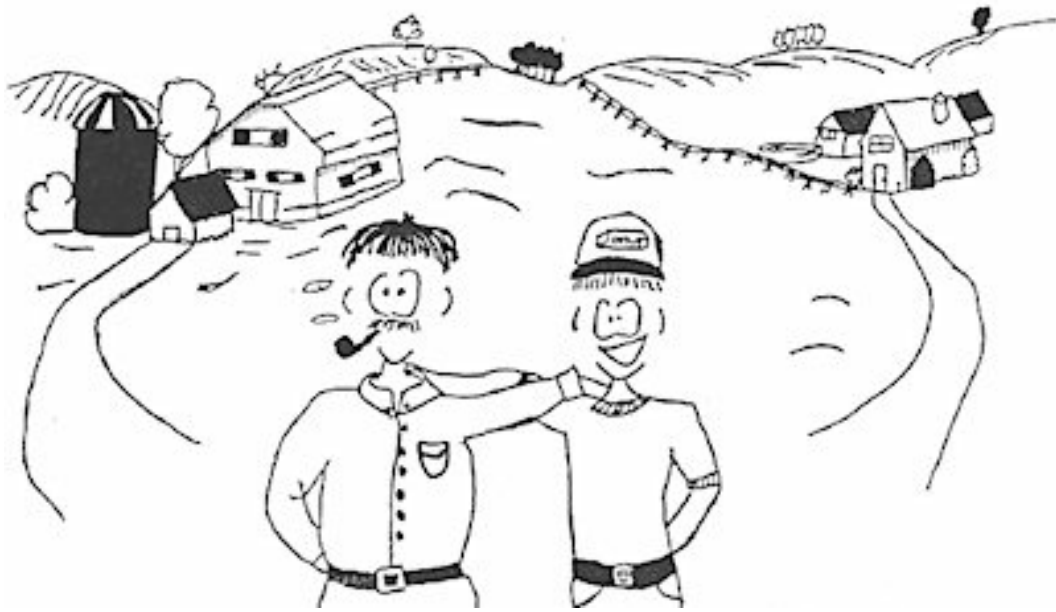


MANURE SHARING STUDY

1991 - 1992



St. Clair Region Conservation Authority
and the
Ministry of the Environment



Manure Sharing Study

1991-1992

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SUMMARY

One hundred and thirty farmers in Lambton county were surveyed about their attitudes and practices towards manure sharing as well as their storage and spreading practices. This study was carried out to determine if manure sharing between farmers is a viable option in alleviating water quality problems resulting from overflowing manure tanks, poorly timed spreading and heavy manure spreading rates.

The study showed that 38% of farmers had "shared" manure in the past. Sharing generally involved spreading on a neighbour's land when manure storage tanks were full and no land was available on the home farm. However, only 32% of the farmers surveyed were interested in sharing manure in the future. Approximately 28% of the livestock farmers were interested in giving it away, while 40% of the crop farmers were interested in receiving manure.

Most livestock farmers felt they had enough land to spread their manure on and wanted its fertilizer value. In fact, some of these farmers wanted more manure. Over half of the crop farmers were resistant to accept manure because of the threat of weed seed dispersal.

Most farmers used less than half their workable land to spread manure on. In addition, most farmers did not have a good understanding of their manure spreading rates. Many were spreading heavier than they assumed.

The lack of adequate manure storage facilities was the main reason farmers got involved in manure sharing. While sharing can be a viable solution to crisis situations associated with overflowing tanks and inappropriate spreading, farmers should ideally avoid these scenarios by being self-sufficient. This entails ensuring there is sufficient storage and adequate land available when the pits need to be emptied.

ACKNOWLEDGEMENTS

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TABLE OF CONTENTS

	Page
SUMMARY	i
ACKNOWLEDGEMENTS	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES	iv
LIST OF TABLES	iv
LIST OF APPENDICES	iv
CHAPTER 1. INTRODUCTION	1
1.1 BACKGROUND	1
1.2 MANURE SHARING	1
Goals	2
Study area	2
CHAPTER 2. METHODS	4
CHAPTER 3. RESULTS	5
3.1 CROP AND LIVESTOCK FARMS	5
3.2 CROPS AND DRAINAGE	5
3.3 LIVESTOCK, MANURE PRODUCTION + STORAGE	8
3.4 MANURE SHARING	13
Giving manure away	13
Receiving manure	17
Legal agreements	17
Manure sharing for over-producers	17
3.5 GENERAL QUESTIONS	17
CHAPTER 4. DISCUSSION AND CONCLUSIONS	19
CHAPTER 5. RECOMMENDATIONS	22
LIST OF REFERENCES	24
APPENDICES	25

LIST OF FIGURES

Figure		Page
1.	Location of study area in the SCRCA	3
2.	Farm types in the study area	6
3.	Reported liquid manure application rates	12
4.	Calculated liquid manure application rates	12

LIST OF TABLES

Table		Page
1.	Crops, acreage and harvest times	7
2.	Frequency of soil testing	7
3.	Livestock farms	9
4.	Manure types	9
5.	Liquid manure storage capacity	10
6.	Manure application rates: Reported vs. Calculated	14
7.	Manure sharing response	15
8.	Reasons against manure sharing	

APPENDICES

Appendix		Page
A.	Landowner Interview Results	26
B.	Introductory Letter	31
C.	Manure Production Values	32
D.	Miscellaneous Tables from Survey Results	33

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The increase in beach closings in recent summers due to high bacteria levels has led researchers to study the sources of this pollutant. Untimely spreading, over-application of manure on fields and overflowing liquid manure storage tanks are some of the major sources of bacterial pollution to waterways.

Today's farms are larger and more specialized than they were in the past, which means more manure is concentrated on individual farms. As more farmers convert to liquid manure systems, the potential for problems increases. The sharing of excess manure between livestock and crop farmers may be one method of reducing pollution risks.

1.2 MANURE SHARING

The sharing and selling of manure is not a new practice. Mushroom growers, for example, buy manure for their operations and garden nurseries sell composted manure to urban gardeners. Manure sharing is most commonly carried out between farm neighbours.

In a manure sharing arrangement, livestock farmers who produce too much manure for their land, give or sell it to cash crop farmers. In this way the over-producers alleviate their problems and the crop growers receive an inexpensive and organic fertilizer for their soil.

Since it was unclear how receptive farmers were to the idea of manure sharing, a survey of farmers in a selected area was undertaken by the St. Clair Region Conservation Authority in 1991 and 1992. This 12 month study was funded by the

Ontario Ministry of the Environment, London Office, through their Regional Agriculture Fund.

Goals:

The overall goal of this study was to assess farmer attitudes about manure sharing. The secondary goal of the survey was to examine their manure management practices including availability of storage and land base for spreading. Farmers were encouraged to establish manure sharing agreements with their neighbours if the need existed.

Study Area:

The study area was selected by choosing areas with high densities of livestock farms in Lambton County. This encompassed Plympton, Warwick and northern Brook Townships as well as a small section of Adelaide Township in Middlesex County. The study area is illustrated in Figure 1. Areas where previous studies had been conducted were avoided so as not to "over survey" the farmers.

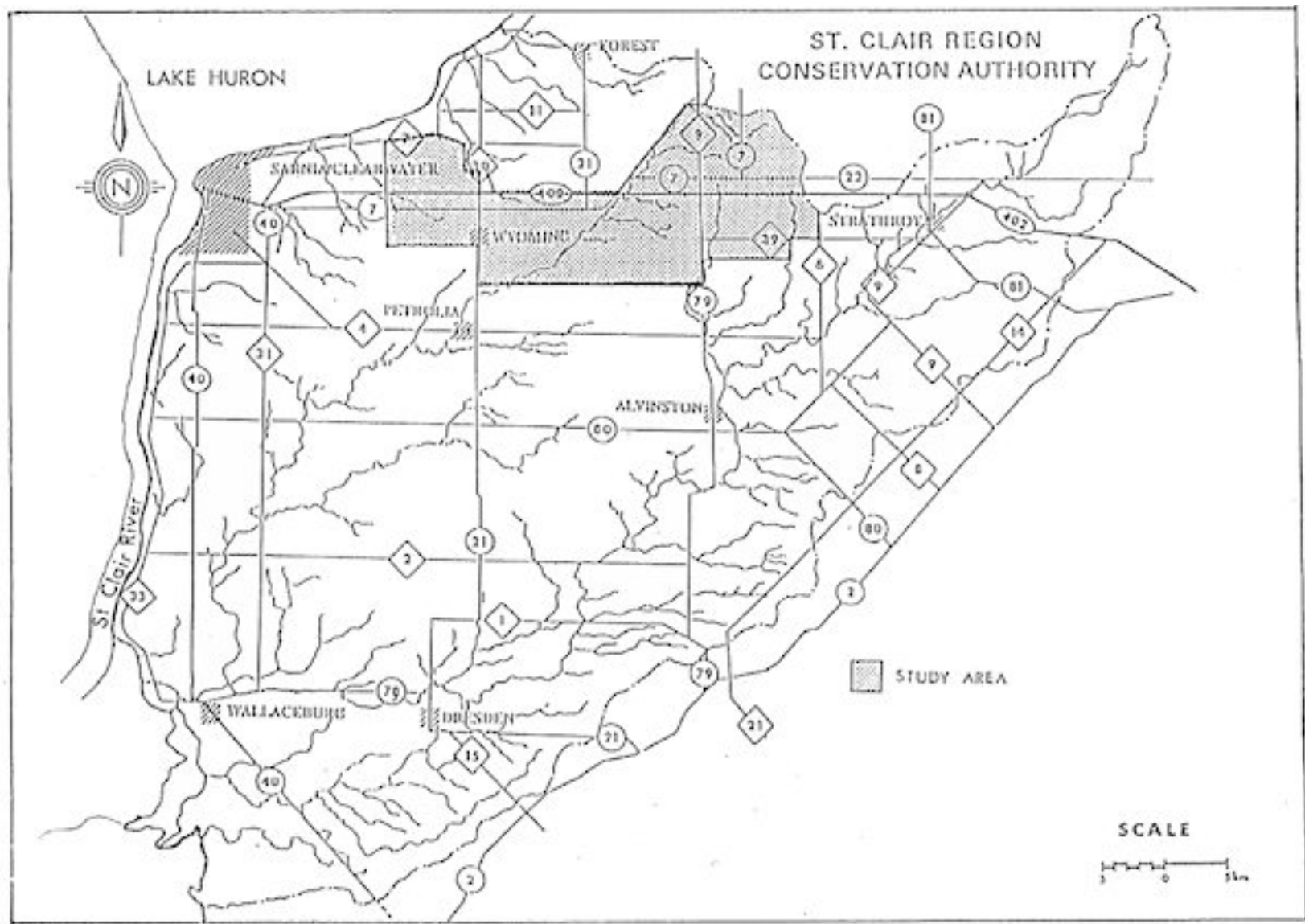


Figure 1: Location of the study area in the SCRCA.

CHAPTER 2

METHODS

In order to achieve the goals set for this survey, a number of steps were undertaken. The first step was to prepare a questionnaire containing questions for both livestock and cash crop farmers. A sample of the questionnaire is included in Appendix A. Questions ranged from specific items about livestock and manure spreading practices, to more general questions on the farmer's views on water quality and the feasibility of manure sharing.

The next step was to map the location and farm types in the study area using a drive-by approach. Farmer's names were recorded from mailboxes and then the phone numbers and mailing addresses were obtained from the phone book and Township Tax Roll. An introductory letter was sent out to each farmer explaining the purpose of the questionnaire and indicating they would be contacted soon. A copy of the letter is included in Appendix B.

The farmers were then contacted by phone and a time was set up to meet at their homes to go over the questionnaire. In some cases, the interview was conducted over the telephone or the questionnaire was dropped off and returned in the mail. By far the best response came from the in-home interviews. The survey answers were compiled on a computer spread sheet using dBase software.

CHAPTER 3

RESULTS

The following section summarizes the results of the questionnaire survey under various sub-headings and categories. More detailed results are listed in table format in Appendix D.

3.1 CROP AND LIVESTOCK FARMS

In total, 130 farmers were interviewed in the study area. Of those, 26% were strictly cash crop farmers and another 72% had some livestock. The remaining 2% were retired and rented their land out. The approximate location of each farm surveyed and the farm type is illustrated in Figure 2.

3.2 CROPS AND DRAINAGE

Questions on crops and drainage were obtained to determine how much workable land each farm had, when the land was available for spreading, and the extent of systematic drainage in the fields.

There were a variety of crops grown in the study area but the three most common were corn, soybeans and wheat. Together they accounted for 84% of the planted crops. Other crops included oats, barley, white beans, mixed grains, hay and vegetables. This information is summarized in Table 1. The actual acreage varies year to year depending on crop rotation practices. Harvest times ranged from June for hay to October-November for corn. Approximately 65% of the land is tied up in soybeans and corn from spring to late fall and unavailable for spreading.

The majority of the farmers surveyed (80%) had subsurface tile drainage systems. Most of these (66%) had their fields systematically tiled and another 19% had randomly drained fields. Another 15% had some combination of random and systematic tiling. This was expected due to the predominance of heavy clay soils and the flat topography.

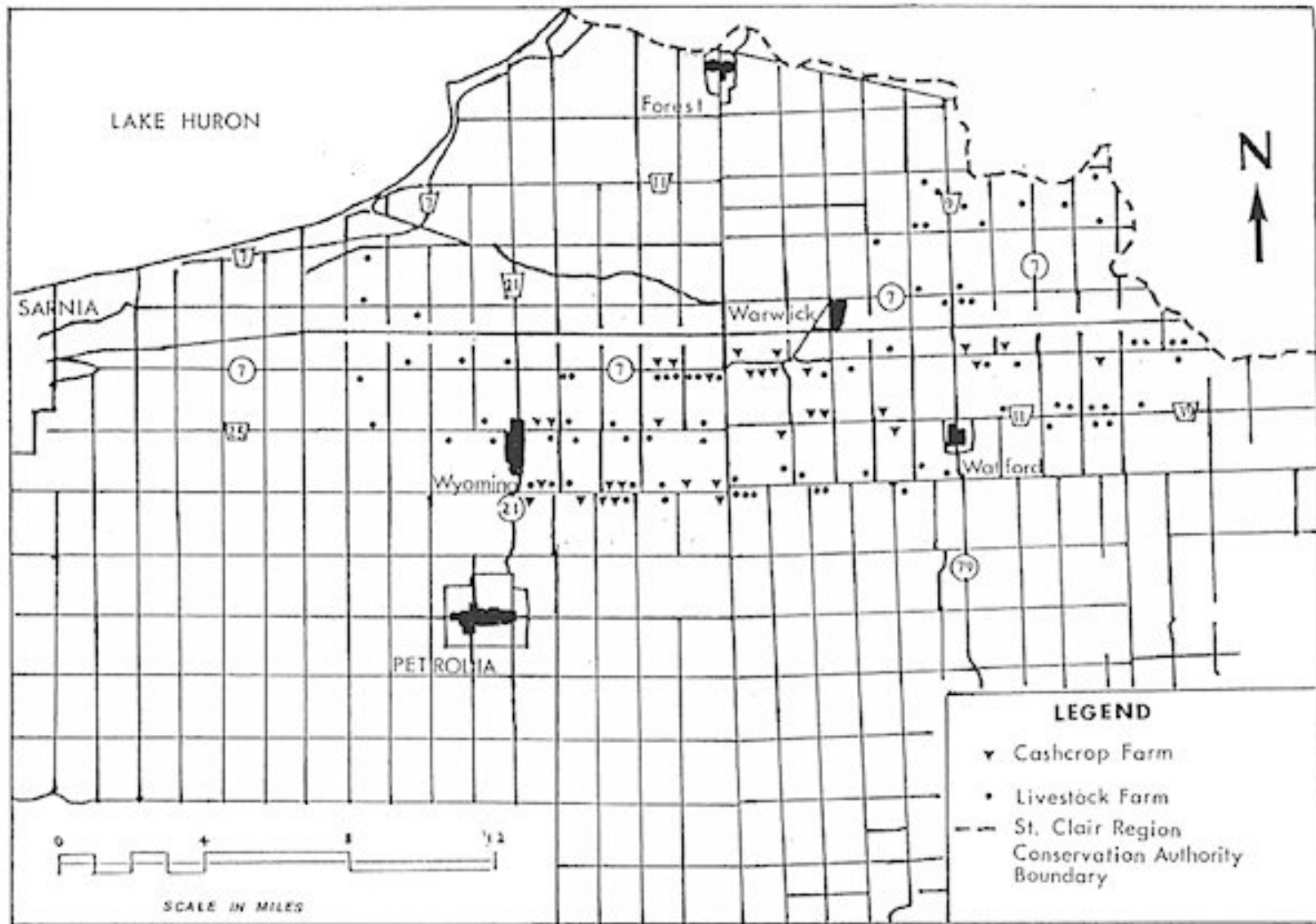


Figure 2: Farm types in the study area.

Table 1. Crops, acreage and harvest times.

Crops	Area (ha).	Percent	Harvest
Soybeans	3315	34	Sep - Nov
Corn	3041	31	Sep - Nov
Wheat	1845	19	Jul - Aug
Hay	518	5	Jun - Jul
Pasture	485	5	N/A
Barley	249	3	Jul - Aug
Oats	170	2	Jul - Aug
Mixed Grains	152	2	Aug
White Beans	36	0	Aug - Sep
Vegetables	2	0	Jul - Sep
TOTAL	9813	100	

Table 2. Frequency of Soil Testing

% of farmers	Frequency of Soil Testing
9	every 1 - 2 years
22	every 3 years
5	every 4 - 5 years
4	infrequently
10	no longer test
28	never have tested
22	did not answer question

As a result, the potential for tile contamination from manure spreading is large.

Only one-third of the farmers test their soil routinely for nutrient needs. Table 2 lists the frequency of testing. Only 6% of the surveyed farmers had tested their manure in the past.

3.3 LIVESTOCK, MANURE PRODUCTION AND STORAGE

Table 3 lists the number of livestock farms in the study area and the average number of head per farm. Pig operations were the most numerous followed by beef, dairy, poultry, horse and goat and sheep operations in that order. Many of the farms had more than one type of livestock animal.

Table 4 lists the percentage of farmers with liquid and solid manure. In this area, just over half of the farmers dealt exclusively with solid manure (54%), while the remainder had liquid manure or a combination of the two.

The volume of manure produced per farm was calculated by multiplying the number of head by the manure production values in Appendix C. On average, each farm dealing with liquid manure produced 286,000 gallons (1,300 m³) of manure per year.

Using the storage sizes given by the farmers and the volume of manure produced, the number of days storage available was calculated. The results are listed in Table 5. The table indicates that only 27% of the farmers had at least 200 days storage (OMAF guidelines) while 64% had less than 4 months (122 days) storage.

Manure Application:

The time of year that manure is applied to the fields tends to vary greatly among farms. Some farmers spread all year round while others do it only in one season. Most of the spreading occurred in the fall months, closely followed by the summer. Most farmers prefer to spread after fall harvest and on wheat stubble.

Table 3. Livestock Farms in the Study Area

Livestock Type	No. of Farms	Avg # head Per Farm
Pigs	38	524
Beef cattle	29	385
Dairy cattle	17	87
Chickens	13	8257
Horses	8	3
Goats and Sheep	5	59

Table 4. Manure Type

% of farmers	Manure Type
54	Solid
26	Liquid
20	Solid + Liquid

Table 5. Liquid Manure Storage Capacity

Farm No.	Manure Production (gallons/year)	Pit Storage Capacity (gallons)	No. Days Storage
1	1,289,700	188,800	53
2	177,600	370,000	758
3	82,500	50,000	220
4	1,707,200	100,000	21
5	156,800	199,200	462
6	2,219,900	229,500	36
7	1,955,900	97,800	18
8	2,075,900	140,800	26
9	1,092,800	90,000	47
10	507,900	90,000	65
11	1,440,600	100,000	25
12	484,600	140,800	106
13	684,200	403,000	214
14	1,645,000	213,700	47
15	263,400	88,000	122
16	260,600	201,500	281
17	416,000	301,600	264
18	1,162,600	160,400	50
19	285,000	140,800	180
20	1,911,100	388,700	74
21	1,522,900	150,000	36
22	2,310,200	350,000	55

* Storage capacity based on pit sizes given or volumes given by farmers.

The percentage of a farmer's land receiving manure in one year ranged from 5 to 100%. Table 6 lists the breakdown. Most farmers (70%) use less than 40% of their workable land for spreading and only 10% use over 60% of the available land.

Only 20% of the farmers knew what their manure application rates were. Many went by sight to determine how much was enough. For example, if the ground looked wet enough, they stopped. Of those who knew their rate, the amount varied from 300 to 22,000 gallons/acre (3 to 247 m³/ha) for liquid manure. For solid manure, rates ranged from 1 to 10 tons/acre (2.5 to 25 tonnes/ha).

Figure 3 illustrates the range of rates and the number of farmers using that rate. The majority of the farmers said they spread between 2,000 and 5,000 gallons of liquid manure per acre. The majority of farmers plowed or disced their fields after the manure was spread, usually within a few days. In addition, 98% of the farmers said they spread on different parts of their farm each time they spread to avoid overloading certain fields.

In order to verify the application rates given by the farmers, the rates were calculated using the following formula:

$$R = M/A$$

where, R = Application Rate (gallons/acre)
 M = Manure produced per year (gallons)
 A = Acreage receiving manure per year (acres)

It was assumed that the farmer spread on those acreages only once per year. A comparison of the stated versus calculated application rates is listed in Table 6 and illustrated in Figures 3 and 4. It is apparent that most farmers are either under-estimating their application rates, under-estimating the acreage on which they spread or are spreading on the same parcel 2-3 times per year.

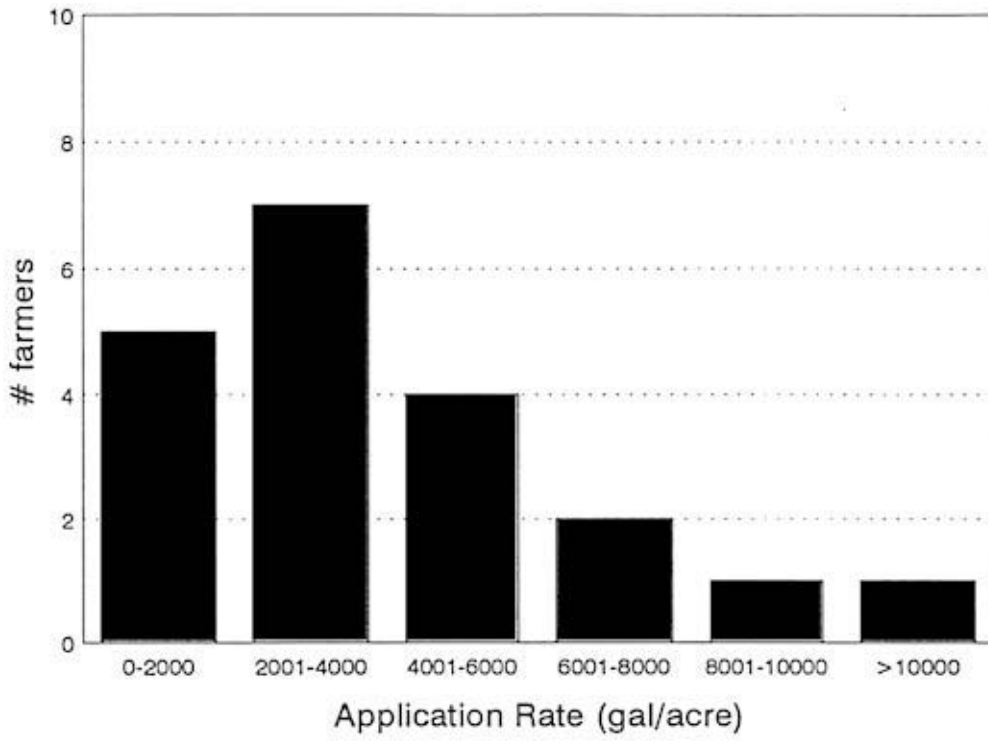


Figure 3: Reported Manure Application Rates

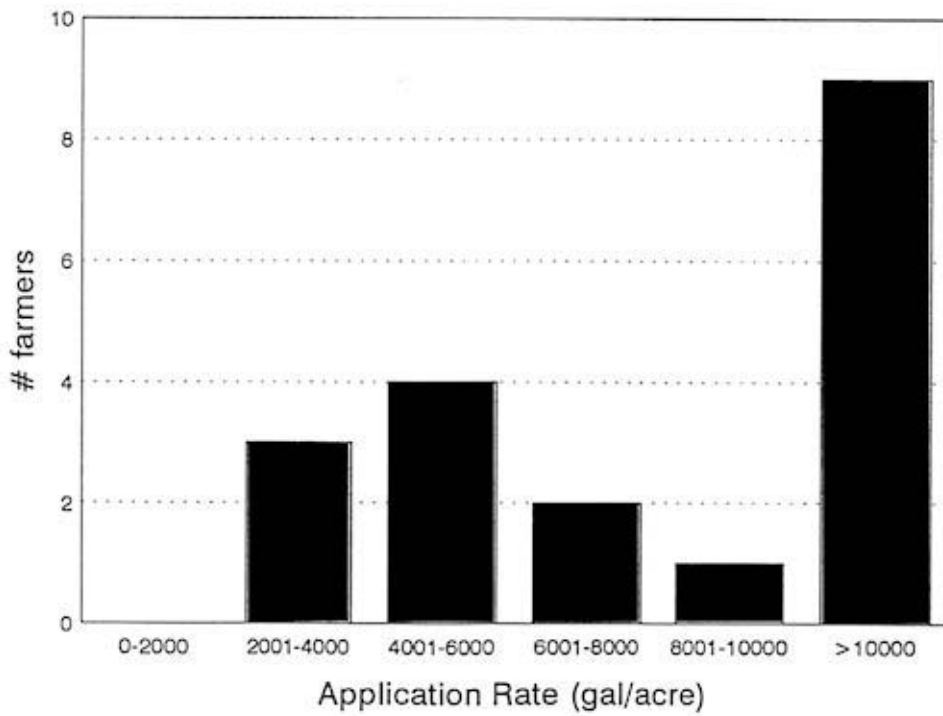


Figure 4: Calculated Manure Application Rates

Table 6. Manure Application Rates: Reported vs. Calculated

Farm #	Reported Application Rate (gal/acre)	Calculated Application Rate (gal/acre)	Farmer under-estimated rate by # times
1	2,000	6,340	3.2
2	5,000	19,100	3.8
3	4,000	4,440	1.1
4	2,500	13,660	5.5
5	2,000	2,600	1.3
6	7,500	24,670	3.3
7	5,000	10,160	2.0
8	4,000	17,080	4.3
9	6,000	24,010	4.0
10	3,000	2,300	0.8
11	2,500	4,900	2.0
12	8,000	7,600	1.0
13	2,000	5,520	2.8
14	3,000	13,700	4.6
15	4,000	4,160	1.0
16	800	9,000	11.3
17	333	2,850	8.6
18	5,000	13,650	2.7
19	22,000	23,800	1.1
Average	4,666	11,028	2.4

According to Table 6, approximately 21% of the farmers had under-estimated their rates by 2-3 times and other 47% had underestimated by 3 - 12 times. The remaining third were quite close to the calculated rates. Only 2/19 farmers had said they spread over 8,000 gallons/acre while the calculated results indicate that 10/19 were spreading at rates over 8,000 gallons/acre. The average reported rate was 4,666 gallons/acre while the calculated average for this group was 11,028 gallons/acre.

3.4 MANURE SHARING

Farmers were asked if they had ever shared manure with another farmer and if they were interested in sharing. A summary of the answers is listed in Table 7. In total, only 32% of the farmers were interested in sharing manure with their neighbours.

Of the 130 farmers interviewed, 62% had never shared manure with their neighbours. Of these, 24% indicated that they would like to share with their neighbours but the majority (76%) were not interested. Most shared only on a need basis when pits were full and no land was available.

Of the 38% of farmers who had shared manure in the past, 45% were happy with the experience and would like to do it again in the future. A little over half (55%) would not choose to do it again.

The most common reasons for not wishing to share manure are listed in Table 8. Most of the livestock farmers felt they had sufficient land and many crop growers were concerned about the spread of weed seeds.

Giving Manure Away:

Of the 91 livestock farmers interviewed, 28% would like to get rid of some of their manure, 70% want to keep it and 2% were undecided. The other 3% did not answer the question. In addition, 19% of the livestock farmers were interested in receiving more manure for their land.

Table 7. Manure Sharing Response

Response Given	# of Farmers	% of Farmers
<u>Of all farmers</u>	130	
Have Shared	49	38
Never Shared	81	62
Interested	41	32
Not interested	89	68
<u>Of those who never shared</u>		
Interested	19	24
Not Interested	62	76
<u>Of those who have shared</u>		
Still Interested	22	45
No longer interested	27	55
<u>Of the livestock farmers</u>	91	
Interested in giving	25	28
Not interested in giving	64	70
Undecided	2	2
Interested in receiving	17	19
Not interested in receiving	41	45
Would take in emergency	6	6
Undecided	27	30
<u>Of the crop farmers</u>	39	
Interested in receiving	16	40
Not interested in receiving	21	54
Undecided	2	6

Table 8. Reasons against Manure Sharing

Ranking of Response	Reason
<u>Livestock Farmers</u>	
1	Have enough land to spread on already
2	Want the fertilizer value for own land
3	Too much hassle
4	Legal Problems if anything goes wrong
<u>Cash Crop Farmers</u>	
1	Would bring in weed seeds
2	Compaction of the soil
3	Too much hassle
4	Legal problems if anything goes wrong
5	Odour/small unwanted
6	Use chemical fertilizers instead

Table 9. Giving and Receiving Manure: Arrangements.

<u>Giving Away Manure</u>		<u>Receiving Manure</u>	
39%	summer is best time	90%	summer + fall
19%	fall is best time	10%	spring
25%	spring is best time		
27%	any time		
62%	willing to transport it	0%	willing to pay for it
28%	not willing to transport it	100%	not willing to pay
52%	willing to spread it	35%	willing to spread it
48%	not willing to spread it	65%	not willing to spread it

Table 9 summarizes the responses related to arrangements for sharing and spreading. For those farmers who were interested in giving away manure, the majority (39%) were willing to give it in the summer, with fewer wanting to give it away in the fall (19%) and spring (15%). Twenty seven percent were willing to give it at any time of the year. As for transporting the manure from one farm to another, 62% were willing to transport the manure up to a distance of 2 miles (3.4 km). The other 38% were not willing to move it. Of the farmers who wanted to get rid of the manure, 52% were also willing to spread it themselves.

Receiving Manure:

For those who were interested in receiving some manure, the majority had no preference as to liquid or solid. None of the farmers were willing to pay for the manure. The majority of the farmers (90%) wanted the manure between July and October. Only a few were willing to take the manure in the spring or winter. Thirty-five percent were willing to spread it themselves, but most farmers did not have the proper equipment.

Legal Agreements:

Approximately 70% of the farmers thought a "handshake" agreement was sufficient between farmers willing to share manure. A signed contract was viewed as unnecessary. Fifty-four percent thought that there could potentially be problems with manure sharing agreements. Many were afraid that the weather could affect the spreading and pollution could result. Many thought that the person who is spreading the manure should be held responsible but many also thought that it should be dealt with on a case by case basis.

Manure Sharing for Over-Producers:

Seventy-four percent of the farmers questioned thought that farmers who had too much manure for their land should enter into manure sharing arrangements with their neighbours. Some thought that livestock producers should cut back on production as well.

3.5 WATER QUALITY QUESTIONS

Farmers were asked if they thought that there was a water pollution problem in their area. Thirty percent thought that there was a definite problem but over half (55%) thought that there was no problem and 15% had no idea. Many neighbours gave conflicting answers.

CHAPTER 4

DISCUSSION AND CONCLUSIONS

The overall goal of this study was to assess farmer attitudes towards manure sharing and to examine the adequacy of the land base to accommodate the manure. The term 'manure sharing' was not commonly used or well understood by the farming community. Instead, farmers referred to it as 'spreading on a neighbour's land' or 'allowing a neighbour to spread his excess manure on my land'.

A little over one-third of the farmers surveyed indicated they had shared manure in the past. Most often sharing occurred between close neighbours or family members farming nearby. In general, livestock farmers shared manure only on a need or crisis basis and not as a general farming management practice. Needs arose when the pits were full and there was no harvested land to spread on. The farmer then approached a neighbour to see if he would allow some of the excess to be spread on his land, usually wheat stubble in the summer. Therefore, the receiver was doing the over-producer a favour by sharing his land as opposed to the other way around. There were cases, however, where farmers would request manure from a neighbour to boost the organic content of their soil.

Ideally, farmers should plan their crop acreage and rotation so that there is always enough land available when the pits need to be emptied. A 200 or 240 day storage facility should be enough so that the pits need only be emptied before planting and after harvesting when all the workable land is available.

In total, only 32% of the farmers were interested in sharing manure. Interestingly, more farmers were interested in receiving manure than giving it away. The majority of livestock farmers were not interested in manure sharing primarily because they felt they had enough land to spread the manure on.

However, most farmers may be spreading heavier than they assume and perhaps heavier than is environmentally safe. The average reported rate was approximately 4,700 gallons/acre while the average calculated rate was over 11,000 gallons/acre. In addition, the study also showed that in many cases, manure storage facilities are woefully inadequate and did not come near 200 days. Manure storages are expensive items and most farmers postpone expanding them long after their operation size requires it.

The lack of adequate storage is the main reason farmers seek out neighbour's lands to spread on and not because they don't have enough total acreage. The predominance of corn and soybeans also exacerbates the problem because it ties up the land until fall. Most farms are large enough to handle the manure produced, but most of the farmers are not using the majority of their land. In fact, 70% of the farmers used less than 40% of their available land for spreading. For smaller operations this is reasonable, but in many cases larger areas are needed.

It would be advisable for farmers to sit down and calculate their yearly manure production (including rain water falling on the open tanks), storage requirements and then determine the acreage needed to spread at a "reasonable" rate. This will provide a better picture of their spreading practices and needs.

Farmers ask what a 'reasonable' rate is. Traditionally, rates have been set to meet nutrient requirements and not water quality criteria. An "environmentally safe" application rate will depend on soil moisture conditions and tillage methods. Spreading at lighter rates can only be a step in the right direction. Monitoring tile outlets is another good step.

The most common reason for not wanting to receive manure was the concern over weed seed dispersal in the manure. Some farmers had experienced it and others had heard the horror stories and refused to risk it. Some farmers said it was not a problem. In order to address these concerns, research is need on the extent of this

problem and methods of controlling the spread of weed seeds in manure. Information is also needed on the type of seeds which pass through each animal's digestive system and whether or not composting kills the seeds. Methods used in organic farming may prove useful.

Another concern farmers expressed over manure sharing was the legal aspects. It needs to be clarified who is responsible in the event of a spill.

It is clear that manure sharing can be a viable solution to crisis situations associated with overflowing tanks and inappropriate spreading, provided farmers are responsible and considerate of their neighbours. If farmers have good experiences, the practice will continue. However, farmers should try to reduce the need for manure sharing by being self-sufficient on their own properties. Neighbours may not be willing to accept manure and then a real crisis will result.

Problems can be avoided by ensuring that there is adequate manure storage facilities, adequate land available to spread on, and reducing application rates. This requires planning crop acreages accordingly and some financial commitment (eg. pit construction). Education is also needed so that farmers are able to accurately document their manure management practices as they complete Environmental Farm Plans in the future.

Manure storages should continue to be funded by such programs as CURB (Clean Up Rural Beaches) and Land Stewardship to help farmers build the facilities they require. Also, manure testing should be encouraged in combination with soil nutrient management in order to obtain the full value of the manure.

CHAPTER 5

RECOMMENDATIONS

The St. Clair Region Conservation Authority and Ontario Ministry of Agriculture and Food should:

1. Encourage manure sharing as an option for farmers who currently have problems associated with inadequate storage and over-production of manure
2. Encourage all farmers do eliminate the need for sharing by improving their storage and calculating their application rates and land base requirements.
3. Encourage wise manure management by farmers
4. Assist farmers who would like to develop a Farm Plan as outlined in Our Farm Environmental Agenda.

The Provincial Government should:

5. Fund research into methods of removing and destroying weed seeds in manure.
6. Fund research to discover which seeds pass through livestock.
7. Continue to fund research in appropriate manure application rates on different soils and moisture conditions and their effects on water quality
8. Continue to fund the installation and upgrading of manure storage facilities.

Farmers should:

9. Calculate their manure storage and acreage needs as well as their spreading rates and incorporate this into the Farm Plans.
10. Monitor tile outlets when spreading to determine when the maximum amount of manure has been applied.

11. Use more of their available acreage to spread manure on and ensure land is available when the tanks need to be emptied.
12. When necessary, give away manure to adjacent farmers.
13. Cooperate in research studies by offering their farms and experience.
14. Test manure and use it as a fertilizer.

Farm Organizations should:

15. Provide fact sheets describing how farmers can calculate manure production and application rates.
16. Provide venues for researchers, farmers and others to share their study results and experience with other farmers.

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APPENDICES

APPENDIX A
LAND BASE AND MANURE SHARING QUESTIONNAIRE

Name _____ Date _____
 Mailing _____ Phone _____
 Address _____

Farm Type: Cash Crop _____ Livestock _____
 Lot, Conc., Twp. _____ Acres _____

 (own or rent) _____

Non-workable acres (eg. woodlot) _____

SECTION 1. CROPS AND DRAINAGE

<u>Crops</u>	<u># of Acres</u>	<u>T I L I N G</u>		<u>Time of Harvest (month)</u>
		<u>Random (acres)</u>	<u>Systematic (acres)</u>	
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

SECTION 2. NUMBER OF LIVESTOCK (if no livestock, go to Section 5.2)

<u>TYPE</u>	<u>TOTAL NUMBER PER YEAR</u>			
DAIRY	calves _____	heifers _____	milking cows _____	dry cows _____
BEEF	cows _____	calves _____	yearlings _____	slaughter steers _____
SWINE	sows + litter _____	weaners _____	feeders _____	boars _____
CHICKEN	broilers _____	laying _____	breeder _____	pullets _____
TURKEY	broilers _____	breeders & toms _____		
HORSES	_____			
SHEEP	_____			
OTHER	_____			

SECTION 3. TYPE OF MANURE

Solid _____ Liquid _____ Both _____
Solid manure is stored: inside _____ outside _____
on pad _____ retaining walls _____

animals in pasture _____ # months in pasture _____
Liquid manure is stored in:
covered tank _____ open tank _____ earthen pit _____
capacity or dimensions _____
In-barn storage _____

SECTION 4. MANURE APPLICATION

Spreader: box _____ liquid tanker _____ injection _____
irrigation _____ other _____

Custom Operator? yes _____ no _____

Month of Application	# of acres	application rate	Is there crop residue on field?
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Is the land tilled before spreading? yes _____ no _____
Is the manure worked in afterwards? yes _____ no _____
same day _____ next day _____ Other _____

Do you tend to use the same parcel or do you move the location of the spreading around? _____

What percentage of your tilled acreage would receive the manure in any given year? _____

Type of soil: sand _____ clay _____ clay loam _____
other _____

Do you have your soil analyzed? yes _____ no _____
How often? _____

Do you have your manure analyzed? yes ____ no ____
How often? _____

SECTION 5 MANURE SHARING

5.1 LIVESTOCK FARMERS:

Have you ever given or sold your manure to another person or farmer?
yes ____ no ____

If yes, describe _____

Have you ever spread your manure on another farmer's land?

Yes ____ No ____ If yes, describe _____

Would you be interested in:

- a) giving some manure to another farmer? Yes ____ No ____ Maybe ____
- b) selling some manure to another farmer? Yes ____ No ____ Maybe ____
- c) spreading your manure on another farm? Yes ____ No ____ Maybe ____

If YOU ARE INTERESTED IN MANURE SHARING,

- a) What time of year is best for You? _____
- b) What is a fair price (if selling)? _____
- c) Would you be willing to transport it? Yes ____ No ____
How far? _____
- d) Would you be willing to spread it? Yes ____ No ____
- e) What is the maximum cost you would incur? _____
- f) Who should be responsible if water pollution results? _____

- g) Should there be a i) signed contract/agreement _____ or
ii) handshake agreement _____

- h) Do you see any potential problems with a manure sharing agreement?
No ____ Yes _____
- i) Would you like to see an organization coordinate lists of farmers who are
interested in sharing?
Yes ____ No _____

- j) If yes, what organization(s) should do the coordinating?
- Ministry of Agriculture and Food _____
 - Conservation Authority _____
 - Ont. Federation of Agriculture _____
 - Ministry of the Environment _____
 - Other _____

If YOU ARE NOT INTERESTED IN MANURE SHARING:

What are some reasons?

- Have enough land _____
- Don't want hassle _____
- Don't know anyone who wants it _____
- Feel there could be legal problems _____
- Want the fertilizer value _____
- Other _____

5.2 FARMERS WITH LITTLE OR NO MANURE:

Have you ever bought or been given manure from another farmer?

Yes ____ No ____

If yes, please describe _____

Has another farmer ever spread some of his excess manure on your land?

No ____ Yes ____ If yes, describe _____

Would you be interested in:

- a) buying manure from another farmer? Yes ____ No ____
- b) receiving manure for free from another farmer? Yes ____ No ____
- c) allowing a farmer to spread on your land? Yes ____ No ____

If YOU ARE INTERESTED IN SHARING MANURE,

- a) Would you like liquid ____ solid ____ either _____?
- b) How much would you be willing to pay (if buying)? _____
- c) What time of year (month) would you want it? _____
- d) Would you be willing to transport it? Yes ____ No ____
 How far? _____
- e) Would you be willing to spread it? Yes ____ No ____
- f) Would you be willing to pay the other farmer the cost of fuel and expense for transport and spreading? Yes ____ No ____
- g) Who should be responsible if water pollution results? _____

h) _____
What type of information about the manure and the farmer would you
need to know beforehand? _____

IF YOU ARE NOT INTERESTED IN MANURE SHARING,

What are some reasons:
Use chemical fertilizers instead _____
Don't want hassle _____
May spread weed seeds _____
Compaction _____
Feel there may be legal problems _____
Don't know anyone to get it from _____
Don't want smell _____
Other _____

SECTION 6. GENERAL QUESTIONS

Do you feel water pollution is a problem in your area?

Do you feel that some farmers have too much manure for their land and should
get into manure sharing agreements?

Additional Comments

Thank you very much for your assistance.

APPENDIX B



ST. CLAIR REGION CONSERVATION AUTHORITY

205 Mill Pond Crescent, Strathroy, Ontario, N7G 3P9

519 245 3710

February 3, 1992.

MEMORANDUM TO: Farmers in Plympton and Enniskillen Townships

The St. Clair Region Conservation Authority in cooperation with the Ministry of the Environment is conducting a study in your area. There are two goals to this study. The first is to determine the amount of land base we have in comparison to manure production and spreading. The second goal is to determine farmer attitudes towards manure sharing. We would like to know if manure sharing is a desired or practical solution to water pollution problems associated with the application of too much manure on the land.

We will be attempting to contact all of the farmers in your area over the next few months. We hope you will be willing to meet with our Water Quality Assistant, Margaret Steele, at your convenience, to answer a brief questionnaire. This should only take 10 to 20 minutes of your time. We think it is very important to obtain your views and concerns regarding manure spreading and manure sharing. This information will be treated as confidential.

If you have any questions or comments, please feel free to contact Margaret Steele at this office. We appreciate your cooperation and look forward to hearing your views.

Yours truly,

Donald Craig,

Conservation Services Supervisor
cmq

APPENDIX C

MANURE PRODUCTION PER DAY BY ANIMAL TYPE

Animal Type	Manure Production (m ³ /day)
Beef or Dairy	
6-15 months	0.0170
15-24 months	0.0227
Beef cows	0.0340
Dairy cows	0.0599
Swine	
Weaners	0.0023
Feeders	0.0071
Sows + litter	0.1700
Chickens	0.0001
Turkeys	
Broilers	0.0003
Breeders + Toms	0.0007
Sheep	0.0042
Horses	0.0566

Source: Sizing of Manure Storage, Factsheet, 1983. Converted from cubic feet to cubic meters.

APPENDIX D

Livestock Farms in the Study Area

Type of livestock	Number of head	Total # of head	No. of Farms
Beef Cows	303		
Beef Calves	3070		
Beef Heifers	4412		
Beef Steers	3367		
BEEF FARMS		11152	29
Dairy Cows	718		
Dairy Calves	422		
Dairy Heifers	346		
DAIRY FARMS		1486	17
Sows	2034		
Weaners	5771		
Feeders	12102		
SWINE FARMS		19907	38
Chickens	107345	107345	13
Goats and Sheep	294	294	5
Horses	24	24	8

Liquid Storage Types

%	Type
45	covered
40	open
15	under barn

Percentage of Land Spread on

% farmers	% land
37	0 - 20
33	21 - 40
20	41-60
6	61-80
4	81-100

SILLY SIGNS.



Yes, but who would want to? Mary Sanders of London wins \$20 for this photo, taken at the corner of Yarmouth Centre Road and Yarmouth Township concession 14.

Silly Signs submissions must tell us where the sign was photographed, what it meant (if the meaning isn't self-evident) and your name, address and telephone number. Winners receive payment in the month following publication. Photos will be returned only if accompanied by a stamped, self-addressed envelope. Send entries to Silly Signs, Travel Section, The London Free Press, P.O. Box 5879, London N6A 4L6.