

ENVIRONMENTAL MANAGEMENT NEWSLETTER

A Quick Update on Nutrient Management

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The Value of Adequate Manure Storage Capacity

BY: Peter Doris, Environmental Specialist, OMAFRA

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Does it pay to build a manure storage facility? This has become a common question in light of sharp increases in fertilizer prices and funding available through the Canada Ontario Farm Stewardship Program (Environmental Farm Plan Program).

Farmers can access up to 30 percent cost shared funding to a maximum of \$30,000 for manure storage facilities. This article will provide a cost-benefit analysis of building adequate manure storage based on the value of different manure types.

MANURE GENERATION AND VALUE

An important consideration in calculating the value of manure is the price of fertilizer. Table 1 provides an overview of the amount of manure generated and nutrient values (based on equivalent fertilizer prices) for five classes of livestock using June 2008 fertilizer prices. For the operations listed below, year one value of manure ranges between \$17,000 and \$21,000 with the exception of the cow calf operation at \$7,391. The values in Table 1 assume that the manure is being applied to crops that can utilize these nutrients and there is a corresponding reduction in commercial fertilizer purchases.

Table 1: Manure volumes and nutrient values for various livestock and poultry classes.

Type of livestock	Number of head	Estimated amount of manure per year	Value of manure (based on plant available nutrients in 1st year of application) ¹	Total Annual value of manure ²
Holsteins – liquid	60 mature cows + followers	594,745 gallons	\$32.25/1,000 gal.	\$19,180
Finishing hogs – full slats; wet-dry feeders	1000	450,235 gallons	\$38.70/1000 gal.	\$17,424
Beef cows and calves	100	573 tons ³	\$12.90/ton	\$7,391
Broilers – 10 week cycle	30,000	415 tons	\$49.20/ton	\$20,418

¹Value of manure is based on purchase price for commercial fertilizer with the same nitrogen (N), Phosphorous (P) and Potassium (K) analysis. Prices for N-P₂O₅-K₂O are 0.65-1.00-0.50 \$/lb respectively as reported in June 2008 Ridgeway College survey of agriculture inputs. Analysis provided by Christine Brown, OMAFRA. Average values were used for each livestock type.

²The actual immediate nutrient value for crop production will be less than what is reflected in the table if the nutrients being applied are not required for the production of the crop. For example the nitrogen from manure applied to a legume crop, or the phosphorus and/or potassium applied to a field with a soil test higher than 60 mg/L (ppm) or 250 mg/L (ppm) for P and K respectively. As with the land application of any nutrient, the farmer needs to take into account costs for application and field conditions (risk of compaction, risk of runoff, etc.)

³Beef cows and calves in Ontario typically spend five to seven months per year grazing on pasture, therefore half of the manure is directly deposited on the pasture area. The amount of manure shown here and the corresponding manure storage capacity required is for the “other” half of the year.

There is a “delayed effect” with some of the nutrients in the manure that is not shown in Table 1. In the years following application, organic nitrogen in the manure eventually converts to the nitrate form, which is plant available. In addition only 40 percent of the phosphate in manure is available in the year of application. The weblink in the textbox below to the fertilizer value of various manures provides additional information on the N and P value of manures two to four years after application. Finally, micronutrients and organic matter in the manure are not factored into the values shown.

The values in Table 1 do not represent the full story for a farmer. For example, the cost of land application of manure is not factored into this calculation. As noted above, these values are only realized if manure is offsetting commercial fertilizer purchases on the farm. The “full” value for manure and commercial fertilizer comes with valid soil tests and an accurate nutrient analysis of the manure.

Table 2: Manure storage sizes for 240 & 365 days capacity and estimated construction costs

Number and type of livestock	Amount of manure generated per year	Example of storage size for 240 days of storage capacity	Example of storage size for 365 days of storage capacity	Estimated construction Costs (365 days capacity) ¹
60 Holstein - liquid manure	594,745 gallons	78.5' diameter x 14' deep	101' diameter x 14' deep	\$100,000
1000 - finishing hogs – full slats; wet-dry feeders	450,235 gallons	65' dia x 14' deep	84' dia. x 14' deep	\$90,000
100 - beef cows & calves	573 tons – see table 1 notes	58' x 50' x 8' (183 days capacity)	58' x 50' x 8' (183 days capacity)	\$37,700
30,000 broilers 10 week cycle	415 tons	65.8' x 50' x 8'	104.' x 50' x 8'	\$67,600

¹The costs used in Table 2 are examples only. Estimated costs for liquid storage facilities based on personal communication with farmers. Reported costs for solid manure storage facilities vary from as low as \$5.00/foot² for uncovered facilities up to \$20/foot² for roofed facilities with a substantial amount of concrete. A value of \$13/ft² was utilized here. Farmers should discuss construction costs with building contractors for site specific estimates.

COST OF A MANURE STORAGE FACILITY VERSUS VALUE OF MANURE

Table 2 demonstrates sample dimensions for storage facilities from the NMAN software that provide 240 and 365 days of capacity. The nutrient management regulations (Ontario Regulation 267/03, as amended) indicate that a minimum of 240 days of storage capacity is one of the acceptable options for manure storage facility. These dimensions should allow farm operations to apply manure in September or October and have enough storage capacity until the following April or May (i.e. no winter spreading).

Many farm operations have opted for 365 or 400 days of storage capacity to allow for future herd expansion or to reduce application frequency and custom applicator expenses. With additional storage capacity over 240 days, there is a greater probability that nutrients can be applied on the fields with the greatest requirement for the nutrients as opposed to applying on the fields available when the storage is full. Finally there is greater flexibility with additional storage capacity if field conditions are not ideal for land application.

Fertilizer value of various manures is available at: www.omafra.gov.on.ca/english/crops/facts/08-041.htm

The current cost-shared funding programs associated with EFP are slated to expire by December 15 2008. Contact OSCIA for more details.

REMINDER: an approved Nutrient management strategy is required before starting construction on a manure storage facility

Farmers may be able to access additional funds from conservation authorities or other local groups for construction of manure storage facilities

Table 3 (next page) provides some quick financial comparisons if you borrow money to build a manure storage facility for each livestock type. Even in the five years that you are paying off the loan, there can be a positive financial return to the operation. These figures do not take into account the longer-term value of manure for fertility (year 2- 4 values) and soil health (organic matter, microbiological life). After the loan is repaid, the manure storage facility will still have many more years of productive use (typical life span of 20 to 25 years). For operations that have virtually no storage capacity and must land apply at a frequency of every few days, this lack of storage can result in increased operational costs (see next page Table 4). Finally, for some operations, these storage facilities can handle other materials such as the milking centre washwater along with the manure so the storage can effectively help manage two different sources of material at the same time.

Table 3: Financial considerations with construction of manure storage facilities for various farms

Number and type of livestock	Sample cost for construction of 365 days of storage capacity	Funding Canada ON. Farm Stewardship Program	Net cost to farmer	Value of manure from Table 1	Annual Principal + Interest (P + I) cost (borrowing net amount at 8% for 5 years ¹)	Difference between nutrient value of manure and annual P + I costs
60 Holstein liquid manure	\$100,000	\$30,000	70,000	\$19,180	\$16,980	\$2,200
1000 - finishing hogs – full slats; wet and dry feeders	\$90,000	\$27,000	63,000	\$17,424	\$15,282	\$2,142
100 - beef cows and calves	\$37,700 (See Table 2 Notes)	\$11,300	26,400	\$7,391	\$6792	\$599
30,000 broilers – 10 week cycle	\$67,600	\$20,100	47,500	\$20,418	\$11,522	\$8,896

¹Annual payments of this amount of principal and interest for a five-year period will result in the loan being paid off at the end of the five year period. Interest calculated on a monthly basis.

Table 4: Hidden costs associated with lack of adequate manure storage capacity

<ul style="list-style-type: none"> Increased labour costs due to frequency of application
<ul style="list-style-type: none"> Increased depreciation on manure spreader especially with operation in cold weather conditions
<ul style="list-style-type: none"> Application sites tend to be “on the fields that I can get to” and not “the fields that need the manure” often resulting poor manure distribution
<ul style="list-style-type: none"> Increased risk of soil compaction from land application during wet periods

CONCLUSION

Determining the answer to the question “does it pay?” requires a number of considerations as shown here. Farmers need to examine their current practices to see if improvements can be made and consider their own costs in making this determination. However, with the increasing cost of commercial fertilizer, some farmers may be surprised at the value adequate manure storage facility adds to their operation.

KNOWING WHAT IS IN YOUR SOIL CAN SAVE YOU MONEY

BY: Peter Doris, Environmental Specialist, OMAFRA

Use of soil test results for phosphorous and potassium combined with nutrient recommendations for the specific crop as the basis to determine the amount of fertilizer for a field can have a significant financial impact.

Consider the following two scenarios...

Scenario 1: Phosphorous

Assume there are three 50 acre fields in corn with different soil phosphorous (P) levels, and the fertilizer cost* to meet OMAFRA recommendations for phosphate can be seen in the P₂O₅ table (see Table 5 next page).

Cost Saving Calculations:

- Soil P levels of 8-9 ppm: 50 acres x 62 lb/ac x \$1.00/lb P₂O₅ = \$3,100
- Soil P levels of 21-25 ppm: 50 acres x 18 lb/ac x \$1.00/lb P₂O₅ = \$900
- Soil P levels of greater than 31ppm = \$0

Results:

By not crediting the existing fertilizer level in the soil, you could be spending as much as \$3,100 more than necessary in this 50 acre field.

*Prices for P₂O₅ and K₂O are 1.00 and 0.50 \$/lb respectively as reported in June 2008 Ridgetown College survey of agriculture inputs.

Scenario 2: Potash

Assume there are three 50 acre fields in corn with different soil potassium (K) levels, and the fertilizer cost* to meet OMAFRA recommendations for soluble potash can be seen in the K₂O table.

Cost Saving Calculations:

- K field values of 31-45 ppm: 50 acres x 125 lb/ac x \$0.50/lb K₂O = \$3,125
- K field values of 101-120 ppm: 50 acres x 27 lb/ac x 0.50/lb K₂O = \$675
- K field values of greater than 31 ppm = \$0

Results:

By not crediting the existing fertilizer level in the soil, you could be spending as much as \$3,125 more than necessary in this 50 acre field.

*Prices for P₂O₅ and K₂O are 1.00 and 0.50 \$/lb respectively as reported in June 2008 Ridgetown College survey of agriculture inputs.

Soil Test (ppm)	P ₂ O ₅ Recommendations (lb/ac)			
	Corn	Beans	Wheat	Alfalfa
8 - 9	62	36	27	54
21 - 25	18	0	0	0
> 31	0	0	0	0

Soil Test (ppm)	K ₂ O Recommendations (lb/ac)			
	Corn	Beans	Wheat	Alfalfa
31 - 45	125	81	27	285
101 - 120	27	27	18	62
> 151	0	0	0	0

Tables adapted from Nutrient Management Workbook 2003

Proposed Deadstock Regulation Posted on the Environmental Registry

BY: Jacqui Laporte, Environmental Specialist, OMAFRA

The Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and the Ministry of the Environment (MOE) are proposing to replace the current legislative framework regulating the management and disposal of deadstock.

The Dead Animal Disposal Act (DADA) and its regulation will be repealed and it will be replaced with two new regulations – one under the Food Safety and Quality Act, 2001 (FSQA) will address off-farm disposal of deadstock and the other under the Nutrient Management Act, 2002 (NMA) will address on-farm disposal.

The proposed new regulation under the NMA applies to operators who own or control farm operations. This regulation would apply to all farm operations, regardless of the requirement to have a nutrient management strategy or plan under O. Regulation 267/03. The purpose of introducing standards for on-farm disposal of deadstock is to protect the environment and provide some separation between deadstock and live animals.

This proposed regulation sets out requirements for the disposal of not only cattle, goats, sheep, horses and swine as per the DADA, but also deer, elk, alpacas, llamas, bison, yaks, donkeys, ponies, rabbits, poultry and fowl, ratites, and fur bearing animals.

Acceptable means of disposal include burial, incineration, composting, disposal vessels, collection by a licensed collector, anaerobic digestion, delivery to a waste disposal site approved under the Environmental Protection Act, delivery to a disposal facility as defined under the FSQA, or delivery to a licensed veterinarian for post mortem. If an operator chooses to bury, incinerate, or compost, the regulation establishes requirements to minimize impacts on the environment. Minimum separation distances have been established from livestock housing facilities; field drainage tiles; residential and commercial lands; surface water; bedrock and aquifers; wells including municipal wells and floodplains. For each disposal option there are specific operating requirements that must be met in order to safely dispose of the dead farm animal and there are limitations on the volume of deadstock being disposed.

In the event of an emergency where the operator believes that it is not possible to comply with the NMA requirements with respect to storage, disposal or transportation of the dead farm animals, then the operator can apply for the approval of the Director to arrange for disposal that would not otherwise meet the requirements of the regulation. The Director will decide each case individually weighing the circumstances and the potential threat to the environment if an alternate method of disposal is used.

The EBR posting can be found here : <http://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTA0NzY2&statusId=MTU2OTAx&language=en>

Please note that formal comments should be submitted through the EBR process. The comment period ends on December 5, 2008.

NEW NUTRIENT MANAGEMENT COURSE CALENDAR IS POSTED ONLINE!

You can access them here at <http://www.omafra.gov.on.ca/english/nm/cert/courses.htm>. Additional courses and locations (including French language courses) will be added to the schedule based on demand.

Register for the Nutrient Management Courses by calling 1-866-242-4460

DATES TO REMEMBER:

December 1, 2008

- NMS submissions must use NMAN 2.0.2 or the Nutrient Management Strategy Application Form

Nutrient Management Consultant Update Meetings:

February 12, 2009 NM Consultant Meeting Guelph

February 19, 2009 NM Consultant Meeting London

February 26, 2009 NM Consultants Meeting Kemptville

How to Prepare a Nutrient Management Strategy and Plan (Using NMAN) Course	Location
December 9 & 10, 2008	Kemptonville
February 19 & 20, 2009 (French)	Alfred
March 3 & 4, 2009	Peterborough

Nutrient Application Technicians Licence Course	
March 31, 2009	Kemptonville
April 9, 2009	Lindsay
April 14, 2009	Lindsay

Introduction to Nutrient Management Course	Location
January 27 & 28, 2009	Lindsay
February 18 & 19, 2009	Brighton
February 24 & 25, 2009 (French)	Alfred
March 3 & 4, 2009	Kemptonville

Regulation and Protocols Course	Location
January 14 & 15, 2009	Lindsay
January 28 & 29, 2009	Kemptonville
February 10 & 11, 2009	Brighton

VISIT

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ONLINE

<http://www.omafra.gov.on.ca/english/nm/newsletter/emn.htm>

WE WANT TO HEAR FROM YOU!

Do you have questions? Need more information? Have a comment about what you'd like to see in the next issue? Please contact your area Environmental Specialist at:

Phyllis MacMaster

Environmental Specialist

Ontario Ministry of Agriculture, Food and Rural Affairs

Address: 59 Ministry Road, Box 2004, Kemptonville, ON K0G 1J0

Tel: 613-258-8297

Fax: 613-258-8392

E-mail: phyllis.macmaster@ontario.ca

Nutrient Management Information Line: 1-866-242-4460

E-mail: nman.omafra@ontario.ca

www.ontario.ca/omafra